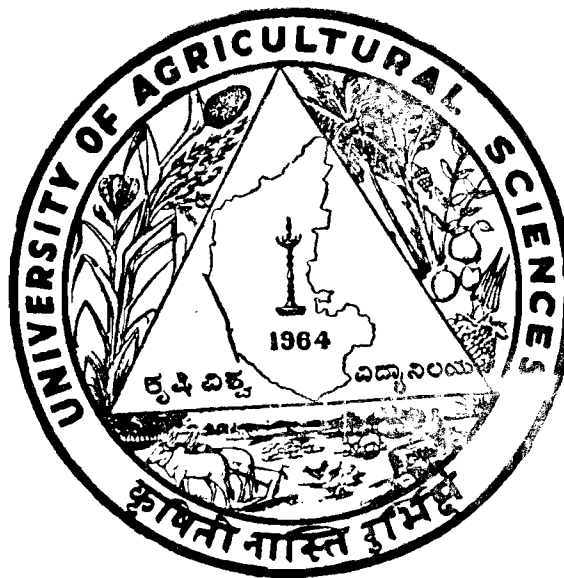
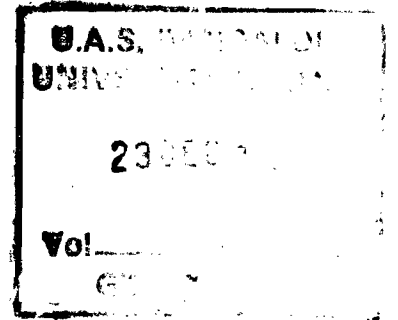


**THE UNIVERSITY  
OF  
AGRICULTURAL SCIENCES**

HEBBAL, BANGALORE-560 024



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U.A.S

1981-82

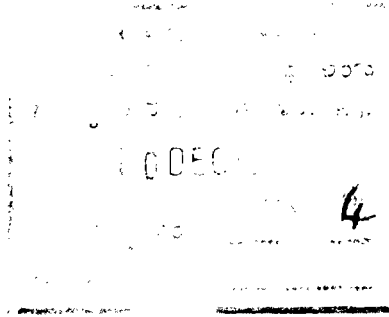


**THE UNIVERSITY OF AGRICULTURAL SCIENCES**  
**HEBBAL, BANGALORE-560 024**

**EIGHTEENTH ANNUAL REPORT**  
**(FOR THE PERIOD FROM 1st APRIL 1981 TO 31st MARCH 1982)**



1981-82



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## FOREWORD

This is the first Annual Report during my tenure. I took over as the Vice-Chancellor of the University on 5th September, 1981, from Dr. R. Dwarakinath, who laid down his office on 4th September, 1981, to take up an F.A.O. assignment at Jakarta, Indonesia. I feel privileged to write foreword to this Annual Report.

The U.A.S. has grown considerably during the last 16 years, since it was established in 1965. To begin with there were only two degree programmes in Agriculture and Veterinary Sciences. Now, we have Undergraduate and Postgraduate programmes in several fields such as Fishery, Horticulture, Rural Home Science, Agricultural Marketing and Cooperation, Agriculture and Veterinary Sciences. Thus, U.A.S. has taken a leading role in providing University education to younger generation in various fields of Agricultural Sciences. Also, the U. A. S. has constituted several training teams to regularly train the field functionaries of the State Department of Agriculture at the District level, as part of Training and Visit System. There have also been several other training programmes organised by the Directorate of Extension to meet the needs of other development departments.

During the period under report, sanction was obtained to strengthen research under NARP at a cost of Rs. 57.00 lakhs. Besides, a benchmark survey scheme was also sanctioned by Upper Krishna Project. The projects like soybean processing, training for self-employment, relative economy on the use of irrigation water to Horticultural crops have been initiated during the year of the report. The work on seed production and research investigations on various crops and management practices and several other new problems like control of Nephantis, studies on Areca Yellow leaf disease, control of Uzi-fly of silkworm were taken up.

Extension Education work of the University was focussed on new areas like - (1) Intensification of promotional work on Bhagyalakshmi biogas plant, (2) Expansion of Soo-babul promotional work with farmers and (3) Organizing special workshop-cum-seminars on biogas technology and bio-fertilizers. The University has added a new extension education unit at Mangalore. Besides, a publication entitled "Technology for Small Farmers" was brought out in collaboration with the Institution of Agricultural Technologists.

(ii)

The Centre for Rural Development Studies, an inter-disciplinary forum of the Departments of Extension, Economics, Marketing and Cooperation, Sociology, Psychology and Statistics organised a training-cum-workshop on Rural Development for the executives of industries. This was jointly sponsored by the Federation of Indian Chambers of Commerce and Industry and the Federation of Karnataka Chamber of Commerce and Industry.

The Project Planning and Monitoring Cell published a report on the Evaluation of the Postgraduate Agricultural Education. This is the second report of the PPMC which is intended to be a management tool for decision-makers of Postgraduate programme. The report provides valuable analysis at different facets of implementing Agricultural Postgraduate Educational Programmes in the University.

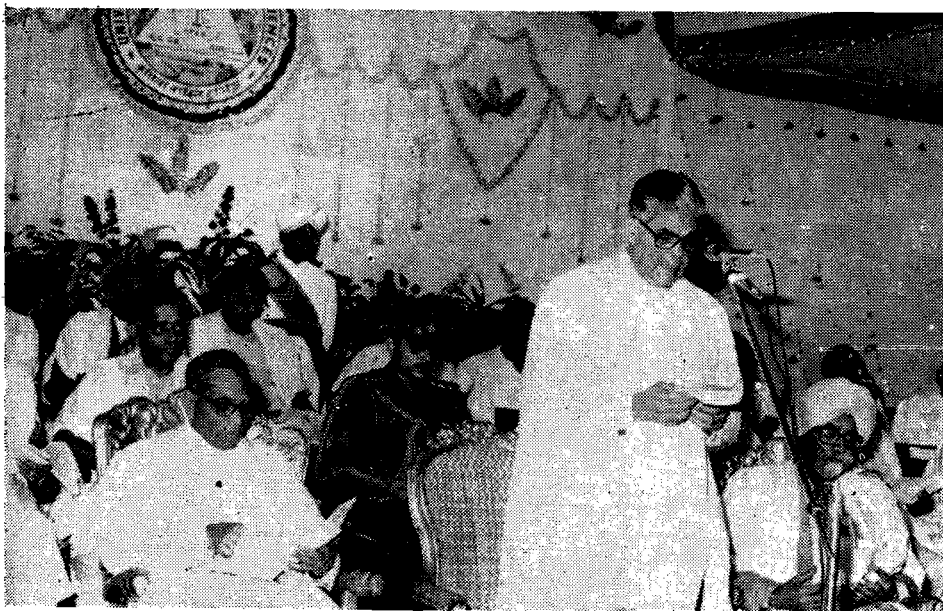
The University has a number of projects and programmes aimed at accelerated development of the rural areas. With the sustained and increased support from the State and Central Governments, the Faculty of the University is playing an important role in shaping the Indian Agriculture. This Annual Report is an account of the efforts made by the University towards this goal during 1981-82.

**N. G. PERUR**  
*Vice-Chancellor*

## SIXTEENTH CONVOCATION 1982



Academic Procession at the Sixteenth Convocation 1982



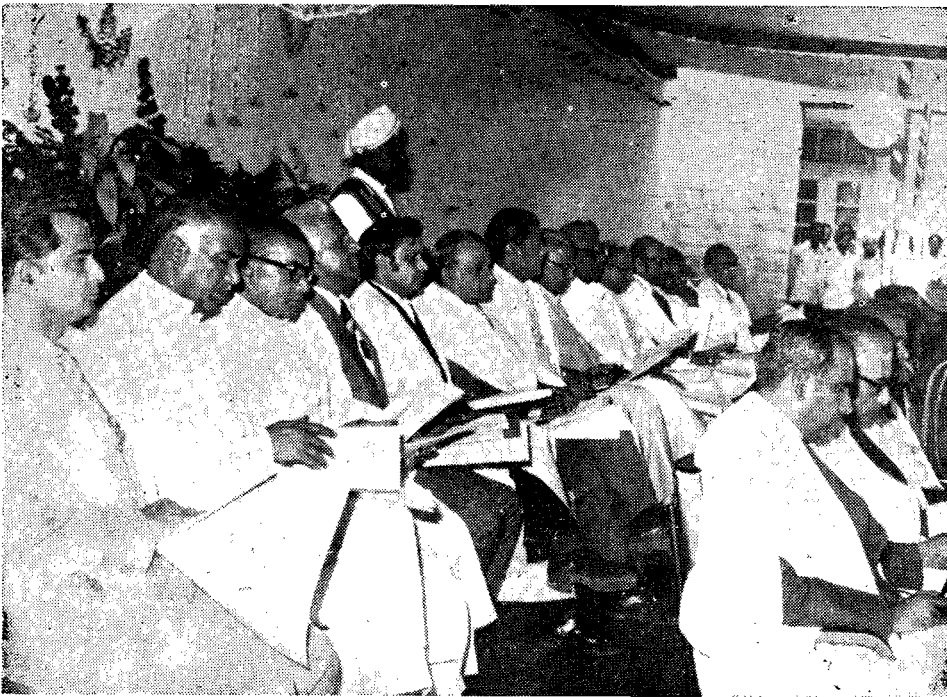
The Chancellor, Shri Govind Narain administering the Oath



Prof. G. S. Sidhu, Director General, CSIR, delivering the Convocation Address



The Vice-Chancellor addressing the Convocation



Members of the Board of Regents and the Academic Council at the Convocation



A view of the audience at the Convocation

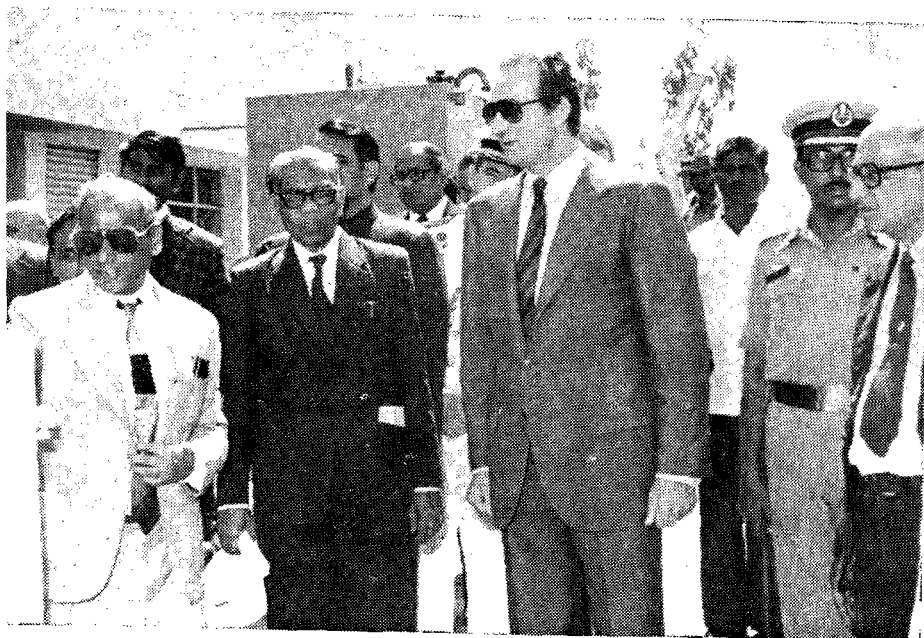


The Chief Minister participating in a South Asian workshop to strengthen the Grass Root Level NGOs for participation in Development

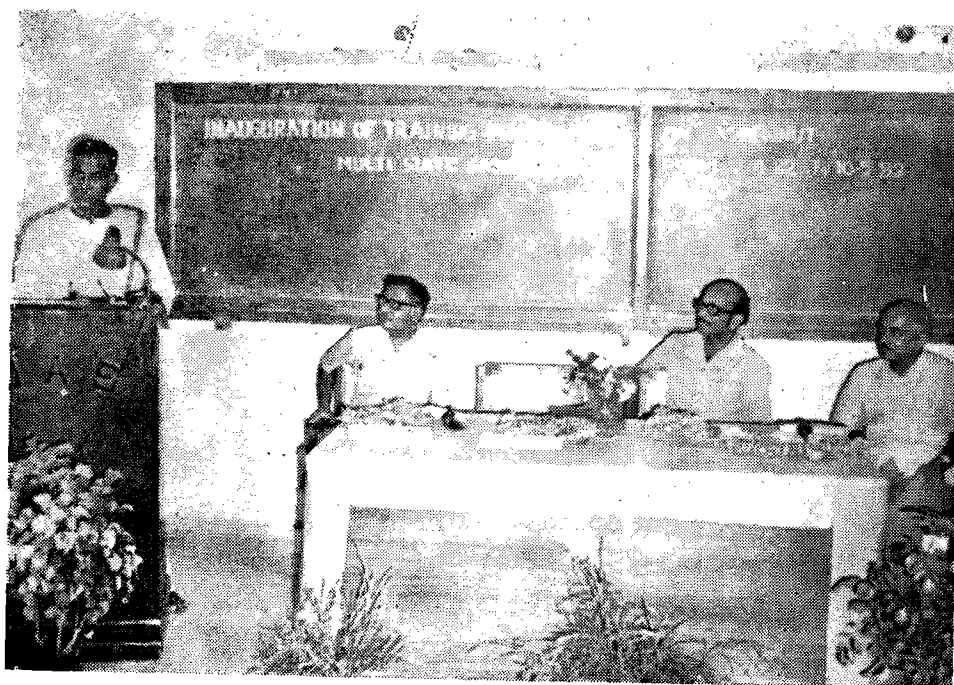




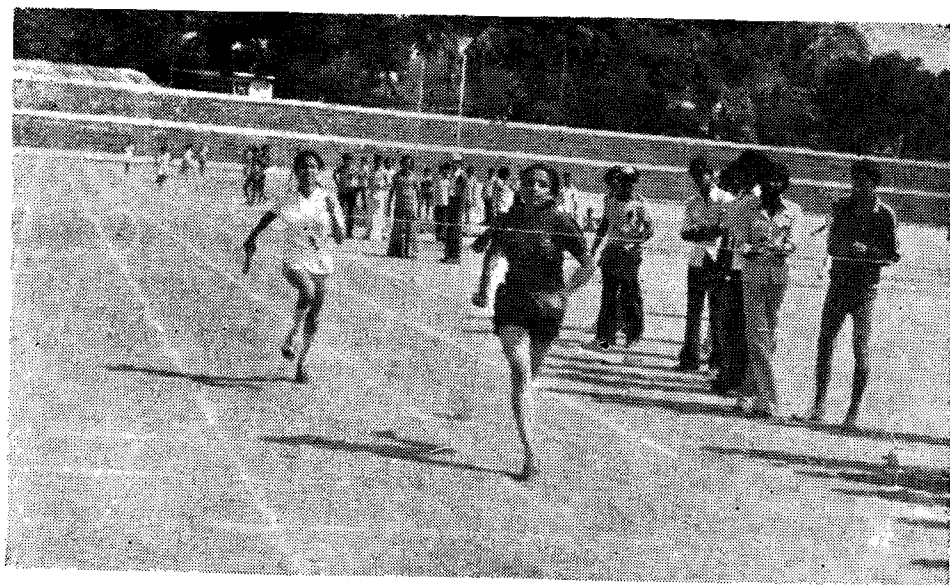
Dr. K. C. Naik, Ex-Vice-Chancellor addressing on the occasion of Christening the 'Naik Bhavan' at GKVK



Visit of King of the Spain to the UAS



Inauguration of Cashew nut Training Programme at Fisheries College, Mangalore  
by Kaup Sanjiva Shetty, MLA and member, Board of Regents



15th Annual Athletic Meet 81-82 conducted at Mangalore Stadium, Mangalore



15th Annual Athletic Meet 81-82 conducted at Mangala Stadium, Mangalore



15th Annual Athletic Meet 81-82 conducted at Mangala Stadium, Mangalore



Inter-campus Youth Festival at Mangalore



Farmers visiting the fields at GKVK during Krishi Mela

**PART I**  
**UNIVERSITY ADMINISTRATION**

**A. General**

**(i) Board of Regents**

**Chairman**

Dr. R. Dwarakinath, Vice-Chancellor (up to 4-9-1981)  
Dr. N. G. Perur, Vice-Chancellor (From 5-9-1981)

**Members**

- 1 Mr. D. R. Prafulla Chandra
- 2 Mr. K. H. Venkatappa
- 3 Mr. Maruthi D. Male
- 4 Mr. N. K. Ganapatah
- 5 Mr. J. A. Karumbaiah
- 6 Mr. M. M. Nadaf
- 7 Mr. Manmohan Attawar
- 8 Mr. M. Chandra Shekar (From 13-2-1982)
- 9 Mr. N. Karibavann Gowda (From 13-2-1982)
- 10 Mr. Kapu Sanjeeva Shetty (From 13-2-1982)
- 11 Mr. D. Rajagopal (up to 2-1-1982)
- 12 Commissioner and Secretary to Government of Karnataka, Agriculture and Animal Husbandry Department
- 13 Commissioner and Secretary to Government of Karnataka, Education Department
- 14 Commissioner and Secretary to Government of Karnataka, Finance Department
- 15 Director of Agriculture in Karnataka
- 16 Director of Horticulture in Karnataka
- 17 Director of Animal Husbandry and Veterinary Services in Karnataka
- 18 Director of Fisheries in Karnataka

## (ii) Officers of the University

**Chancellor**

Mr. Govinda Narain, His Excellency, the Governor of Karnataka

**Pro-Chancellor**

Mr. R. Gundu Rao, Honourable Chief Minister, Government of Karnataka

**Vice-Chancellor**

Dr. R. Dwarakinath (up to 4-9-1981)

Dr. N. G. Perur (From 5-9-1981)

**Other Officers**

Director of Instruction (PGS), Dharwad	...	Dr. S. V. Patil
Director of Instruction (Agri), Hebbal	...	Dr. N. G. Perur (up to 31-8-81) Dr. G. V. Havanagi (From 31-8-81 to 22-3-82) Dr. K. S. Krishna Sastry (From 22-3-82)
Director of Instruction (Agri), Dharwad	...	Dr. R. B. Patil
Director of Instruction (Vety), Hebbal	...	Dr. K. Trivikrama Rao
Director of Instruction (Fisheries), Mangalore	...	Prof. H. P. C. Shetty
Director of Instruction (Home Science) Dharwad	...	Dr. (Mrs.) Leela Phadnis
Director of Instruction (BS&H)	...	Dr. R. Narayana
Director of Research	...	Dr. K. Krishnamurthy
Director of Extension	...	Dr. K. A. Jalihal
Comptroller	...	Mr. H. M. Nagabhushana
Registrar	...	Mr. R. Krishnappa
Administrative Officer	...	Mr. B. J. Nanjundappa
Estate Officer	...	Mr. B. Venkataswamy
Librarian	...	Mr. H. R. Ramachandra
Director of Student Welfare	...	Mr. K. Subbaiah

## (iii) Heads of Departments

**Basic Sciences and Humanities**

1. Biochemistry	...	Dr. T. K. Virupaksha Professor
2. Statistics	...	Dr. N. Sundararaj Professor

**Agriculture**

- |                              |   |
|------------------------------|---|
| 1. Agricultural Botany       | ... Dr. J. V. Goud<br>Professor (Dharwad)   |
| 2. Agricultural Chemistry    | ... Dr. T. Seshagiri Rao<br>(up to 31-1-1982)<br>Dr. P. B. Deshpande<br>Professor (Hebbal) (From<br>1-3-1982) |
| 3. Agricultural Economics    | ... Dr. R. Ramanna<br>Professor (GKVK)  |
| 4. Agricultural Engineering  | ... Prof. R. Ramaiah<br>Professor (Dharwad)   |
| 5. Agricultural Entomology   | ... Dr. T. S. Thontadarya<br>Professor (Hebbal)   |
| 6. Agricultural Extension    | ... Dr. M. K. Sethu Rao<br>Professor (Hebbal)   |
| 7. Agricultural Marketing    | ... Dr. A. N. Krishnamurthy<br>Professor (GKVK)   |
| 8. Agricultural Microbiology | ... Dr. T. K. Ramachandra<br>Reddy, Professor<br>(Dharwad)  |
| 9. Agronomy                  | ... Dr. G. V. Havanagi<br>Professor (Hebbal)  |
| 10. Crop Physiology          | ... Dr. K. S. Krishna Sastry<br>Professor (GKVK)<br>(appointed as D.I.(Agri)<br>from 22-3-82)                 |
| 11. Horticulture             | ... Dr. U. V. Sulladmath<br>Professor (GKVK)  |
| 12. Plant Pathology          | ... Dr. R. K. Hegde<br>Professor (Dharwad)  |
| 18. Seed Technology          | ... Dr. G. N. Kulkarni  |

**Veterinary**

- |                                 |   |
|---------------------------------|---|
| 1. Animal Genetics and Breeding | ... Dr. A. V. Rai<br>Professor (Hebbal)   |
| 2. Gynaecology and Obstetrics   | ... Dr. R. V. Patil<br>Professor (Hebbal) |

- |                            |  |
|----------------------------|--|
| 8. Poultry Science         | ... Dr. B. S. Ramappa<br>Poultry and Genetics<br>(Poultry) (Hebbal)        |
| 4. Surgery                 | ... Dr. P. H. Thippaiah Reddy<br>Professor (Hebbal)                        |
| 5. Veterinary Anatomy      | ... Dr. K. Trivikrama Rao<br>(appointed as D.I. (Vety.)<br>from 22-3-1982) |
| 6. Veterinary Microbiology | ... Dr. B. S. Keshava Murthy<br>Professor (Hebbal)                         |
| 7. Veterinary Pathology    | ... Dr. S. J. Seshadri<br>Professor (Hebbal)                               |
| 8. Veterinary Pharmacology | ... Dr. D. K. Veeranarayana<br>Gowda, Professor (Hebbal)                   |
| 9. Veterinary Physiology   | ... Dr. K. Thimmaiah<br>Professor (Hebbal)                                 |

#### **Fisheries**

- |                               |   |
|-------------------------------|---|
| 1. Aquaculture                | ... Dr. T. J. Verghese<br>Professor (Mangalore)     |
| 2. Fish Processing Technology | ... Dr. T. M. Rudra Shetty<br>Professor (Mangalore) |
| 3. Fishery Engineering        | ... Prof P. K. Salian<br>Professor (Mangalore)      |

#### **Home Science**

- |                       |   |
|-----------------------|---|
| 1. Food and Nutrition | ... Dr. (Miss) Meera Rao<br>Associate Professor<br>(Dharwad)    |
| 2. Home Economics     | ... Dr. (Mrs.) M. P. Vaidehi<br>Associate Professor<br>(Hebbal) |



## **B. General Administration**

### **(i) Activities of the Vice-Chancellor**

Dr. R. Dwarakinath continued as Vice-Chancellor till 4-9-81 when he took up an FAO assignment at Jakarta, Indonesia. Dr. N. G. Perur, who was appointed to act as Vice-Chancellor during the absence of Dr. Dwarakinath assumed office with effect from 5-9-81. The activities in which the Vice-Chancellor participated were :

Inaugural function of the Radio Science Sammelan on "Today's Crisis" at the Institution of Engineers, Bangalore on 18-4-81 and chairing of a session on the theme : Science Superstition Spectrum on 19-4-81.

Seminar on Management of Deep Black Soils for Increasing Production of Cereals, Pulses and Oilseeds, organised by GOI, Ministry of Agriculture at New Delhi on 21-5-81.

Conference of Vice-Chancellors of Universities and deemed Universities in India organised jointly by the Ministry of Education and Culture and the University Grants Commission at New Delhi on 30-5-81.

Inaugural function of the National Agricultural Research Project (NARP) at Bijapur on 21-8-81.

First State Level Conference of Karnataka State Universities and Colleges Employees' Federation organised at U.A.S., Bangalore on 26-9-81.

Regional meeting on Agricultural Development Programmes 1981-82 organised by the Government of India, Ministry of Agriculture at Bangalore on 21-10-81 and 22-10-81.

Eighth Conference of the Asian-Pacific Weed Science Society organised by APWSS in conjunction with the Indian Society of Weed Science and the U.A.S. with cooperation of State Department of Agriculture, ICAR, IIAT and GOI at Bangalore, from 22-11-81 to 29-11-81.

Conference of the Directors of Bangalore-based Training, Research and Development Institutes, organised by the Indian Institute of Management at Bangalore on 26-11-81.

Seminar on Oil Seed Development of Southern States of India arranged under the joint auspices of the Karnataka Pradesh Krishik Samaj, U.A.S. and Department of Agriculture at Raichur on 5-12-81 and 6-12-81.

Inaugural function of the institution of the Professorial Chair by the Indian Farmers Fertilisers Cooperatives Ltd. at U.A.S., Bangalore on 16-12-81.

Inauguration of the Convention of the Disabled College Teachers and Students organised by the All India Students Parishad at Bangalore on 23-12-81.

Platinum Jubilee Celebrations of the Agricultural Research Station, Hagari on 12-1-82.

Plenary Session of the National Seminar on Dryland Agriculture at Hyderabad on 20-1-82.

*Annual Inspection:* The Vice-Chancellor conducted the annual inspections of the offices of the D.I (PGS), Director of Student Welfare, Comptroller, Administrative Officer and Registrar in June 1981 and that of Librarian, Estate Officer, Director of Research and Director of Extension in July 1981.

*Press Conference:* The Vice-Chancellor held Press Conferences at Bangalore on 20-7-81, 31-8-81, 11-11-81 and 4-2-82 and explained the programmes and progress of the University.

*Articles and Speeches:* Inaugurated the XII Workshop Conference of the All India Coordinated Research Project on Soybean organised jointly by ICAR and UAS at Bangalore on 6-4-81.

Inaugurated the Seminar on Water Use and Management at K. R. Sagar organised by the UAS in collaboration with the Karnataka Engineering Research Station on 8-4-81.

Inaugurated and delivered a talk at the Conference on Standardization and Quality Control of Biofertilizers organised by the Indian Standards Institution at Bangalore on 20-4-81.

Inaugurated the Seminar on Public Financing in Freshwater Fisheries Development organised jointly by the UAS and Department of Fisheries at Bangalore on 4-5-81 and presided over at the Plenary Session.

Delivered a talk on Agricultural Development in the State—Role of UAS for the participants of the Agricultural Projects Course organised by the ARDC (Agricultural Refinance and Development Corporation) at Bangalore on 8-5-81.

Inaugurated a Seminar on Sugarcane and Paddy organised in collaboration by the UAS, KSDA, MCF and Taluk Development Board at Mangalore on 10-5-81.

Attended the Regional Workshop on Training and Visit System of Agriculture Extension organised by the GOI, Ministry of Agriculture at Mysore on 25-5-81 and delivered a talk on Linkage between Research and Extension under the T&V System.

Inaugurated the Regional Workshop on Organising the Traditional Light Engineering Industry for Agriculture organised by the Commonwealth Science Council, UK, GOI Department of Science and Technology and ESCAP Regional Centre for Technology Transfer at Bangalore on 3-6-81.

Inaugurated the National Workshop on National Demonstration organised jointly by the ICAR and UAS at Bangalore on 10-6-81.

Addressed the trainees of the Regional Seminar-cum-Workshop Course on Youth Broadcasts organised by the Regional Training Centre of All India Radio, Hyderabad at Bangalore on 17-6-81.

Delivered valedictory address at the Workshop on Project Formulation, Monitoring and Reporting System organised by the National Institute of Public Cooperation and Child Development at Bangalore on 18-7-81.

Delivered welcome address at the First All India Workshop on Biological Nitrogen Fixation held at U.A.S., Bangalore on 17-8-81.

Participated in the Conference on Renewable Energy and its On-going Potential and Small Energy Sources for Developing Countries, organised by the Karnataka Productivity Council at Bangalore on 26-9-81 and contributed a paper on "Role of Biogas in Indian Rural Energy Use".

Delivered keynote address at the Training Workshop on Rural Development organised by the Federation of Indian Chambers of Commerce and Industry in collaboration with Federation of Karnataka Chambers of Commerce and Industry and Centre for Rural Development Studies of UAS at Bangalore on 2-12-81.

Inaugurated the 41st Annual Conference of the Indian Society of Agricultural Economics at Karnatak University, Dharwad on 25-12-81.

Delivered welcome address at the Second National Convention on Studies in Cooperation organised by the Indian Society for Studies in Cooperation Bangalore on 26-12-81.

Inaugurated the Southern Regional Agricultural Information Communication Workshop organised by the Directorate of Extension of the GOI, Ministry of Agriculture at UAS, Bangalore on 19-1-82.

Inaugurated the All India Symposium on The Diseases of Finfish and Shellfish organised by UAS at Mangalore on 1-3-82.

Inaugurated the Annual Conference of the Society of Pathologists, Microbiologists and the Indian Association of Medical Sciences at Bangalore on 13-3-82.

*AIR Recording:* Recorded a talk on "Towards the next phase in Indian Agriculture" in the series; Technologies for Rural Development, at All India Radio, Bangalore on 20-4-81.

Recorded a programme on "ನಾ ಕುಷುಕೆ ಗ್ರಾಮಾಭಿವೃದ್ಧಿ ಕಾರ್ಯ" (in Kannada) at All India Radio, Bangalore on 13-8-81.

Recorded a programme at the All India Radio, Bangalore in connection with the celebration of World Food Day on 16-10-81.

Recorded a programme at the All India Radio, Bangalore on the highlights of the Krishi Mela Celebrations at UAS, Bangalore, on 11-11-81.

Recorded a programme of interview by the All India Radio, Gulbarga, on "the relation between U.A.S., Agriculture Department and the Farmers" (in Kannada) on 10-1-82.

*Foreign Visitors:* Dr. Gilbert Anderson of DANIDA on 15-5-81.

Dr. P.R.R. Sinha, Director, Asian Mass Communication Research and Information Centre, Singapore, on 3-6-81.

Mr. Yang and Mr. Jung, FAO Experts from China, on 9-9-81.

Mr. Andrew Martin, Asst. Representative (Science), British Council Division, on 13-10-81.

Dr. John Burgh CB, Director General, British Council Division, on 28-10-81.

Mrs. Lilly Vamos, Head of the Department, Central Food Research Institute, Budapest, on 13-11-81.

His Excellency, the King of Spain, on 29-1-82.

Mr. Alexander Macmillan, on 12-2-82.

Mr. Mandelsam of Oxford University, UK, on 18-2-82.

Dr. B.A. Nekby of World Bank (IBRD) on 18-3-82.

*Visit of important Teams/Committees:* The Estimates Committee of the Karnataka Legislature under the Chairmanship of Sri Sheerahalli Chandrasekhar, on 5-6-81.

The N. A. R. P. Review Team comprising Dr. B. A. Nekby, Dr. R. V. Ramakrishna and Dr. T. C. Jain, on 14-9-81.

A 5-Member Egyptian Team to study Biogas Technology for Rural Development on 10-10-81.

Members of the Executive Council and Officers of the Marathwada Agricultural University, Parbhani, on 15-10-81.

A 3-Member delegation from Bangla Desh, on 2-11-81.

A delegation consisting of five officers from Malawi, Tanzania and Lesotho, on 18-11-81.

Members of the Quinquennial Review Team on Soyabean on 24-10-81.

DANIDA Team consisting of Dr. Gilbert Anderson, Mr. Kris Lund-Jensen, Deputy Head, Asian Department, and Mr. Johannes Sode, Attache Development on 5-3-82.

*Other important Visitors:* Mr. Kagoda Thimmappa, Hon'ble Minister for Public Works on 12-5-81 to see the working of Biogas units in the University.

Mr. Balaram Jakhar, Lok Sabha Speaker on 2-11-81.

Dr. G. S. Sidhu, Director-General, Council of Scientific and Industrial Research, New Delhi on 5-2-82 to deliver the 16th Convocation Address of UAS.

Sri Govind Narain, His Excellency, the Governor of Karnataka, presided over the 16th Convocation of U.A.S., on 5-2-82.

B. J. NANJUNDAPPA  
*Administrative Officer*

## **(ii) Meetings of the Authorities of the University**

### **(a) Board of Regents**

The Board of Regents held twelve meetings during 1981-82. The following are some of the important decisions :

### ***Amendment to Statutes of the University***

1. The Board approved and recommended to the Chancellor for approval of the amendment to Statute 9 (1) (ii) regarding payment of increased road Mileage of Rs. 1.25 per KM to the Board members.

2. The Board recommended to the Chancellor for approval, addition of statute 51(1) (K) Bachelor of Science (Sericulture).

3. The Board recommended to the Chancellor for approval, amendment to Statute 18 making the appointment of Dean on a tenure basis for a period of 3 years at a time.

4. The Board recommended to the Chancellor for approval of addition of the following Master's Degree programmes to the existing Statute 52(1).

- (j) M.Sc. (Poultry Science)
- (k) M.Sc. (Agril. Statistics)
- (l) M.Sc. (Agril. Bio-Chemistry)
- (m) M.Sc. (Agril. Extension)
- (n) M.Sc. (Agril. Microbiology)

5. The Board approved amendment to Statute 32 providing for a scheme of promotion in respect of service personnel.

6. The Board recommended to the Chancellor for approval, additions of Statute 62-89 to the existing statutes providing for the creation of pension and gratuity fund.

### ***Other important decisions of the Board of Regents***

1. The Board approved the proposal to depute Dr. (Mrs.) Radha D. Kale, Asst. Prof. of Zoology to attend the Darwin's Centenary Symposium and Earthworm Ecology at U.K.

2. The Board approved the proposal to depute Mr. H.M. Nagabhushana, Comptroller, to the University of Western Ontario, London, Canada for the Senior University Administrator's course.

3. The Board approved to depute Dr. K. A. Jalihal, Director of Extension, to the International Seminar on the Management of Change organised by the University of Illinois, U.S.A.

4. The Board approved the deputation of Dr. R. Anantha Narayana for the training course on International network on Soil Fertility and Fertilizer

Evaluation on Rice, at the International Rice Research Institute, Manila, Philippines.

5. The Board agreed to advance a sum of Rs. 2 lakhs to the U. A. S. Employees' Credit Cooperative Society for a period of 2 years.

6. Pending the final decision by the Government, the Board decided that the status quo be maintained with respect to the remuneration of Mr. M. Ramanatham Chetty, Asst. Prof. of Economics, to the State Government.

7. The Board ratified the action taken by the University in permitting Dr. P. M. Rameshthulla, to accept a post-doctoral position at the University of Cincinnati, Ohio, U.S.A. without any financial commitment on the part of the University.

8. The Board approved the proposal of Dr. N.K. Asanth Rao to institute "Nagamma Distaffery Prize" for outstanding Adaptive Agricultural Research and to award financial assistance to students.

9. The Board approved the proposal to offer M.Sc.(Agri) in Sericulture from the academic year 1981-82 at Hiralbal campus.

10. The Board approved the proposal for construction of a separate irrigation channel for Regional Research Station, V. C. Farm, Mandya.

11. The Board approved the proposal for revision of pay scales of Laboratory Attenders in the University from Rs. 80-145 to 90-160 w.e.f. 1-1-1977.

12. The Board agreed to spare 5 acres of rainfed land and 2 acres of wetland along with the vacant lands just adjoining the present Farmers Training Centre at Agricultural Research Station, Hiryur to the Department of Agriculture.

13. The Board agreed to depute Dr. (Mrs.) Kubra Banu, Instructor, Dept. of Biology to attend the 5th International Congress of Myriapodology at Red Fort, Virginia, U.S.A., to present her paper on Reproductive Strategy.

14. The Board approved revision of Fees structure.

15. The Board agreed to spare the services of Dr. S. Sathiyarayanan Shetty, Prof. of Animal Nutrition, Management and Products Technology to the University of Suriname for a period of one year.

16. The Board approved to extend the benefit of an additional increment to the employees in the 7 categories who have put in 15 years of service in the same post.

17. The Board agreed to sanction two advance increments to the Graduate Field Assistants and Lab. Assistants in accordance with the Government Order.

18. The Board agreed to retain the Lien of Dr. R. Dwarakinath, in his permanent post of the Director of Extension in the University for the period of his F.A.O. assignment abroad.

19. The Board recommended to the Chancellor for approval of the name of Dr. N. G. Perur, Director of Instruction (Agri), Hebbal for being appointed to carry on the duties of the Vice-Chancellor during the absence of Dr. R. Dwarakinath.

20. The Board elected Mr. Maruti D. Male to serve as the State Library Authority.

21. The Board agreed to permit Dr. M. K. Sethu Rao, Prof. of Agril. Extension to participate in the Workshop at Searca College, Laguna, Philippines.

22. The Board ratified the action taken by the University in permitting Mr. M. A. Singlachar to join INSFFER tour to Bangladesh and other places under International Rice Research Institute, Manila.

23. The Board ratified the action taken by the University in permitting Dr. M. Mahadevappa, Prof. of Seed Technology to participate in the Workshop/ Training course on Hybrid Rice of China at C'hangsha.

24. The Board approved the proposals of the works committed to construct Diagnostic Laboratories at Hebbal Campus, Tumkur, Hassan and Mysore.

25. The Board approved sanction of stagnation increments to the teachers with effect from 1-10-1979 in accordance with the Government Order.

26. The Board ratified the action taken by the University in permitting Dr. S. Narasimha Murthy to participate in the Autumn course in Italy from 20-10-1981 to 11-12-1981.

27. The Board decided to extend the benefit of Revision of pay scales of Rs. 90-200 to both Lab. Attenders and Attenders with effect from 1-1-1970.

28. The Board agreed to enhance the rates of University Merit and General Scholarships.

29. The Board decided to permit Dr. K. G. H. Setty to serve as a member of the visiting group of the Scientific Advisory Board set up by the Commonwealth Agril. Bureaux to review, assess and make recommendations



on the working of the Commonwealth Institute of Helminthology, U.K., for a period of two weeks.

30. The Board decided to sanction Medical and Washing allowances to all the employees of the University, who are in the scales of Rs. 250-400 and Rs. 280-500 in accordance with the Government Orders.

31. The Board sanctioned the conveyance allowance to the employees who are blind and physically handicapped with disability of lower extremities and who generally require physical assistance for going and coming to the place of duty at 5 per cent of Basic pay subject to a maximum of Rs. 40 pm.

32. The Board ratified the action taken by the University in permitting Dr. R. B. Patil, to accept the assignment of FAO consultancy for a period of 8 weeks.

#### (b) Academic Council

The Academic Council met four times during the year 1981-82. Following are the important decisions:

1. The Academic Council approved modifications of regulations relating to Admission to Undergraduate courses as follows:

##### *Domicile*

Only a person who is a citizen of India and who has studied in any educational Institution in the State of Karnataka for a minimum period of five years at any time prior to the date of making application shall be eligible to apply.

Provided that this provision shall not apply in case of (i) Defence, Ex-defence personnel, (ii) Children of Central Govt. Employees and employees of Statutory Corporations serving on duty in the State. Both on the date of making the application and during a period of at least 24 months immediately before such date, (iii) Children of State Govt. Employees—(1) who are serving or have served outside the State of Karnataka on deputation during relevant period and (2) are in the service of the State on the date of making the application or have retired from the service prior to the date of making the application.

2. The Academic Council approved modification to regulations relating to eligibility for admission to Undergraduate courses increasing the minimum percentage of marks from 45 to 50 per cent of marks in the 2nd year P.U.C. examination.

3. The Academic Council approved modification to regulations regarding mode of admission to undergraduate course, as follows :

Substitute the following for the existing clause (b) of Regulations relating to Mode of Admission :

(b) Add 10 to the percentage of marks as at (a) for candidates whose parents/guardian's (if both the parents are not alive) profession is actual cultivation including Agricultural Labour/Poultry Farming/Livestock Farming/Fishing/Sericulture as evidenced by a Certificate from the Tahsildar or a Revenue Officer of higher rank prescribed for the purpose, besides producing evidence to the effect that the candidate has studied for at least a period of three years out of 12 years of schooling in a school/college located outside the limits of a Municipal Corporation in the State, as evidenced by a Certificate issued from the Head of the concerned Institution.

The above Regulations be made applicable to Diploma in Agricultural Engineering also.

4. The Academic Council approved regulations increasing the minimum working days in each Trimester from 65 to 70 for both undergraduate and postgraduate students.

5. The Academic Council approved 3 courses in placement training for B.Sc. (Agril. Marketing and Co op.) each of 0+4 credits.

6. The Academic Council approved to introduce a scheme of Internship of Veterinary graduates from the Academic year 1981-82.

7. The Academic Council decided to modify the existing provision to count the number of days for depositing the Registration card with fine to six working days after the last date for registration for the trimester instead of from the date of commencement of the trimester.

8. The Academic Council approved the regulations relating to registration for undergraduate courses permitting them to add a course or courses, if entitled, up to a period of 15 days from the date of commencement.

9. The Academic Council approved modification to the regulations relating to constitution of Advisory Committees in respect of postgraduate students that the Advisory Committee shall consist of at least 4 members of whom at least one must be from outside the students's Major Field.

10. The Academic Council decided to modify the regulations relating to eligibility for admission to postgraduate courses to the effect that a certificate as

to the satisfactory character and conduct from the University/College from which the candidate has obtained the degree should be enclosed to the application.

**Other important Decisions**

1. The Academic Council approved Ag. Engg. 409 and Ag. Engg. 410 undergraduate courses in Post-harvest Technology as elective courses.

2. The Academic Council approved Ag. Ent. 405 and Ag. Ent. 406 courses to be offered as majors for B.Sc. (Agri.) students by the Department of Vertebrate Biology.

3. The Academic Council decided that Econ. 102 course as a pre-requisite course for Ag. Maco. 101.

4. The Academic Council approved changes of pre-requisites in respect of undergraduate courses in the discipline of Parasitology.

5. The Academic Council decided to delete F. Hy. 102 as pre-requisite for Aqua. Cul. 101.

6. The Academic Council, while approving the starting of B.Sc. (Sericulture) degree programme at Hebbal, suggested that a committee be constituted by the Vice-Chancellor with Dr. N. G. Perur, Director of Instruction (Agri), Hebbal, as Chairman to work out the details of the requirements of the course programme.

7. The Academic Council approved the proposal to admit the graduates of B.Sc. (Agril. Marketing and Co-op.) to M.Sc. (Agri) in Agril. Extension and M.Sc. (Agri) Statistics degree programme w.e.f. the Academic year 1981-82.

8. The Academic Council approved the proposal to start M.Sc. (Agri) degree in Sericulture from the Academic year 1981-82 with World Bank assistance.

9. The Academic Council decided that B.Sc. (Agri) degree holders getting admitted to Master's degree subjects in Horticulture should get M.Sc. (Hort) degree and B.Sc.(Hort) degree holders getting admitted to Master's degree programme in Agricultural subjects, should get M.Sc. (Agri) degree in the concerned subject.

10. The Academic Council while approving the revised University scholarship amount to the D.A.E., undergraduate and postgraduate students recommended the same to the Board for consideration.

11. The Academic Council approved the modified qualifications for the post of Instructors, Research Assistants and Extension Guides in Agril. Engineering.

**Rpt** 7/8/82

12. The Academic Council approved the additional postgraduate courses F. Biol. 528 and F. Biol. 529 in Fishery Biology.

13. The Academic Council approved the following two postgraduate courses in Agril. Engineering :

- i) Ag. Engg. 516 — 2+1 credits
- ii) Ag. Engg. 517 — 1+1 credits

14. The Academic Council approved the new postgraduate course in Entomology viz., Ag. Ent. 530 (2+1) credits.

15. The Academic Council decided that for both qualifying and final viva-voce examination of Master's and Ph.D. degree candidates, not more than one member other than the Chairman and the nominated member could be absent.

16. The Academic Council decided that the nominated member for conducting the qualifying examination of the Master's Degree candidates should be from the students major or allied field but from within the U.A.S.

17. The Academic Council approved that the caution money is refundable on completion of the degree or diploma programme to which the candidate is admitted or on leaving the course in the middle. The student should claim caution money furnishing the prescribed receipt and No Dues Certificates within a period of 6 months from the date of completion/leaving the degree programme.

18. The Academic Council constituted a committee with the Director of Instruction (BS&H) as Chairman, the Director of Student Welfare, the Prof. of Agril. Extension, Hebbal and the Assoc. Prof. of Sociology to reexamine the question of introduction of NSS as a curricular programme of undergraduate students.

19. The Academic Council elected Dr. K. Trivikrama Rao and Dr. K. A. Jalihal to serve on the K. S. E. E. Board, Bangalore.

20. The Academic Council approved the two postgraduate courses in Meteorology viz., Ag. Met. 501, 2+1 credits and Ag. Met. 502, 2+1 credits.

21. The Academic Council decided that the B.Sc. (Agril. Mark. and Co-op.) be prescribed as eligible qualification for the post of Instructor, Research Assistant, Extension Guide in Agril. Mark. and Co-op., besides other usual qualifications.

22. The Academic Council while ratifying the action taken by the University in giving effect to the revised syllabus for the first trimester of the

**Research Assistant, Extension Guide in Agril. Mark. and Co-op., besides other usual qualifications.**

22. The Academic Council while ratifying the action taken by the University in giving effect to the revised syllabus for the first trimester of the first year DAE students with effect from I Trimester of 1981-82, through circulation, further approved the revised course curricula and outlines as recommended by the Advisory Committee and by different Boards of Studies.

### **(c) Board of Studies**

The Board of Studies of the Faculty of Agriculture, Faculty of Animal Science and Faculty of B.S. & H. held 4, 3 and 2 meetings, respectively, besides a combined meeting of all the three Boards.

#### **(A) Faculty of Agriculture**

1. The Board of Studies approved modifications to regulations relating to admission for undergraduate courses.

2. The Board of Studies approved new postgraduate courses in Entomology.

3. The Board of Studies approved new postgraduate courses in Agricultural Engineering.

4. The Board of Studies approved modification to regulations relating to mode of admission for undergraduate courses.

5. The Board of Studies approved revised course contents of Agricultural Faculty prescribed for D.A.E. students and Agricultural Extension.

6. The Board of Studies accepted the proposal to rename the Department of Agricultural Botany as "Department of Plant Breeding and Genetics."

7. The Board of Studies agreed to the proposal of starting of Ph.D. programme in Food and Nutrition.

8. The Board of Studies agreed for starting of Ph.D. programme in Seed Technology.

#### **(B) Faculty of Animal Science**

9. The Board of Studies approved introduction of Scheme of internship to B.V.Sc. students for a period of six months.

10. The Board of Studies agreed for revision of postgraduate courses in Fishery Microbiology.

11. The Board of Studies approved a new postgraduate course in Fishery Statistics.

**(C) Faculty of Basic Sciences and Humanities**

12. The Board of Studies approved modifications to regulations relating to mode of admission for undergraduate courses.

13. The Board of Studies approved revision of Fishery Statistics courses for B.F.Sc. students.

**(d) Admissions and Awards**

The number of students admitted to various Courses during the academic year 1981-82 and the total strength of the students of the various colleges and institutions of the university are presented in Table I and Table II, respectively.

The outturn of the graduates from this University is indicated in Table III.

Table IV gives the details of Scholarships awarded by the University and other institutions for the students.

TABLE I  
*Number of students admitted during the year 1981-82*

1. B.Sc. (Agri)	:	365	(including VLWs)
2. B.Sc. (Hort)	:	34	
3. B.Sc. (Agril. Mark. & Co-op.)	:	57	
4. B.H.Sc.	:	29	
5. B.V.Sc.	:	122	
6. B.Sc. (D.T)	:	19	
7. B.F.Sc.	:	40	
8. D.A.E.	:	20	
9. M.Sc. (Agri)	:	310	
10. (M.Sc. Hort)	:	23	
11. M.H.Sc.	:	12	
12. M.V.Sc.	:	17	
13. M.F.Sc.	:	27	
14. M.Sc.(D.Sc.)	:	14	
15. Ph.D.	:	60	
Total	:	1,149	

TABLE II  
*Students' strength at various colleges and institutions*

College	Course	No. on Roll
Agricultural College, Hebbal	Ph.D	106
	M.Sc.(Agri)	308
	M.Sc.(Hort)	43
	M.H.Sc.	5
	B.Sc.(Agri)	878
	B.Sc.(Hort)	150
	Agril. Marketing & Cooperation	98

<i>College</i>	<i>Course</i>	<i>No. on Roll</i>
Veterinary College, Hebbal	Ph.D.	5
	M.V.Sc.	45
	M.Sc.(D.Sc)	25
	B.V.Sc.	543
	B.Sc.(D.T.)	36
Agricultural College, Dharwad	Ph.D.	38
	M.Sc.(Agri)	205
	B.Sc.(Agri)	461
	B.Sc.(Agril.Mark. & Coop)	98
Fisheries College, Mangalore	M.F.Sc.	46
	B.F.Sc.	140
Rural Home Science College, Dharwad	M.H.Sc.	15
	B.H.Sc.	80
Agricultural Engineering Institute, Raichur	DAE	64
Total		3,389

TABLE III

*Outturn of graduates during 1981-82*

<i>College</i>	<i>Course</i>	<i>No. Completed</i>
Agricultural College, Hebbal	Ph.D.	11
	M.Sc.(Agri)	72
	M.Sc.(Hort)	6
	M.H.Sc.	1
	B.Sc.(Agri)	185
	B.Sc.(Hort)	27
	B.Sc.(Agril. Mark. & Coop)	17
Veterinary College, Hebbal	Ph.D.	3
	M.V.Sc.	34
	M.Sc. (Dairy Science)	12
	B.V.Sc.	100
Agricultural College, Dharwad	Ph.D.	7
	M.Sc.(Agri)	58
	B.Sc.(Agri)	125
	B.Sc.(Agril. Mark. & Coop)	16
Fisheries College, Mangalore	M.F.Sc.	14
	B.F.Sc.	36
Rural Home Science College, Dharwad	B.H.Sc.	19
	M.H.Sc.	5
Agricultural Engineering Institute, Raichur	D.A.E.	18
		766

TABLE IV

(iii) Scholarships awarded during 1981-82

Name of the College	University of Agricultural Sciences				GOI & ICAR
	Merit	General	Fee concessions	Loan	
1. Agricultural College, Hebbal					
i. Undergraduate					
a) B.Sc. (Agri)	8	69	141	13	85
b) B.Sc. (Hort)	8	13	20	1	13
c) B.Sc. (Agril Mark. & Coop)	8	6	29	3	10
d) B.Sc. (Dairy Tech)	4	3	3	—	3
ii. Postgraduate	46		46		40
2. Agricultural College, Dharwad					
i. Undergraduate					
a) B.Sc. (Agri)	8	38	29	12	37
b) B.Sc. (Agril Mark. & Coop)	8	5	13		8
ii. Postgraduate	16	—	1		32
3. Veterinary College, Hebbal					
i. Undergraduate	10	59	107	6	39
ii. Postgraduate	16	—	8	4	2
4. Fisheries College, Mangalore					
i. Undergraduate	8	9	14	3	13
ii. Postgraduate	5	—	—	1	7
5. Home Science College, Dharwad					
i. Undergraduate	6	—	—	—	6
ii. Postgraduate	3	—	—	1	1
6. Agricultural Engineering Institute, Raichur					
i. Diploma	6	6	2	1	—

R. KRISHNAPPA  
Registrar



## PART II

### TEACHING

#### 1. College of Postgraduate Studies, Dharwad

The meetings of Heads of Departments offering Postgraduate courses was convened on 17th September 1981 and 2nd January 1982 at Hebbal campus and on 21st September 1982 and 29th December 1981 at Dharwad campus, respectively to decide the courses to be offered during the first, second trimesters of 1981-82. Altogether 98 and 96 courses were offered at Hebbal and 80 and 82 courses at Dharwad campus during first and second trimesters of 1981-82 respectively.

#### **Special Lectures**

The following special lectures by the outside scientists were arranged for the benefit of postgraduate students :

<i>Name of the Speaker</i>	<i>Date</i>	<i>Topic</i>
<b>Hebbal Campus</b>		
Dr. Sharma Horticulturist, K.K.V.P., Dapoli	25-5-81	Recent Advances in Horticulture
Dr. Punchaksharappa Karnataka University, Dharwad	3-7-81	Importance of Meristem in Plants
Dr. (Mrs.) M. J. Koistra	8-7-81	Micromorphology
Prof. G. E. Park Agromark Fertilizers Dallas Texas, USA	14-7-81	Plant Hormones
Prof. N. S. Randhawa	18-8-81	Guidelines to Prepare for 12th International Soil Science Congress
Dr. (Mrs.) Sumati Muly Senior Scientist, IARI, New Delhi	5-12-81	Research Trends in Agricul- tural Extension
Mr. M. M. Verma Central Testing Laboratory, IARI New Delhi	Dec. 81	Role of Seed Testing Laboratory
Dr. Ramananda Rao Indian Institute of Science Bangalore	4-3-82	Monoclonal Antibodies

<i>Name of the Speaker</i>	<i>Date</i>	<i>Topic</i>
Dr. V. K. Dubey N.D.R.I., Karnal	20-3-82	Development Communications
Don Snowdon Newfoundland, Canada	20-3-82	Community Communications
Dr. A. K. Sen	24-3-82	Interferon
<b>Dharwad Campus</b>		
Prof. M. H. Nagaraja Setty Administrator, T.B.P., Munirabad	23-9-81	Agricultural Marketing and Co-operation in Japan and Australia
Dr. B. V. Gantotti Carnegie University New York, USA	16-9-81	1) Plasmids and Bacteriocin Production in <i>Erwinia</i> <i>herbicola</i> 2) Recombinant DNA Tech- nology in Agriculture
Dr. B. V. Gantotti	25-9-81	Plasmids and Toxigenicity in <i>Pseudomonas phaseolicola</i>
Mr. S. G. Ratod Reserve Bank of India, Patna	29-10-81	Integrated Rural Develop- ment and Agricultural Re- financing and Development Corporation
Dr. Gopal Marathe National Medical Center, Duarte California, USA	2-11-81	Electron Microscopy in Rela- tion to Tumour Cells
Dr. T.D.J. Nagabhushanam Department of Agricultural Economics, A.P.A.U., Bapatla	11-11-81	Methodological Improvements in Agricultural Research in Economics
Prof. M. L. Dantwala Retired Director, School of Economics, Bombay University Bombay	26-12-81	Issues in Agricultural Prices
Prof. M. A. Murlidharan Indian Agricultural Research Institute, New Delhi	28-12-81	Areas of Research in Agricul- tural Economics in India
Dr. H. C. Govindu Retired Scientist, University of Agricultural Sciences, Dharwad	12-1-82	Plant Pathology in India
Dr. V. Ravindranath S. 3, A.I.C.S.I.P, Hyderabad	12-1-82	Current Status Sorghum Diseases

**Completion of Degree Programme**

The students who have completed their P.G. degree programme were :

<i>Name of the Student</i>	<i>Department</i>	<i>Topic of the thesis</i>
<b>Ph.D.</b>		
1. K. Pandu Sastry	Agronomy	Influence of agronomic practices on flowering behaviour in the parental lines of sorghum hybrid CSH-5
2. D. N. Nagaraja	-do-	Agronomic investigations on the utilization of raw sewage effluent in crop production
3. A. S. Prabhakar	-do-	Agronomic investigations on irrigated hybrid cotton
4. R. A. Setty	-do-	Agronomic investigations on irrigated <i>Rabi</i> maize
5. K. Giriraj	Ag. Botany	Studies on correlation, path analysis, genetic divergence, heterosis, combining ability and nature of gene action in eight parent diallel cross of sorghum
6. R. R. Hanchinal	-do-	Aneuploid analysis in <i>Triticum durum</i> Desf. Cv. Bijaga Yellow
7. K. V. Jacob	-do-	Genetic architecture of yield and its components in field bean
8. K. G. Parameswara rappa	-do-	Genetic analysis of oil, yield and other quantitative characters in safflower
9. K. S. Prakash	-do-	Studies on intergenotypic competition in cowpea
10. S. J. Patil	-do-	Studies on the relative stability of maize inbred lines
11. B. Narayana Bhat	-do-	Genetic analysis and character association of fruit yield and its components in chilli
12. B. V. Patil	Agricultural Entomology	Bionomics, life-tables and bio-control of the teak skeletonizer, <i>Pyrausta machaeralis</i> Walker
13. K. D. Ghorpade	-do-	A taxonomic revision of Syrphini from the Indian subcontinent

<i>Name of the Student</i>	<i>Department</i>	<i>Topic of the thesis</i>
14. P. R. Krishna Prasad	Plant Pathology	Studies on the effect of antibiotic (TC-506) on the root-knot nematodes
15. C. Nanja Reddy	Agricultural Economics	Income and employment potential of small farmers in Channapatna Block, Bangalore district, Karnataka
16. M. Subashchandra-bose	Soil Science	Oxidation-reduction equilibria and nutrient utilization by rice grown in compacted soils with varying water regimes
17. H. M. Manjunathaiah	-do-	Studies on some physical and chemical properties of vertisols formed from different parent materials in Karnataka State
18. H. C. Parvathappa	-do-	Exchangeable and water soluble cation equilibria in some irrigated soils of Karnataka State
19. B. S. Siddaramaiah	Agricultural Extension	A field experiment on one-sided and two-sided presentation with and without advance organizers in agricultural communication
20. O. P. Dutta	Horticulture	Male sterility in okra and bottle gourd and its utilisation in hybrid production
21. M. B. Sontakke	-do-	Genetical studies in chillies
22. N. A. Prakash	-do-	Studies on root parasitism and nutrition of sandal wood
23. N. C. Narase Gowda	-do-	Effects of inter-row spacings and cycocel on growth, yield and quality attributes of bhendi
24. Avinash I. Patel	Agricultural Microbiology	Influence of edaphic factors in the establishment of cowpea rhizobia at Bangalore
25. S. K. Vijaya Sarathi	Veterinary Pathology	Pathology of some common diseases of central nervous system and experimental studies on allergic encephalomyelitis in the dog



<i>Name of the Student</i>	<i>Department</i>	<i>Topic of the thesis</i>
<b>M.Sc. (Agri)</b>		
1. S. R. Ganga	Agronomy	Effect of row spacing and ferttlizer dose on the growth and yield of safflower under irrigation
2. C. V. Nagaraja	do-	Productivity of sorghum hybrids as seeded and ratoon crop at varied levels of fertility
3. M. Syed Anwarulla	-do-	Effect of seed treatment and foliar nutrition of molybdenum on the growth nodulation and yield of greengram and blackgram
4. R. M. Kumar	-do-	Response of irrigated hybrid cotton levels and the time of nitrogen application
5. K. Ramakrishne Gowda	-do-	Productivity of cowpea as influenced by varieties and fertility levels
6. A. S. Kumara Swamy	-do-	Studies on intercropping in finger millet with grain legumes in different planting patterns and plant populations under dryland agriculture
7. G. C. Matolli	-do-	Response of cotton genotypes to population densities and fertilizer levels under rainfed condition
8. H. Thimme Gowda	-do-	Sink-source relationship in finger millet
9. H. D. Sheshagiri	-do-	Source and yield relationship in maize
10. U. S. Gourakkanavar	-do-	Studies on the cropping sequence for black soils of Malaprabha Project Area
11. Abdul Khalak	-do-	Forage and seed yields of lucerne varieties at different dates of sowing and levels of fertility
12. S. B. Patil	-do-	Intercropping in chilli and cotton <i>mixed cropping system under rain-fed condition</i>

<i>Name of the Student</i>	<i>Department</i>	<i>Topic of the thesis</i>
13. S. Santharam	Agronomy	Fertilizer use efficiency in relation to weed control in soybean
14. B. Jayarama Reddy	-do-	Response of wheat genotypes to methods of sowing and seed rates under irrigated condition
15. Jogur, B. I.	-do-	Effect of cutting heights and tiller numbers of ratoon performance of irrigated hybrid sorghum
16. D. Kallu Rao	-do-	Response of irrigated safflower levels and time of nitrogen application
17. B. G. Suryanarayana Reddy	Agricultural Botany	Studies on heterosis, combining ability, correlations and genetic parameters of yield and yield-contributing characters in safflower
18. T. S. Nadana Sigamani	-do-	Genetic divergence studies in groundnut
19. H. E. Shashidhar	-do-	Cytomorphological studies in some species of genus <i>Vigna savi</i>
20. A. R. G. Ranganatha	-do-	Adaptability analysis in cowpea
21. C. B. Hugar	-do-	Evaluation of some newly developed cytoplasmic genetic male sterile lines in sorghum
22. A. C. Shankara	-do-	Evaluation of sunflower inbreds for their combining ability by line $\times$ tester analysis
23. A Vittala Raya Kini	-do-	Histological and histochemical studies in cytoplasmic and gibberellic acid induced male sterile lines of sunflower
24. T. H. Gowda	-do-	Comparison of three selection criteria in segregating populations of cowpea
25. M. R. Bandeppa Goudar	-do-	Linkage studies in sorghum
26. P. Y. Kamannavar	-do-	Studies on mutagenesis in chilli
27. M. G. Bhat	-do-	Studies on inheritance of resistance to downy mildew in sorghum

Name of the Student	Department	Topic of the thesis
28. T. R. Rathnaiah	Agricultural Botany	The study of variability and formulation of selection indices for vegetable yield in field bean
29. Jagadish Murthy	-do-	Path Analysis and selection indices in three F <sub>2</sub> populations of cowpea
30. A. R. V. Kumar	Agricultural Entomology	A revision of Indian <i>Batracomorphus lewis</i>
31. K. S. Thyagarajan	-do-	Bioecological studies on lesser grain borer and evaluation of etrimphos and malathion for their efficacy as seed protectants
32. Gurunatha Reddy	-do-	Ant fauna of Dharwad with special reference to foraging behaviour of <i>Myrmecaria brunnea</i> Saunders
33. P. P. Girish	-do-	Role of bees in the pollination of summer squash with special reference to <i>Apis cerana</i>
34. P. S. Jayarama Guptha	-do-	Preliminary studies on the light trap catches of selected insect pests with special reference to the moon phases and some weather factors
35. V. T. Sannaveerappa- navar	-do-	Influence of insecticides on the reproductive potential of <i>Tetranychus ludeni</i> Zacher and toxic effects of some pesticides on this mite
36. T. M. Musthak Ali	-do-	Ant fauna of Bangalore with observations on their nesting and foraging habits
37. M. Jayaramaiah	-do-	Studies on the entomogenous fungus, <i>Beauveria brongniartii</i> Petch in relation to whitegrub, and silkworm, and possibilities of its use in the management of the whitegrub
38. K. B. Mahabale- swarappa	Plant Pathology	Studies on leaf spot of safflower caused by <i>Alternaria carthami</i> Chowdhury

<i>Name of the Student</i>	<i>Department</i>	<i>Topic of the thesis</i>
39. S. S. Adiver	Plant Pathology	Studies on grain moulds of sorghum with special reference to species of <i>Curvularia</i> and <i>Drechslera</i>
40. C. K. Parthasarathy Prasad	-do-	Studies on foot-rot and damping-off of fenugreek caused by <i>Rhizoctonia solani</i> Kuhn.
41. G. S. Shekharaiah	do-	Studies on bacterial blight of cowpea
42. V. B. Nargund	-do-	Studies on foot rot of wheat caused by <i>Sclerotium rolfsii</i> Sacc. in Karnataka
43. Angadi Bhaskara Rao	-do-	Some studies on eye spot disease of sugarcane.
44. N. G. Patil	-do-	Studies on <i>Phoma sarghina</i> , Boerema, Dorenbusch and Van Kestern causing leaf blight of cotton
45. S. M. Srinivasaiah	-do-	Studies on seed borne aspects of stack burn disease of rice caused by <i>Trichoconiella padwickii</i>
46. S. B. Katti	-do-	Studies on anthracnose <i>Coriandrum sativum</i> Linn. caused by <i>Glomerella spauld</i> and <i>srenk</i>
47. G. A. Aswatharayanarayanan Setty	-do-	Some studies on the persistence of few common fungicides on the phylloplane of cotton and ragi plants
48. Umakant V. Dolle	-do-	Studies on leaf blight of sesame caused by <i>Alternaria sesami</i> Mohanty and Behera
49. B. B. Patil	do-	Studies on the burrowing nematode <i>Radapholus similis</i> Thorne 1949 infecting Banana.
50. Lakshminarayana, H. K.	-do-	Studies on <i>Cercospora solanumelongenae</i> Chupp causing leaf spot of brinjal
51. Ashok N. Hadagali	-do-	Studies on leaf spot of tomato caused by <i>Alternaria logissina</i> Deighton and Macgarvie



<i>Name of the Student</i>	<i>Department</i>	<i>Topic of the thesis</i>
52. Y. Shivarama	Agricultural Economics	An evaluation of investment in coffee estates in Coorg District, Karnataka
53. N. Deshaiah	-do-	A comparative study of the economics of change in production technology in rainfed ragi and groundnut in Tumkur Taluk, Karnataka State
54. B. V. Chinnappa Reddy	-do-	An analysis of overdues among farmers in Srinivasapur Taluk, Kolar District, Karnataka State
55. K. Perumal	-do-	Assessment of production credit requirements of Varalaxmi cotton growing farms in North Karnataka
56. P. B. Chengappa	-do-	Financial management by market intermediaries of fruits and vegetables in Bangalore city
57. C. R. Muralidharan	-do-	Comparative study of processing sugarcane into sugar, gur and Khandsari-A case study in Mandya district
58. B. Busavaraja	-do-	Economic of Karnataka hybrid tomato in Bangalore District
59. Vasant H. Kulkarni	-do-	Impact of credit on the economy of small farmers in drought prone taluks of Dharwad District in Karnataka
60. B. Jayaraman	-do-	Comparative economics of investment in bore-well and open: A case study in Bangalore District of Karnataka
61. M. G. Chandrakant	-do-	Investment strategies for the development of forestry sector in Karnataka - An application of Leontief Model
62. B. Chinnappa	-do-	Economics of production and marketing of guava in Bangalore District, Karnataka

<i>Name of the Student</i>	<i>Department</i>	<i>Topic of the thesis</i>
63. K. G. Venkatesh Reddy	Agricultural Economics	Comparative economics of production and marketing of robusta and dwarf cavendish varieties of banana in Bangalore District
64. G. N. Nagaraja	-do-	Farm financial management by farmers in Doddaballapur Taluk of Bangalore District, Karnataka
65. G. Anjaneya Gowda	-do-	Farm financial requirements and optimum cropping pattern for Sreenivasapur Taluk, Kolar District, Karnataka
66. B. K. Masali	Soil Science	Studies on the soils of Kolachi-Weir across Malaprabha river
67. S. Srinivasa	-do-	Improving phosphate use efficiency in ragi
68. C. E. Manjunath	-do-	Evaluation of efficacy of insecticides against brinjal and estimation of their residues in/on brinjal fruits
69. G. Shiva Shankar	-do-	Effect of leaching of soils with salt solutions on water retention characteristics
70. K. A. Bheemaiah	-do-	Evaluation of lime-requirement methods for the acid soils of Karnataka
71. V. V. Shiparamatti	-do-	Effect of salinity on growth yield and uptake of nutrients by sunflower genotypes
72. H. Dakya Naik	-do-	Fate of increasing levels of applied phosphorus in base saturated black soils of Karnataka
73. V. R. Ramakrishna Parama	-do-	Soils properties affecting potassium status and crop response to applied potassium in different soils of Karnataka
74. Venkatesh Kotabagi	-do-	A study on the classification of some soils of upper Krishna Project area

<i>Name of the Student</i>	<i>Department</i>	<i>Topic of the thesis</i>
75. S. N. Upperi	Soil Science	Effect of higher levels and methods of potassium application
76. Gurumurthy	-do-	Effect of magnesium and gypsum on the nutrition of crops in selected soils of Karnataka
77. S. K. Gali	-do-	Studies on the effect of carbaryl, monuron and PCNB mineralization of Urea-N in some soils of Karnataka
78. Sridhara Adiga	-do-	Influence of calcium and sulphur on growth and yield of groundnut in acid soils of Bangalore
79. K. Sheshachar	Agricultural Extension	A study on adoption behaviour, consultancy pattern and value orientation of chilli cultivators in Dharwad District, Karnataka
80. B. M. Pamadi	-do-	A study on adoption behaviour, consultancy pattern of groundnut growers in Dharwad District of Karnataka
81. K. V. Nagarajaiah	-do-	An analysis of the impact of training and visit system of agricultural extension with reference to visits in Karnataka
82. Channabasavaiah	-do-	Influence of redgram demonstrations on farmers of Bangalore District
83. Awanti, D. S.	-do-	Adoption behaviour and motivation patterns of dairy farmers of Dharwad and Belgaum districts of Karnataka State
84. Bharmappa, C.	-do-	A study on achievement motivation of Assistant Agricultural Officers of Dharwad District, Karnataka State
85. M. A. Narasaraj	-do-	Relative effectiveness of selected combinations of visuals in sericulture extension meetings

<i>Name of the Student</i>	<i>Department</i>	<i>Topic of the thesis</i>
86. R. L. Narasimhamurthy	Agricultural Extension	Influence of small farmers development agency (S. F. D. A.) on participant and non-participant small farmers, marginal farmers and agricultural labourers in the selected taluks of Bangalore district
87. G. S. Srinivasan	-do-	Farmers' perception of preparedness for irrigated farming in Hemavathy Project Area, Karnataka State
88. F. R. Nidagundi	-do-	A study on knowledge and adoption behaviour of trained farmers in Ghataprabha Command area, Karnataka State
89. G. S. Sinha	-do-	A study of knowledge, perception and adoption of wheat growing small and other farmers in Dharbhanga District of Bihar
90. R. A. Budihal	-do-	A study on knowledge and adoption of improved practices among <i>rabi</i> jowar growers of Dharwad District, Karnataka State
91. A. M. Savalagi	-do-	Impact of Pilot-project demonstration programme on knowledge and adoption behaviour of participant farmers in Belgaum District, Karnataka State
92. H. Thimmappa	-do-	A study on adoption behaviour and motivation pattern of coconut cultivators in Tumkur District of Karnataka State
93. Sacriya Naik	-do-	A critical analysis of in-service training needs of Assistant Agricultural Officers of Karnataka
94. S. J. Patil	Crop Physiology	Physiological studies in maize genotypes for tolerance to moisture stress

<i>Name of the Student</i>	<i>Department</i>	<i>Topic of the thesis</i>
95. Mahadev B. Chetti	Crop Physiology	Physiological studies on salt tolerance in some cotton genotypes
96. D. Nagappa	-do-	Studies on pre-sowing seed hardening in sunflower : effect on growth and productivity
97. K. Shivakumar Reddy	Horticulture	Interrelationship between vegetative growth and flowering in mango
98. Nanje Gowda	-do-	Studies on vegetative propagation of tamarind by air layering
99. V. N. Shivanandam	-do-	Studies on systematic selection of productive types of tamarind
100. L. V. Sathyamadhava	-do-	Influence of pruning time and delayed harvesting on quality of Bangalore blue grapes
101. N. Rajanna	-do-	Studies on the propagation of Bassein seedless pomegranate by cuttings
102. K. Pandurana Shenoy	-do-	Studies on the effect of nutrients and cycocel on growth and yield of davana
103. L. B. Kulkarni	-do-	Studies on regulation of vegetative growth, flowering and fruit drop in mango
104. Vivek V. Telang	-do-	Studies on propagation in "Seedless Lime" by air layering
105. K. H. Ramanjaneya	-do-	Studies on some factors influencing quality of guava jelly
106. V. Nache Gowda	-do-	Nutrient status of Coorg mandarin and Kinnow mandarin as influenced by different root stocks
107. Miss Sangamma	-do-	Effect of growth regulators on the germination of orchid seeds
108. R. Jayaselan	-do-	Effect of pre-sowing treatments of corms of Gladiolus on their sprouting, cormel development, growth and flowering.

<i>Name of the student</i>	<i>Department</i>	<i>Topic of the thesis</i>
109. P. Usha Rani	Horticulture	Varietal differences in chillies for pungency pigmentation and ascorbic acid contents
110. S. R. Nagabhushana	-do-	Propagation and cytotaxonomic studies in some Indian orchids
111. Ganesh S. Hegde	-do-	Effect of number of nodes on cuttings and growth regulators on rooting of 'Panniyur-I' pepper vine
112. V. S. Huddar	-do-	Studies on chemical weed control in raddish
113. D. P. Kumar	-do-	Studies on the propagation of India rubber plant by stem cuttings
114. M. N. Narasimha Reddy	-do-	Chemotaxonomical studies in some citrus species and hybrids
115. Ch. Gandhi	Agricultural Microbiology	Seed microflora of sorghum with reference to <i>Azotobacter</i> inoculants
116. T. G. Nanda Kishore	-do-	Studies on urban solid waste composting
117. K. R. Sree Ramulu	-do-	Response of chillies to VA mycorrhiza under field conditions
118. Nagaraju, H. C.	-do-	Studies on the use of organic wastes in the cultivation of Azolla
119. Y. S. Govind Rao	-do-	Field response of finger millet to VA mycorrhizal inoculation
120. Miss Jalaja Y. Mudkavi	-do-	Microflora of species and their antimicrobial action on some food spoilage microorganisms
121. P. Parashuramana Goud	-do-	Microbial interactions in the rhizosphere of hybrid napier grass and the role of <i>Azotobacter</i> Spp. in fodder production
122. K. R. Krishna	-do-	Studies on the mechanism of improved plant growth due to vesicular arbuscular mycorrhiza

<i>Name of the student</i>	<i>Department</i>	<i>Topic of the thesis</i>
123. V. K. Ganesh	Agricultural Microbiology	Aflatoxin production in soybean, effect on microbial growth, seed germination and histochemical changes in a germinating seed
124. D. S. Bhorgonde	Agricultural Engineering	Drip system of irrigation for the use of saline water for cabbage crop
125. C. S. Viraktamath	-do-	Evaluation of check basin method of irrigation in black soils of Dharwad
126. A. P. Kulkarni	-do-	A study on the suitability of sprinkler method of irrigation under Dharwad agro-climatic conditions
127. S. Abdulla	-do-	Drip irrigation system for application of fertilizer
128. R. B. Hiremath	-do-	Evaluation of filter materials used for tile drains in black soils of Dharwad
129. Ramegowda	Seed Technology	Studies on seed viability in relation to storage in sunflower
130. K. Nagarajaiah	-do-	Evaluation of storage structures for safe storage of seeds and <i>in situ</i> fumigation along with studies on reaction of sorghum genotypes to rice weevil attack
131. M. N. Merwade	-do-	Studies on yield and quality of Varalaxmi hybrid seed
132. V. C. Belle	-do-	Effect of time and method of harvesting on yield and seed quality of sorghum
133. D.V.S.S.R. Sastry	-do-	Effect of method of threshing and threshing parameters on seed quality in sorghum
134. D. S. Ravi Kumar	-do-	Influence of different aged seeds on growth and yield attributes in sorghum
135. V. Ramesh	-do-	Effect of biological enrichment on seed yield and quality of sunflower.

<i>Name of the student</i>	<i>Department</i>	<i>Topic of the thesis</i>
136. G. V. Basavaraju	Seed Technology	Nitrogen management and spacing studies on the hybrid seed yield and quality of CSH-6
137. G. V. Jagadish	-do-	Evaluation of threshing procedures in relation to seed quality in sunflower
138. B. K. Dharmarajan	-do-	Assessment of storage losses in paddy and evaluation of current storage practices for safe storage of paddy grains
139. Sreenivas Ellur	-do-	Effect of delayed pollination on seed setting and quality of seed in maize
140. M. K. Raja Rao	-do-	Evaluation of planting ratios for BJ-104 hybrid bajra seed production and seasonal effect of stability on male sterility in MS 5141A
141. Suresh Nath	-do-	Studies on planting ratios and effect of boron in seed production of CSH-5 sorghum
142. M. K. Krishna Swamy	Statistics	A sectoral systematic design with wet-row width for cowpea genotypes
143. K. V. Devappa	-do-	Statistical studies on the mortality patterns of selected broiler breeds
144. Sudhindra Gadagkar	-do-	Temporal analysis of marine landings along coastal Karnataka
145. S. K. Thimmaiah	Bio-chemistry	Studies on the glycogen phosphorylase of <i>Labeo rohita</i> : Purification, characterization and changes in its activity at different storage temperatures
146. M. N. Subramanya	-do-	Isolation and characterisation of proteases from the muscle of Indian major carp Rohu
147. P. Annadurai	-do-	Comparison of the protein fractions of <i>Channa</i> spp. and biochemical systematics
148. L. Sudarshana	-do-	Characterisation of changes in the isozyme pattern of lactate dehydro-



<i>Name of the student</i>	<i>Department</i>	<i>Topic of the thesis</i>
		genase in fresh and stored tissues of <i>Labeo rohita</i>
149. Ujwal Kumar, M.L.	Bio-Chemistry	Peroxidases of finger millet : Isolation and characterization

## M.V.Sc.

150. T. G. Honnappa	Gynaecology and Obstetrics	Biochemical studies on cervico-vaginal mucus and blood serum of fertile and infertile cows during oestrus
151. Major M.A. Upasani	-do-	Studies on the influence of exotic inheritance on the reproductive performance of Sindhi cattle
152. A. Ramu	-do-	Postnatal development of male genitalia in Holstein Friesian
153. V. Chandrasekhar Murthy	-do-	The influence of age, body weight and latent theilerial infection on the biochemical composition of blood serum in oestrus, anoestrus, pregnant and lactating cows
154. K. S. Jayaram	-do-	Studies on blood serum concentrations of certain electrolytes and non-electrolytes during normal and disturbed conditions of reproduction in Bannur sheep
155. R. Krishna Moorthy	-do-	Studies on certain sugars as cryoprotectants in semen extenders without and with reduced levels of glycerol for freezing the bull spermatozoa in straws
156. K. Nagesh	Animal Nutrition	Studies on some physio-chemical aspects of grain formation in ghee
157. S. B. Garikipati	-do-	Studies on the utilization of soymilk in the manufacture of cheddar cheese with special reference to protein break-down during ripening process

<i>Name of the student</i>	<i>Department</i>	<i>Topic of the thesis</i>
158. B. N. Adinarayana- nappa	Animal Nutritton	Substitution of yellow maize by rice polish as energy source in laying performance
159. M. Sesha Sai	-do-	Incidence of gram-negative psychro- trophic bacteria in stored raw and pasteurised milk
160. P. Subramanian	-do-	Studies on microbiology of acido- philus—Yeast milk
161. M. Srinivasa Murthy	-do-	Utilization of poultry droppings in the rations of graded pigs
162. R. Gideon Glori Doss	-do-	Studies on the nutritive value of kitchen waste supplemented with fish meal and lysine for growing pigs
163. Syed Anwar	-do-	Studies on some factors affecting the stability of ascorbic acid milk
164. M. Anwer Pasha	-do-	Utilization of coffee husk in dairy cattle ration for milk production
165. P. Subrahmanya Prasad	-do-	Relationship for estimating proteins in milk by formol titration and Kjeldahl methods
166. Markandeya Jois	-do-	Utilization of spend ginger in the ration of cattle
167. B. L. Krishna- murthy	Veterinary Microbiology	Immune response of animals to combined modified vaccine against haemorrhagic septicaemia and black quarter
168. V. Jayarama	-do-	Thermostability of rinderpest virus
169. S. Shivalingaiah	Veterinary Medicine	Clinical pathology of bovine mastitis with special reference to aerobic bacterial infection and their anti- biogram
170. Divakara	-do-	Therapeutic effect of iron and copper in piglet anemia
171. T. G. Radhakrishna	-do-	Prevalence of cryptococcus neoformans in pigeon droppings in Banga- lore city

<i>Name of the student</i>	<i>Department</i>	<i>Topic of the thesis</i>
172. P. Nagarajachar	Vetrinary Medicine	Serological studies of the J substance in cattle
173. B. N. Kumar	-do-	Chemotherapeutic and toxic effect of clofibrate in dogs affected with transmissible venereal tumour
174. H. Rafeeq Anwar	Veterinary Pathology	Pathology of pituitary, thyroid and adrenal glands and some aspects of pathogenesis based on experimental allergic disease of these glands in the fowl
175. G. Srinivasarao	-do-	Pathology of pulmonary disorders in canines
176. M. Syed Ahmed	-do-	Pathology of bovine mastitis in relation to several bacterial infections
177. M. R. Venkata-ramana Reddy	Veterinary Pharmacology	Pharmacokinetics of Chloramphenicol in buffalo calves
178. R. Medhamurthy	-do-	Effect of bromocriptine on the pituitary gonadotrophin secretion and ovulation in the ewe
179. Christoher Neal	Veterinary Parasitology	Incidence of ticks on domestic animals in Chikmagalore district of Karnataka and a study on the life cycle of <i>Hyalomma hussaini</i> Sharif 1928
<b>M.Sc. (Dairy Sciences)</b>		
180. H. V. Jayaprakash	Dairy Technology	Effect of concentration of milk on physico-chemical properties of spray-dried whole milk powder
181. K. Yerriswamy	-do-	Studies on kulfi with reference to ready mix
182. R. Rajarathinam	-do-	Comparative study of the preparation and changes in ripening of Edam cheese from cow and buffalo milk
<b>Poultry Sciences</b>		
183. Mohamed Nadeem Fairoye	Poultry Science	An economic analysis of problems of marketing of eggs in Bangalore city

<i>Name of the student</i>	<i>Department</i>	<i>Topic of the thesis</i>
184. B. N. Rajanna	Poultry Science	Efficacy of coccidiostats in broilers
185. E. A. Morais	-do-	Diallel cross for estimation of combining ability variances and genetic parameters of growth and conformation in broiler strains
186. A. S. Raje Gowda	-do-	Preparation of chicken rolls and their quality changes during chilled and frozen storage

## M. F. Sc.

187. N. Yellappa	Fish. Proc. Technology	Effect of certain organic acids on the preservation of shellfish (Clam) pickle.
188. Ranganath	-do-	Canning of the giant catfish <i>Tachysurus thalassinus</i>
189. H. M. Chidananda Sastry	-do-	Biochemical changes in cuttlefish during iced and frozen storage
190. S. Venkatesha Murthy	-do-	Factors influencing the rate of heat penetration and 'F' value in the canning of seer fish
191. H. N. Sathyanarayana Rao	Aquaculture	Hormonal manipulation of sex in the carp, <i>Cyprinus carpio</i>
192. Hegde Ramachandran	-do-	Studies on the effect of fertilizing fish ponds with poultry manure and varying doses of NPK
193. K. Anil	-do-	Studies on the growth performance of cultivable carps fed on four formulated diets
194. T. Venkateshappa	Fish Biology	Studies on <i>Ergasilus</i> sp. parasitic on <i>Wallago attu</i>
195. Gangadhara V Maddikery	Fish Hydrography	Hydrographical features in relation to fisheries in the Arabian sea off Gangolli Region, Dakshina Kannada
196. U. Ramachandra	-do-	Studies on the macrobenthos of Mulki estuary, Dakshina Kannada

Name of the student	Department	Name of the thesis
197. C. V. Mohan	Fish Hydrography	Combined toxic effects of mercury and cadmium on a few marine invertebrates
198. N. R. Ramakrishna	Fish Prod'n. Mgmt	Studies on the relative growth rate of grass carp <i>Ctenopharyngodon idella</i> when fed on a terrestrial grass and two leguminous fodder plants
	<b>M.H.Sc. (Home Science)</b>	
199. Usha Malagi	Food and Nutrition	Composition, cooking quality and acceptability of high yielding cultures of cowpeas

S. V. PATIL  
D.I. (PGS)

## 2. Agricultural College, Hebbal, Bangalore

The following Officers held the post of Director of Instruction (Agri), Agricultural College, Hebbal, during the year under report :

- 1) Dr. N. G. Perur till 31-8-1981
- 2) Dr. G. V. Havanagi, i/c from 1-9-1981 to 22-3-1982
- 3) Dr. K. S. Krishnasastry from 22-3-1982 onwards

### *Students strength at the beginning of the academic year 1981-82*

	Undergraduates		
	II Year	III Year	IV Year
B.Sc.(Agri)	245	190	155 + 90 repeaters
B.Sc.(Hort)	33	32	33
B.Sc.(Ag. Mark. & Co-op)	25	19	27
	Postgraduates		
	Junior	Senior	
M.Sc.(Agri)	155	140	
M.Sc.(Hort)	32	21	
M.H.Sc.	3	3	
Ph.D.	31	49	

*Students' performance:* One hundred and thirty five students who had completed the B.Sc.(Agri) Degree programme from this College, have been

awarded the Degree during the Annual Convocation held on 5-2-1982. Eighteen students have been awarded B.Sc(Hort) degree and fourteen students have been awarded B.Sc(Agri. Marketing & Co-op) Degree. The performance of the Undergraduate students in the their degree programmes are as under :

CGPA	B.Sc(Agri)	B.Sc(Hort)	B.Sc(Ag. Mark)
3.50 to 4.00	36	1	7
3.00 to 3.49	50	4	4
2.50 to 2.99	34	12	1
Below 2.50	15	1	2

Seventeen students have completed their Ph.D. Degree while seventy five students have completed the M.Sc.(Agri) degree from the various departments of this College during 1981.

The following students of the Agricultural College, Hebbal, have been awarded Gold medals at the sixteenth Convocation held on 5-2-1982 for their outstanding academic performance.

B.Sc.(Agri)	Mr. D. S. Ravindra	I Rank	(receptient of six gold medals)
	Miss Anne Mathews	II Rank	
B.Sc.(Ag. Mark & Co-op)	Mr. A. R. Subba Rao	I Rank	
	Mr. K. Narayanaswamy	II Rank	
M.Sc.(Agri)	Mr. B. K. Dharmarajan	(Seed Technology)	
	Mr. Rame Gowda	-do-	
	Mr. A. R. G. Ranganath	(Agri. Botany)	
M.Sc.(Hort)	Mr. K. S. Thilak		
	Mr. K. H. Ramanjaneya		
Ph.D.	Mr. V. Veerabhadraiah	(Agri. Extension)	
	Mr. B. S. Siddaramaiah	(Agri. Extension)	
	Mr. K. V. Jacob	(Agri. Botany)	
	Mr. B. C. Suryanarayana	(Agronomy)	

As many as twenty students of this College have been selected for the award of Junior Fellowship during the year 1981, in the ICAR Competitive examinations held in April 1981.

*Earn while you learn scheme:* Various schemes aimed in helping the students in earn while they learn, were in operation in different departments such as Agronomy, Agricultural Botany and Horticulture. As part of the practical in Agronomy, the students of II B.Sc.(Agri.) have raised ragi and fodder maize, earning an average of Rs. 40 as profit. In another course in crop production, the students of III B.Sc.(Agri) raised paddy and fodder maize, earning a profit of Rs. 165 per student.

### **Postgraduate Diploma in Intensive Crop Production**

Seven students are undergoing the Diploma course in Intensive crop production at Mandya, while two are doing the course at Dharwad. The students of previous batch who have completed the course during the year under report, have earned a profit of Rs. 13,000/- in this course.

#### **Awards**

The following teachers of the Agricultural College, Hebbal, were the recipients of awards as noted below during 1981 in recognition of their outstanding research work in their fields of specialization.

Dr. G. K. Veeresh  
Professor of Entomology

Dr. K. S. Krishnasastry  
Prof. of Crop Physiology  
(presently D.I. (Agri))

Natasarvabhuma Rajakumar  
Sanmana Samiti Award 1981  
J. J. Chinoy Memorial Medal

K. S. KRISHNA SASTRY  
D.I. (Agri), Hebbal

### **3. College of Agriculture, Dharwad**

The Academic year 81-82 commenced as detailed below :

II, III and Final year of all Undergraduate Courses	24-8-81
Postgraduate courses	21-9-81
I year of Undergraduate Courses	29-10-81

The number of admissions made during the year were ; B.Sc.(Agri), 131 ; B.Sc.(Ag. Mark. & Coop), 22 ; M.Sc.(Agri), 117 ; Ph.D., 21 ; M.H.Sc., 10 ; B.H.Sc., 29.

The strength of the students in various degree programmes during the year were : B.Sc.(Agri), 468, B.Sc.(Ag. Mark. & Coop), 91 ; B.H.Sc., 80 ; M.Sc. (Agri), 215 ; M.H.Sc., 15 ; and Ph.D., 42.

There are 891 students on roll at this Campus.

#### **Students' Performance**

One hundred and twenty five students completed their course in B.Sc. (Agri) degree programme while 16 students have completed their B.Sc.(Ag. Mark. & Coop.) degree programme. The Cumulative grade point average of students who graduated from the College during 1980-81 is as under :

CGPA	B.Sc(Agri)	B.Sc. (Ag. Mark. & Coop)
3.75 to 4.00	13	3
3.75 to 3.25	51	6
3.25 to 2.75	31	5
2.75 to 2.00	30	2

The students who have secured the first five places in the B.Sc.(Agri) degree course were; Sri R. S. Hegde, Sri Nelson Xaviar, Sri R. M. Melavanki, Sri M. Afsal Baig and Sri J. S. Hiremath

The students who have secured the first three place in B.Sc.(Ag. Mark. & Coop) degree course were; Sri M. G. Bhat., Sri V. G. Pandit and Sri M. T. Kajjidoni.

*Fellowships:* Thirtyseven students have been awarded with ICAR Jr. Fellowship for master's degree under 1981-82 programme. Eight students of this College have been awarded H.R.D.P. Scholarships during the year under report.

*Plot work of students:* The students of I, II and III year B.Sc. (Agri) raised different crops under crop production courses. Each student was allotted 1/10 hectares of land for raising crops. The details of yield and profit obtained are given in Table I.

TABLE I  
*Yield and income obtained from different crops raised by students*

Particulars	Per plot		Per hectare	
	Highest	Average	Highest	Average
1. Yield of <i>Kharif</i> crops (kg)				
a) Maize (7.5 gts)	403	226.5	5360	3100
b) Groundnut (2.5 gts)	94	56.9	3760	2130
2. Yield of <i>Rabi</i> crops (kg)				
a) Safflower (7.5 gts)	85	51	1120	680
b) <i>Rabi</i> Sorghum (2.5 gts)	50	35	2000	1400
3. Gross income from <i>Kharif</i> crops (Rs.)	839.45	481.75	8394.50	4817.50
4. Gross income from <i>rabi</i> crops (Rs.)	335.00	209.00	3350.00	2090.00
5. Total gross income from <i>Kharif</i> and <i>rabi</i> crops (Rs.)	1174.45	690.75	11,744.50	6907.50
6. Cost of cultivation	230		2300	
7. Total profit	944.45	460.75	9444.50	4607.50



**Visitors**

- 1) Eight I.A.S. and one I.F.S. probationers visited the Campus on 1-4-81.
- 2) Sri Nadaf, Board Member visited the campus and went round the Farm on 2-4-81.
- 3) Dr. Peterson and Ronald Stryker USAID officials visited the Campus on 28-5-81 to review the research works on B.C. & M & G Project areas.
- 4) Dr. D. M. Nanjundappa, Vice-Chancellor of Karnatak University visited the Campus on 9-6-81.
- 5) Dr. H. R. Arakeri, Chairman, ASRB, ICAR, visited the Campus on 13-7-81.
- 6) World Bank Team consisting of Dr. Nekby and Sri Radhakrishnan visited the Campus on 12-9-81.
- 7) Sri Nagarajshetty, Administrator, CADA, Tungabhadra Project visited the Campus on 23-9-81.
- 8) Dr. N. K. Ananth Rao, Ex. Dy. Director General, ICAR, New Delhi visited the Campus on 21-1-82 and addressed the staff and students.
- 9) Thirteen inservice trainees from Kenya (1), Malawi (1), Fiji (1), Sudan (5), Pakistan (2), Jordan (1) and Lesotho (2) visited the Campus on 23-1-1982.
- 10) Dr. J. B. Dixon, Prof. of Soil Mineralogy, Texas A & M, University College Station Texas, USA visited the campus on 26-2-1982.

R. B. PATIL  
D. I. (Agri), Dharwad

#### 4. Veterinary College, Hebbal

Dr. K. Trivikrama Rao, Prof. of Anatomy was in additional charge of the duties of the post of Director of Instruction (Vety) up to 22nd March and on the afternoon of 22-3-82 he assumed the post of D.I.(Vety) on regular basis.

The diagnostic laboratories located at Bangalore, Mysore, Hassan and Tumkur are continuing to function normally with the staff already appointed.

Dr. S. J. Seshadri, Prof. of Pathology was appointed as Director, KDDC and he assumed the charge of the same on the forenoon of 27-1-82

The College is also associating with the Institute of Animal Health and Veterinary Biologicals for implementing and coordinating the health coverage programme of dairy cattle in KDDC area.

The Animal Shelter-cum-Rescue Home in the Hebbal Campus which was started under the auspices of Bangalore Society for the Prevention of Cruelty to Animals in collaboration with the UAS is rendering Medical aid to dumb animals. The Rescue Home is working satisfactorily and is meeting the demands of the animals rescued in the city area.

At the instance of the ICAR, Internship Training Programme for B.V.Sc. students for a period of six months was introduced and 60 students are undergoing the training programme. The students are paid Rs. 400 p.m. for six months and a sum of Rs. 200 to meet the travelling charges for the entire period of 6 months.

A training programme in dairy production for the service personnel of the Department of Animal Husbandry and Veterinary Services of the State Government was conducted. Eight in-service personnel attended the programme.

In connection with opening of Bull-centre, a state level workshop was organised on Management of Artificial Insemination. Officers from UAS, State Department of Animal Husbandry, KDDC, NDRI and BAIF participated in the workshop.

A State level training programme was organised for the officers of the State Department of Animal Husbandry in the field of Physiology of Reproduction for a period of 10 days. Six officers participated in the programme.

*Teaching :* During the year 112 students were admitted to the B.V.Sc. degree and 34 students for Masters degree in the Veterinary Faculty.

The final year and pre-final year B.V.Sc. students went on All India and State Educational tour for a period of 3 weeks and 2 weeks respectively, as a part of curriculum requirements.

K. TRIVIKRAMA RAO  
DI (Vety), Hebbal

### 5. College of Fisheries, Mangalore

The Academic year 1981-82 commenced on 24-8-1981 for the II, III and IV B.F.Sc. Classes and on 21-9-1981 for M.F.Sc. and Ph.D. Classes.

**Admission:** During the year under report, 26 students were admitted to the first year of the postgraduate programme, 17 for Fish Production and Management and 9 for Industrial Fishery Technology. Only one student was admitted to the Ph.D. programme in Aquatic Biology. The classwise break-up of students is as follows:

Ph.D.	2	Final Year B.F.Sc.	28
Senior M.F.Sc	16	Third Year B.F.Sc.	28
Junior M.F.Sc	26	Second Year B.F.Sc.	27
		Total	127

**Students' Performance:** Thirty-two students completed their B.F.Sc. degree programme at the end of the Academic year 1980-81, while another 5 students completed the same at the end of I trimester of 1981-82. 14 candidates completed their M.F.Sc. programme during 1980-81, while another 9 completed the same during 1981-82.

Shri Gopal Bhat Kund and Shri Mulla Muniruddin Abbas were awarded UAS gold medals for outstanding performance in B.F.Sc.

Twenty postgraduate students were awarded I.C.A.R. Jr. Fellowship during this year. Another 15 postgraduate students of Sr. M.F.Sc. class are also in receipt of I.C.A.R. Jr. Fellowship.

**Meetings:** Professor H.P.C. Shetty, Director of Instruction (Fisheries) attended the following important meetings outside the University.

- 1) Meeting of I.C.A.R.'s Scientific Panel for Agricultural Education on 3-8-1981 at New Delhi.
- 2) Meeting of M. Visvesvaraya Industrial Research and Development Centre (MVIRDC) on 6-8-1981 at Bombay.
- 3) Meeting of the I.C.A.R.'s Scientific Panel on Agricultural Education on 26th and 27th February 1982 at New Delhi.

He also served as the member of

- 1) Board of Studies in Marine Biology, Karnatak University, Dharwad,
- 2) Board of Studies in the Faculty of Fisheries, Kerala Agricultural University,

- 3) Committee to review the evaluation of working of Fisheries College, Tamil Nadu Agricultural University, Tuticorin,
- 4) Committee for considering training programme of Central Institute of Fisheries Education, Bombay,
- 5) Quinquennial Review Team in respect of Central Institute of Fisheries Education, Bombay and
- 6) Member to conduct the Achievement Audit of the Central Institute of Fisheries Education, Bombay.

A two-day Workshop was held on 15th and 16th June, 1981, to discuss the problems highlighted in the PPMC Report. The Workshop was presided over by Professor H.P.C. Shetty, Professor Jade Srinivasa Murthy of PPMC participated in the Seminar.

A fisheries exhibition was organised under the auspices of the Pasteur Club of the College of Fisheries, Mangalore at the premises of Government College, Mangalore on 21st and 22nd February, 1982.

A 3-day symposium on the "Diseases of Finfish and Shellfish" was organised at the College of Fisheries, Mangalore from 1-3 March 1982. It was inaugurated by Dr. N. G. Perur, Vice-Chancellor, UAS, and presided over by Dr. C. R. Kamath, Professor of Ophthalmology, K.M.C., Mangalore.

H. P. C. SHETTY  
D.I. (Fisheries), Mangalore

## 6. College of Rural Home Science, Dharwad

The academic year commenced from 24-8-81 for II year and III year B.H.Sc and from 29-10-81 for I year students.

The classwise breakup of students registered during the year is as follows :

<i>Class</i>	<i>III trimester</i> 1980-81	<i>I trimester</i> 1981-82	<i>II trimester</i> 1981-82
<b>Undergraduate</b>			
I year	22	27	27
II year	28	22	22
III year	20	28	28
	70	72	77

<i>Class</i>	<i>III trimester 1980-81</i>	<i>I trimester 1981-82</i>	<i>II trimester 1981-82</i>
<b>Postgraduate</b>			
Jr. M.H.Sc.			
FN	4	3	3
CD	—	5	5
Sr. M.H.Sc.			
FN	3	4	4
CD	4	—	—
	—	—	—
	11	12	12
	—	—	—

*Conference / Seminars / Workshops :* Mrs. Suhasini Rao participated in National Conference on women's studies at SNTD, Bombay.

Dr. Meera Rao participated in a workshop on Educational Technology organised by TNAU, Coimbatore

Dr. L. Phadnis and Miss Surekha Kodmaggi, NSS Officer of this college, attended conference of NSS programme coordinators of Agricultural Universities held at Bangalore.

Dr. L. Phadnis attended seminar on Oilseeds and read a paper at Raichur.

LEELA PHADNIS  
D.I. (Home Science)

#### 7. Agricultural Engineering Institute, Raichur

The academic year commenced on 24-8-81 for II and III year DAE students, and on 29-10-81 for I year DAE students.

The trimesterwise students strength in different classes were :

<i>Class</i>	<i>III trimester of 1980-81</i>	<i>I trimester of 1981-82</i>	<i>II trimester of 1981-82</i>
I year DAE	16	18	17
II year DAE	15	14	15
III year DAE	22	30	21

*Courses offered :* In all 76 courses amounting to 224 credit hours were offered during the year under report. The trimesterwise breakup is given below :

Trimester	No. of regular Courses	No. of repeat Courses	Total credit hours
III trimester of 1980-81	19	3	66
I trimester of 1981-82 for II and III year	13	11	73
I trimester for I year	6	—	16
II trimester of 1981-82 for II and III year	11	4	49
II trimester for I year	8	1	20

The classwise breakup of the students on the basis of their C.G.P.A. is given below :

C.G.P.A.	III Trimester 1980-81			I Trimester 1981-82		
	I	II	III	I	II	III
4.00	—	—	—	—	—	—
3.00 to 3.99	5	3	3	4	5	4
2.00 to 2.99	2	5	9	6	2	15
Below 2.00	9	6	10	8	7	11

Sixteen students have successfully completed the Diploma during the year under report.

*Recognition/Awards:* Professor N. L. Maurya, Principal of this Institute was awarded ISAE Commendation Medal 1981-82 for outstanding achievements in the field of Agricultural Engineering education in the country, during the XIX Annual Convention of the Society held at CTAE, Udaipur between February 15-17, 1982.

N. L. MAURYA  
Principal

#### 8. College of Basic Sciences and Humanities, GKVK, Bangalore

The Academic year 1981-82 for the College of Basic Sciences and Humanities (BSH) began on October 29, 1981. With this the College entered into the Seventh Year of its founding at the Gandhi Krishi Vignana Kendra (GKVK) Campus. The student enrolment in the BSH College is given below :

*Students on rolls for various undergraduate and postgraduate courses of  
BSH College*

Degree Programme	Students on rolls (March 1982)
B.Sc (Agri)	218
B.V.Sc.	121
B.Sc (Hort)	30
B F.Sc.	39
B.Sc (Agril. Mark. & Coop)	27
B.Sc (Dairy Tech.)	18
M.Sc (Agril. Biochemistry)	1
M.Sc (Agril. (Statistics)	2
	456

27 foreign students from E. Africa, Sri Lanka, Malaysia and Iran were also on the rolls.

The BSH College continued to provide the facilities of Electron Microscope and Amino Acid Analyzer and they were utilised by various departments of the University as well as by outside organizations.

The GKVK Hostel day was celebrated on July 18, when Dr. M. N. Vishwanathaiah, Vice-Chancellor, Bangalore University was the Chief Guest. The Valedictory Function of the GKVK Students' Association was held on August 6, 1981 when Sri B. D. Jatti, Former Vice-President of India was the Chief Guest and Dr. R. Dwarakinath, Vice-Chancellor, distributed the prizes. The General Elections for GKVK Students' Association for the academic year 1981-82 were held on December 26, 1981.

The Director of Instruction (BSH) gave a talk on 'Food, Energy and Environment' at the Rotary Club meeting on February 9, 1982 at Hotel East West.

Mr. P. C. Sridharan, Associate Professor of Mathematics, and Mr. H. L. Krishnaswamy, Asst. Prof. of Mathematics participated in Seminar organised by Delhi Cloth Mills Corporation during the month of March, 1982 at Bangalore.

Dr. S. Narasimha Murthy, attended the autumn course on "variational methods in analysis and mathematical physics" at the International Centre for Theoretical Physics Trieste, Italy and VI Annual Science Conference of Bangladesh at Deccan during February and gave seminars.

Mrs. S. Parvathamma, Instructor in Mathematics, attended 26th Congress of the Indian Society of Theoretical and applied mechanics held at Coimbatore during December, 1981 and presented a paper.

Dr. R. V. Ramamohan, Associate Professor of Physics, attended the 14th All India Conference on Electron Microscopy held at Calcutta. He was nominated as one of the Executive Members of the Electron Microscopy Society for two years.

Mr. E. V. Murali Mohan Rao, Instructor in Meteorology, attended the All India Geography Conference held at Delhi.

Dr. M. A. Khan attended the State Level Seminar on "Reservation" in August, 1981 and Land Reform Training Programme during September, 1981. In October he also attended an All India Seminar on Effective Implementation of Civil Rights Projection Act, '51.

Mr. Chandrasekhara Buggi and Dr. M. A. Khan attended the Workshop on Voluntary Organisation involved in Rural Development during August, 1981.

Dr (Mrs.) Radha D. Kale was deputed to present a paper in Darwin's Centenary Symposium on Earthworm Ecology held at Cumbria, U.K. during August-September, 1981.

Dr (Mrs.) Kubra Bano was also deputed to present a paper in the Vth International Congress of Myriapodology held at Virginia, USA, during August, 1981.

Dr. R. V. Krishnamoorthy presented papers in the second Regional Conference of the Association of Physiologist and Pharmacologists of India, held at Bangalore during October, 1981. His services are lent to the Government of Karnataka as Divisional Chief, Karnataka State Sericulture Development Institute, Bangalore.

Dr. (Mrs) A. Sundara Bai attended the Symposium on Diseases of Finfish and Shellfish during the month of March, 1982 and presented papers.

R. NARAYANA

*Director of Instruction (BS&H)*

## **B. University Library**

The significant development during the year is the occupation of impressive and functional library building at Dharwad in August, 1981.

*Library sub-committees:* The Library Sub-committee at GKVK Campus met five times during the year to consider the recommendations made by the faculties



of the main campus. Besides, it considered subscriptions to new journals for other campuses as these would constitute a recurring expenditure.

Library sub-committees functioned at the College of Agriculture, Dharwad, the College of Fisheries, Mangalore, and the Agricultural Engineering Institute, Raichur. They met several times in their campuses under their respective Chairmen and sent their recommendations of books and journals to the University Library for taking action.

*Acquisition:* In all 1,800 titles of books were recommended by various departments. Of them, 175 titles were dropped during scrutiny, and the other 1,625 titles were placed before the library sub-committee for consideration. The committee approved 1,550 titles, rejecting 75 titles, as suggested for addition to the library.

#### **Membership and use of the Libraries at GKV and Hebbal Campuses**

*Circulation:* This section looks after the membership enrolment of staff and students, issue and return of books, in addition to attending to the reservation of books loaned out i.e., the issuing of 'No Due' Certificate. The section also attends to Inter-Library Loans.

##### *Membership of University Library from 1-4-1981 to 31-3-1982*

Particulars	Potential			Actual		
	1979-80	1980-81	1981-82	1979-80	1980-81	1981-82
B.Sc. (Agri)	898	897	878	592	623	679
B.Sc. (Hort)	150	150	150	87	80	112
B.Sc. (Agril. Mark. & Coop)	98	98	98	67	58	82
B.F.Sc.	41	39	140	21	28	59
B.V.Sc.	409	496	543	383	346	305
B.Sc. (D.T.)	—	17	36	—	15	34
Postgraduates	369	434	447	325	319	415
Ph.D.	99	82	111	51	65	81
Bakery Training School	22	16	23	21	21	14
Staff	—	—	—	687	742	776

*Technical section:* During the year, 1747 titles comprising 1986 books were classified and catalogued. The progressive total of titles and books so far classified and catalogued are 44,354 and 53,142 respectively. During the year 6,772 catalogue cards were prepared, typed and merged at GKV and Hebbal Campus library catalogues. The section further prepared 1,750 shelf list cards and merged in the shelf catalogue.

*Periodical section:* The ever increasing cost of subscriptions, has, as in previous years, limited the new additions. Only 10 new titles were added, and another 12 titles are under consideration and will be taken up, when the funds improve. As an economy drive, 7 titles, which were found to be of marginal interest were dropped.

From this year, reminders for non-receipt of journals are being sent to local vendors instead of publishers, thus minimising postage involved therein.

*Reports section:* This section contains annual reports, technical reports of various research institutes, reports of several commissions appointed by Government of India, along with ISI Standards, Theses, WHO, FAO, WMO, UNESCO, UAS, ICAR publications. They are kept in a separate sequence with a catalogue of its own to facilitate easy consultation by its readers. For easy access a portion of the reports collection is housed in GKVK library.

*Growth of report section*

	1979-80	1980-81	1981-82
Acquisition of reports	750	690	742
Acquisition of theses	156	152	174

*Documentation section:* The Documentation Section plays an important role in providing necessary information and data to research workers.

Since 1981, the section has been providing a list of articles from current periodicals to various research stations of the University, after matching them with the subject profile of the station and its research staff. 2,100 items of information were noticed during the year and photocopies of 500 articles were provided. Further, 150 primary journals on agriculture were scanned and 3,500 articles were indexed.

As in previous years "Recent addition" and "Library Bulletin" were issued regularly providing information about new books and journals received in the University Library.

*Reprographic services:* The University Library provides reprographic services in both the Campuses.

Details of work done by the reprographic unit are furnished below :

Particulars	1980-81	1981-82
Requests received	1,922	2,276
Pages copied and supplied	27,760	27,305
Amount collected	Rs. 12,719-00	Rs. 17,948-30

Particulars	1980-81	1981-82
<i>B.A.T.</i>		
Requests received	187	256
Pages copied and supplied	6,709	8,597
Amount claimed	Rs. 3,215-80	Rs. 4,739-00
Photocopies received from outside	8	9

*Out Station Library:* Mr. Stanley M. Kumar visited RRS Library, Mudigere to update its catalogue and other library work. He also visited ARS, Bijapur to organize the library there. Along with the University Librarian, he visited the college of Agriculture Library, Dharwad to assess its furniture and the requirements of equipment.

H. R. RAMACHANDRA  
University Librarian

### C. Student Welfare

The Student Welfare programmes in the University were continued as ever to improve the amenities in hostels, hospitals, sports and other recreational aspects.

*Student Counselling:* As before 10 to 15 undergraduate students and 5 to 10 postgraduate students were assigned to each teacher for counselling.

An orientation programme was arranged at the beginning of the first trimester for freshers to get them acquainted with the system of our education and the facilities available on the campus. In this programme all the Officers and Counsellors took active part. A campus tour was also arranged when the fresh students were taken round the library, laboratories, hostels, cafeterias, etc., at the end of which the students were given guidance for registration of courses.

*Student Associations:* The Student Associations were formed in all the campuses by conducting elections in the first trimester. These associations have been engaged in arranging a number of cultural and literary activities through the respective clubs.

Campus	Date	Function	Invitees/Chief Guests
Hebbal	16-6-81	Inauguration of the Students' Science Forum	Vice-Chancellor, UAS
Hebbal	16-6-81	Get-together function to honour the UAS Cricket	Vice-Chancellor, UAS

1	2	3	4
		team for having won the Runners-up shield in the State Level 'Torino' Cricket Tournament	
Hebbal	20-6-81	Agricultural College Hostel Day	Mr. A. S. Murthy, President, Inter-National Humour Club, Bangalore Mr. Rajan Bala, Sports Editor, Deccan Herald
Raichur	2-7-81	Valedictory function of the Agril. Engg. Institute Students' Association, Raichur	Dr. R. Dwarakinath, Vice-Chancellor, Mr. B. A. Coutinho, Project Director, Dist. Rural Development Society, Raichur
Hebbal	3-7-81	Inauguration of the Karnataka Sangha (Kannada Balaga)	Director of Student Welfare, UAS Estate Officer, UAS
Mangalore	10-7-81	Hostel Day Celebrations of Fisheries College, Mangalore	Mr. K. N. Seetharam, Principal, Govt. College, Mangalore Mr. H. P. C. Shetty, Director of Instruction, Fisheries
Dharwad	16-7-81	Annual Social Gathering of the Students' Association, Dharwad	Sri K. P. Shyamsundar, Principal, District and Sessions Judge, Dharwad Dr. S. V. Patil, Director of Instruction (Postgraduate)
Hebbal	17-7-81	Valedictory function of the Veterinary College Students' Association	Dr. V. S. Joshi, Director of Animal Husbandry & Veterinary Services Sri Rajan Bala, Sports Editor,

1	2	3	4
			Deccan Herald Dr. K. Trivikrama Rao Director of Instruction (Vety)
GKVK	17-7-81	Hostel Day Celebrations of the G.K.V.K. Hostel	Dr. M.N. Viswanathaiah Vice-Chancellor Bangalore University Smt. Ashwini Kannada Novelist Dr. R. Narayana Director of Instruction (BS&H)
Dharwad	17-7-81	Hostel Day Celebrations of the Agricultural College Hostel	Prof. R.S. Bhoosnurmath Head of Physics Dept. Karnataka Science College, Dharwad Dr. T. Seshagiri Rao
Hebbal	29-7-81	Valedictory Function of the Agricultural College Students' Association	Mr. H. T. Sangliana Deputy Commissioner of Police Mr. Shankar Nag Cine Artist Dr. N. G. Perur Director of Instruction (Agri)
GKVK	12-8-81	Class Socials of the Final year B.Sc. (Ag. Mark.) students	Mr. K. H. Patil
GKVK	6-8-81	Valedictory Function of GKVK Students' Association	Sri B. D. Jatti Former Vice-President of India Dr. R. Dwarakinath Dr. R. Narayana
Hebbal	11-11-81	Inaugural Function of Veterinary College Students' Association	Dr. N. G. Perur Vice-Chancellor, UAS Mr. Laxmi Nizamuddin

1	2	3	4
			Dr. K. Trivikrama Rao Director of Instruction (Vety)
Mangalore	17-11-81	Inauguration of the Students' Association, Fisheries College, Mangalore	Sri Blasius D'Souza M.L.C. Mr. H.P.C. Shetty Director of Instruction (Fisheries)
Hebbal	18-11-82	Inaugural Function of the Agricultural College, Hebbal	Dr. M. Chidananda Murthy Prof. of Kannada Bangalore University Dr. N. G. Perur Vice-Chancellor, UAS
Raichur	21-11-81	Inaugural Function of Agril. Engg. Institute, Students' Association	Director of Student Welfare, UAS Mr. N. L. Maurya Principal, AEI
Mangalore	9-12-81	Inaugural Function of the Swimming Pool and Indoor Games Complex at Fisheries College, Mangalore	Dr. N. G. Perur Vice-Chancellor, UAS Mr. D. Rajagopal Board Member
GKVK	29-1-82	Inaugural Function of the GKVK Students' Association	Dr. T. V. Sampath Director of Agriculture Govt. of Karnataka Dr. R. Narayana Director of Instruction (BS&H)

A selected cultural team of the GKVK campus was deputed to participate in the "PESOE CARNIVAL" conducted by the PES College of Engineering, Mandya, on 28-6-1981. The team secured as many as 14 individual prizes and the "Runners Up" shield.

At the instance of the Directorate of Health and Family Welfare Services, Govt. of Karnataka, an essay competition was conducted on Family Welfare and the essays were sent for the State Level Competition. A Postgraduate

student Mr. M. C. Nandeesha, of Fisheries College, Mangalore secured a cash award of Rs. 300 as II Prize.

Two debators of the Veterinary College, Hebbal, Mr. A. K. Nagaraju and Mr. P. Prabhu, were deputed to participate in the Inter-Collegiate Kannada Debate organised by Sri Kuvempu Vidyavardhaka Trust, Mysore for the Rolling Shield in the name of Smt. Shanthi N. Bhadriah. It is a matter of pride to mention that our debators won the Rolling Shield. Mr. P. Prabhu bagged I prize and Mr. A. K. Nagaraju, the fourth.

At the instance of the State Department of Forestry an English Essay competition was conducted on Vanya Prani Saptah during the first week of October 1981. The results are awaited.

The Rajaji Centenary Committee, Bombay, has instituted a Rolling Shield in memory of late Shri Rajaji, in our University. We have been regularly conducting an English Elocution competition, on rotation in all the campuses, every year. This year it was conducted at Dharwad campus on 20-11-1981. The Rolling Shield was won by the Agricultural College, Dharwad. The following cash priyes were also awarded to the winners :

- |  |                    |
|--|--------------------|
| 1. Mr. T. S. Vagish<br>Agricultural College, Dharwad               | I Prize - Rs. 150  |
| 2. Miss C. M. Kala<br>Postgraduate Student, GKVK                   | II Prize - Rs. 100 |
| 3. Mr. A. K. Nagaraju, Final B.V.Sc.<br>Veterinary College, Hebbal | III Prize - Rs. 50 |

On 7-2-82, at the instance of the Committee for Cooperative Training, New Delhi, an Inter-Collegiate English Debate was conducted on Cooperation at the Fisheries College, Mangalore. The debators from all the Colleges of the UAS participated in the debate. The following students were adjudged winners :

- |   |          |
|---|----------|
| Mr. M. C. Nandeesha, P.G. Student<br>Fisheries College, Mangalore | I Prize  |
| Mr. Sudheer Dhume<br>Agricultural College, Dharwad                | I Prize  |
| Mr. Sreenivasa Murthy<br>Agricultural College, Dharwad            | II Prize |

The first two winners were also deputed to take part in the National Debate at Kurukshetra University, from 5th to 7th March 1982.

An Inter-Collegiate English Essay competition was also conducted on Cooperation, on behalf of the Council for Cooperative Training, New Delhi. As many as 25 students participated in the competition and the following were adjudged winners and their names have been recommended for the award of cash prizes:

(i) Mr. D. Mahadevan Final B.Sc. (Ag. Mark. & Coop)	I Prize – Rs. 150
(ii) Mr. Divakara Shetty, Final B.Sc. (Ag. Mark. & Coop)	II Prize – Rs. 100
(iii) Mr. D. T. Raja, Final B.Sc. (Ag. Mark. & Coop)	III Prize – Rs. 75
(vi) Mr. B. Aswatha Reddy, Final B.Sc. (Ag. Mark. & Coop)	

#### **Hostels and Cafeterias**

The construction of the Postgraduate Hostel at Dharwad Campus is completed and commissioned for use from the beginning of III Trimister. Construction of additional four rooms (first floor) on the Girls Hostel at Hebbal Campus was completed and made available for use.

The following members of the staff have been working as Rectors, Wardens and Additional Wardens in different Hostels of the University :

Campus	Name of the Rector, Warden, Addl. Warden	
1	2	
<i>Hebbal Campus :</i>	Dr. A. V. Rai	Rector, UAS Hostels Hebbal Campus
Agricultural College	Mr. K. G. Ranganathathiah	Warden
Hostel, Hebbal	Dr. B. Shivaraj	Additional Warden
Veterinary College	Dr. R. V. Patil	Warden
Hostel, Hebbal	Dr. R. N. Srinivasa Gowda	Additional Warden
UAS Girls' Hostel Hebbal	Mrs. Shakunthala Raju	Warden
GKVK Hostel, GKVK	Vacant	Rector
	Dr. J. V. Venkataram	Warden
	Dr. M. S. Jagannath	Additional Warden
	Mr. A. G. Huddar	Additional Warden
<i>Dharwad Campus :</i>	Dr. K. C. Hiremath	Rector
Agricultural College	Dr. P. Basavaiah	Warden
Hostel, Dharwad	Dr. P. C. Hiremath	Additional Warden
	Dr. P. Venkataramaiah	Additional Warden



1	2	
Rural Home Science College Hostel Dharwad.	Mrs. Suhasini Rao	Warden
Raichur Campus : Agricultural Engineering Institute, Raichur	Mr. Surya Rao	Warden
Mangalore Campus : Fisheries College Hostel, Mangalore	Mr. K. V. Rajagopal	Warden

The strength of the boarders in the UAS Hostels at different campuses, and the average food charges during 1981-82 were as follows :

Campus	No. of rooms available	No. of boarders accommoda- tion	Daily average food charges	
			Vegetarian	Non-Vegetarian
1	2	3	4	5
Hebbal Campus				
Agricultural College Hostel :			Rs.	Rs.
I Block	62	174	4.13	4.82
II Block	62	180		
Veterinary College Hostel :				
I Block	62	150	5.03	5.29
II Block	62	140		
UAS Girls' Hostel :				
Ground Floor	5	18	5.25	
First Floor	9	38		
GKVK Campus				
UAS Hostel, GKVK :				
I Block	66	189	4.65	5.22
II Block	66	195		
III Block	66	198	P.G. Mess	5.03
Dharwad Campus				
Agricultural College Hostel :				
Suyoga Block	16	64	5.20	5.15
Spurti Block	20	80		
Pragati Block	107	214		
Krishika Block	116	232		
Cellar Rooms	12	24		

1	2	3	4	5
<i>Rural Home Science College Hostel :</i>				
A - Block	4	17	3.50	-
B - Block	4	22		
<b>Raichur Campus</b>				
<i>Agricultural Engineering Institute Hostel</i>				
Ground Floor	6	11	4.86	
First Floor	6	18		
Second Floor	6	20		
<b>Mangalore Campus</b>				
<i>Fisheries College, Mangalore</i>				
Cauvery Block	18	33	6.45	
Narmada Block	18	30		
Ganga Block	18	54		

**N.C.C. and Physical Education**

As in vogue, courses in NCC, Physical Education, Swimming, Boating and Rowing were offered for the first year undergraduate students.

The Annual NCC Training Camp, for the Cadets of GKVK and Dharwad Campus, was conducted at Dharwad Campus from 19th to 30th March 1982. 213 Cadets and three Officers from GKVK Campus, and 130 Cadets and one Officer from Dharwad attended the above training : amp.

The following were the number of students that registered for NCC and Physical Education at GKVK and Dharwad Campuses during 1980-81 :

Campus	Class	Strength	
		Boys	Girls
1	2	3	4

**N.C.C****GKVK Campus**

All first year classes excluding			
Veterinary College (UAS Coy. 1)		170	—
First year B.V.Sc. (UAS Coy. 2)		106	—

**Dharwad Campus**

All first year classes of			
Agricultural College		80	—

**Physical Education****GKVK Campus**

All first year classes		140	32
------------------------	--	-----	----

1	2	3	4
<b>Dharwad Campus</b>			
	All first year classes of Agricultural College	57	—
	First year B.H.Sc.	—	28
	<b>Boating and Rowing</b>		
<b>GKVK Campus</b>			
	First year B.F.Sc.	35	—

### **Sports and Games**

*The UAS Inter-Campus Athletic Meet 1982:* The 15th UAS Inter-Campus Athletic Meet was conducted on 13th and 14th February 1982 at Mangala Stadium, Mangalore. Shri K.V.R. Tagore, Superintendent of Police, State Special Branch, Mangalore Division inaugurated the meet. Shri H. M. Nagabhushana, Comptroller, UAS, was the Chief Guest while Shri B. Venkataswamy, Estate Officer, UAS, presided over the function. Prof. H.P.C. Shetty, Director of Instruction (Fisheries), Mangalore, distributed the prizes at the closing function on 14-2-1982 when Shri R. Krishnappa, Registrar, UAS, presided.

Mr. Kemparaju and Miss Akkamma of the Agricultural College, Hebbal secured the Individual Championships among the Men and Women selections respectively. The athletes of Agricultural College, Hebbal won the Athletic Championship and the athletes of Veterinary College, Hebbal, were the Runners. The late Sri B.N.M. Hegde Memorial Rolling Shield for the overall championship in games and athletics went to the Veterinary College for the year 1981-82.

*The Karnataka State Inter-University Meet:* Our UAS Teams were sent to participate in the Karnataka State Inter-University Tournaments conducted at the Karnataka University, Dharwad from 19th to 21st February 1982. The following positions were secured by our UAS teams :

<i>In Athletics:</i>	4 × 400 mts. relay	—Third Place
<i>In Games:</i>	Basket Ball	—Runners-up
	Kabaddi	—Runners-up

Selected UAS Teams were deputed to participate in as many as 10 Inter-University Tournaments conducted by the Sports Board of India. The calendar of events and venue of Inter-Campus and Inter-University Tournaments are furnished below :

*Calendar of sports events for the year 1981-82*

Sl. No.	Event	Inter-Campus Tournaments				Inter-University Tournaments		
		Date and Month	Venue	Results		Date and Venue	Played against	
1	2	3	4	5	6	7		
1.	Chess	29th to 31st Jan. '82	Mangalore	Vetico. GKVK	—Winners —Runners	—not participated—		
2.	Table Tennis	13/14th Feb. '82	Mangalore	GKVK	—Winners —Runners	—not participated—		
3.	Football			Agrico. Dhar. GKVK Agrico. Hebbal—Runners	—Winners —Runners	2nd Oct. '81	—Kerala Univ. Trivandrum	i) Venkateshwara University (2-1) ii) Tamil Nadu Agril. University (2-0) iii) Mysore University (0-2)
4.	Kabaddi	17/18th Oct. '81	Hebbal	GKVK Agrico. Darwad	—Winners —Runners	18th Nov. '81	—Sardar Patel University Anand	
5.	Volleyball	—do—	Hebbal	Agrico. Hebbal—Winners Vetico. Hebbal—Runners	—Winners —Runners			
6.	Basketball	7th to 9th Nov. '81	Hebbal	Fishco. Mangalore Vetico. Hebbal—Runners	—Winners —Runners			
7.	Hockey	14/15th Nov. '81	Hebbal	GKVK Vetico. Hebbal—Runners	—Winners —Runners	14th Dec. 81	—Mysore Univ. Mysore	i) Kakatiya University (7.0) ii) Nagapur University (0.2)
8.	Cricket	7th to 9th Nov. '81	Hebbal	Vetico. Hebbal—Winners GKVK —Runners	—Winners —Runners	—not participated—		
9.	Kho-Kho	28-29th Dec. '81	Hebbal	Vetico. Hebbal GKVK	—Winners —Runners	5/9th Jan. '82	—Kanpur Univ. Ajithmal	i) Kumayum Univ. ii) Kanpur Univ. iii) Karnatak Univ. iv) Nagarjuna Univ. v) Bombay Univ.

	2	3	4	5	6	7
10. Ball Badminton	9/10th Jan.' 82	Raichur	Vetico. Hebbal Fishco. Mangalore	—Winners —Runners	—not participated—	
11. Lawn Tennis					20/23rd Jan.' 81	—P.A.U.T. Madras —Calicut Univ. (Men and Women) i) Kakatiya Univ. ii) Nagapur Univ.
12. Shuttle Badminton	24th Oct.' 81	Hebbal	Agico. Hebbal Fishco. Mangalore	—Winners —Runners	2nd Nov.' 81	i) P.A.U.T. Won
13. Athletics	13/14th Feb. 82	Mangalore			—not participated—	

### **Local Tournaments**

**Hockey:** Karnataka State 'B' Division Hockey League Tournament was conducted from 19th to 26th April 1981 and the UAS Hockey team has completed the Hockey League Tournament and has been promoted from 'B' Division to 'A' Division.

In the Maharaja Gold Cup Hockey Tournament conducted by St. John's Medical College, Bangalore, from 9th to 12th December 1981 our UAS Hockey team were the winners.

**Lawn Tennis:** Mr. Sirish Kumar, a Ph.D. student of Agricultural College, Hebbal, participated in the Karnataka State Tennis Tournament conducted at Hospet on 4-6-1981 and won the following distinctions:

1. Singles - Runners-up - A cash award of Rs. 400
2. Doubles - Runners-up - A cash award of Rs. 200

**Best Physique:** Best Physique competition was conducted on 14-7-1981 at Hebbal campus. Mr. T. K. Ghosh, 'BHARATH SHRI' 1980-81 was one of the committee members on the Selection Committee. The following were the winners:

- |                          |   |              |
|--------------------------|---|--------------|
| 1. Mr. Jagadish M. Desai | — | Mr. Agrico.  |
| 2. Mr. Shambashiva Reddy | — | Mr. Vetico.  |
| 3. Mr. Basavakumar       | — | Mr. G.K.V.K. |

**UAS Awards for Sportsmen:** In recognition of the outstanding contributions made by our students in the field of sports, the following were awarded Gold Medals by the UAS during the year 1981-82:

- |                      |                 |           |
|----------------------|-----------------|-----------|
| 1. Mr. D. M. Devaiah | G.K.V.K. Campus | Hockey    |
| 2. Mr. Swamy         | Agrico. Hebbal  | Athletics |
| 3. Mr. Suresh Kumar  | Vetico. Hebbal  | Kho-Kho   |

The construction of the swimming pool and the Indoor Games Complex at Mangalore Campus was completed and commissioned for the use of the students during the month of January 1982. Now the swimming and boating courses which are being offered for I B.F.Sc. class at G.K.V.K. could be shifted to Mangalore.

### **N.S.S. Scheme**

The National Service Scheme which was organised in all our campuses as the special camping programme in the previous years has been discontinued from this year since it was pointed out that camping programme alone would

not be organised unless the regular NSS programme be working in the institutions. An attempt was made to introduce this scheme as regular programme in all the campuses; but unfortunately there was little response with the exception of the Rural Home Science College, Dharwad. The NSS volunteers of the Rural Home Science College have adopted a village in the vicinity of the campus viz., Yattinagudda, and have been carrying on the programme. They also conducted a special camp for ten days from 28-3-1982 to 6-4-1982 at a village called Mansu near Dharwad in which 49 girl students participated.

A Zonal Conference to review the implementation of the NSS programme in the Agricultural Universities of the South Zone was held at Hebbal campus of the University of Agricultural Sciences, on December 26, 1981. The Deputy Programme Advisers, Asst. Programme Advisers, Programme Co-ordinators, and Programme Officers of the different Universities participated in the seminar.

#### **Medical Services**

The Hospitals in all the campuses worked satisfactorily during the year. The Hospital building at GKVK is under construction for which the staff, including a Medical Officer, a Compounder and a Ward Boy have been created. The Annual Medical Examination of the first year classes was completed.

As in the previous years, the students of final year and pre-final year classes who went on educational tours were protected against cholera and typhoid.

K. SUBBAIAH

*Director of Student Welfare*

## **PART III**

### **RESEARCH**

Under the National Agricultural Research Project (NARP), establishment of a research station at Navile, Shimoga at a total cost of Rs. 56.60 lakhs is under implementation during this year. However, for starting a research station at Nagamangala under NARP, at a total cost of Rs. 57.37 lakhs, has been cleared by the Project Funding Committee and the budget is to be released by the Indian Council of Agricultural Research.

A research component in the agricultural complex of the Upper Krishna Project at a total cost of Rs. 75.29 lakhs and a project on conducting bench mark survey of Upper Krishna Project at a total cost of Rs. 10.56 lakhs are also under implementation during this year. Besides, projects like Soybean Processing and Training for self-employment—at a cost of Rs. 25,000 and relative economy in the use of irrigation water to horticultural crops at a cost of Rs. 8,685—have also been initiated during this year.

The work on seed production and research investigations on various crops and management practices and several other new problems like control of *Nephantis*, studies on areca yellow leaf disease, control of Uzi-fly of silkworm are being continued. The research report in respect of plant science, animal science and fishery science for the year 1981-82 is as follows :

#### **1. Plant Science**

##### **1.1. Agronomy**

###### **1.1.1. Rice**

In the trial on nitrogen fertilizer efficiency in wetland rice, conducted at Mandya during *kharif* season, maximum yields were obtained by the use of urea super granules placed at 10-12 cm depth as compared to use of prilled urea by split application and sulphur or lac-coated urea. Yield levels of 6049 kg/ha and 5359 kg per hectare were obtained by the use of urea super granules at 116 and 87 kg N/ha respectively as compared to 4859 kg/ha and 4328 kg/ha in the use of prilled urea at the same nitrogen levels. In another trial in *kharif*, the use of urea super granules gave better yields of rice with a higher plant density



(15 × 10 and 15 × 20 cm) whereas similar trial conducted during summer did not indicate such a response. The studies on best time of root zone placement of urea super granules from the time of transplanting to 20 days after transplanting did not indicate any treatment differences. Azolla application at 6 t/ha gave similar yields as those of 25 kg N/ha as urea in 2 splits.

In the nitrogen variety trial conducted at Mandya during *kharif* season, IR-20 has given the highest yield of 8430 kg/ha at 120 kg N/ha and 7673 kg/ha at 80 kg N/ha. The variety which proved next best was IET 5882 with yield levels of 7503 kg/ha and 6193 kg/ha at 120 and 80 kg N/ha respectively. In another trial also IR-20 gave maximum response to N application followed by Mandya Vani, IET 6211, KMP-39 and KMP-104.

#### 1.1.2. *Ragi*

In the nitrogen-variety trial conducted at Bangalore during *kharif*, JNR-1008 and PES-110 gave the highest yield of 4930 kg/ha and 4918 kg/ha respectively as compared to 4676 kg/ha of Indaf-5 over 0-90 kg N/ha levels. In another trial HR 1523 variety gave the highest yield of 6188 kg/ha over 0-100 kg N/ha levels followed by 5977 kg/ha of Indaf-8. In the studies conducted on plant population, varieties and nitrogen, Indaf-5 has given the highest yield of 3886 kg/ha with 100 kg N/ha and at 22.5 × 10 cm spacing.

The gross income of Rs. 7,923/ha was obtained from inter-cropping of C.11 redgram at 40,000 plants/ha with sorghum, at Dharwad. Mean yield of sorghum was 3240 kg/ha and that of redgram was 1162 kg/ha.

#### 1.1.3. *Wheat*

DWR-16 and HD 2189 were found to be promising at rates of nitrogen at Dharwad during *rabi* 1980-81. On an average over 100, 150 and 200 kg/ha seed rate, sowing with 20 cm spacing gave the highest yield of 4964 kg/ha at Dharwad and 5469 kg/ha at Navalgund. The yield levels obtained with 20 cm row sowing were 4461 and 5213 kg/ha at Dharwad and Navalgund respectively.

#### 1.1.4. *Groundnut*

Among the different inter and intra row spacings of DH-3-30 groundnut variety 4293 kg/ha yield was obtained with 20 × 7.5 cm spacing at Dharwad.

#### 1.1.5. *Soybean*

On an average, over last two years results at Bangalore, intercropping of soybean, two rows in paired row planting of redgram, and one row in ragi sown at 45 cm spacing gave higher monetary returns of Rs. 8,327/ha and Rs. 9544/ha respectively as compared to Rs. 8294/ha in pure crop redgram and

7209 in pure crop of ragi. Pure crop of soybean gave Rs. 3758/ha. Amongst the different herbicides tried in soybean, Sencor at 0.5 kg a./ha gave mean yield of 1474 kg/ha as compared to 1360 kg/ha in twice hand weeding and 633 kg/ha in weedy check.

#### 1.1.6. Tobacco

Application of castor cake at 2000 kg/ha gave the highest yield of 1753 kg/ha of bidi tobacco at Nippani as compared to 1416 kg/ha 120-60-40 kg NPK/ha application.

The results of fertilizer-cum-varietal-cum-spacing trial on bidi tobacco conducted at Nippani showed that plants gave highest yield of 3135 kg/ha followed by 3104, 3069 and 2557 kg/ha obtained with A. 119, NPN-190 and 288-174 tobacco varieties. Higher yields were obtained with 75 × 75 cm, 100 × 50 cm spacings which gave 2954-2972 kg/ha as compared to 2892 kg/ha in 100 × 75 cm spacing. Application of 120-60-40 NPK kg/ha gave 3019 kg/ha as compared to 2915 kg/ha with 160-80-60 NPK kg/ha.

#### 1.1.7. Sugarcane

KHS. 3296 an early maturing cane gave 150 t/ha as compared to 155 t/ha of Co. 419 and 185 t/ha of Co. 62175. The highest mean yield of 197 t/ha was obtained with KHS 3461 as compared to 182 t/ha with Co. 62175 and 169 t/ha with Co. 419. The studies on the effect of defoliation on yield and quality of cane varieties of Co. 419 and Co. 62175 conducted at Mandya showed that defoliation was harmful. There was no improvement in girth of cane by defoliation. Yields reduced from 196 t/ha in no defoliation to 184-188 t/ha in 25 to 75 per cent defoliation.

#### 1.1.8. Forage crops

Under KDDC Fodder Project at Bangalore, 48.34 t/ha of herbage yield of soo-babul was obtained with 150 cm ht. of cutting and at an interval of 70 days. The data are available for an average of two years. Lesser height of cutting or lower interval of harvest gave lower yields.

#### 1.1.9. Irrigation water management

On an average, as obtainable from the data of the last three years, a maximum yield of 2766 kg/ha Bengalgram was got when irrigation was scheduled at 0.6 IW/CPE ratio. In case of A. 1 *rabi* jowar which lodges under irrigation, withholding of irrigation up to 40 days and then irrigating at 0.8 IW/CPE ratio has produced the grain yield on par with irrigation at 0.8 IW/CPE ratio throughout, but plant height was reduced. There was a saving of 2 irrigations. On an average of 3 years data, a maximum yield of 1652 kg/ha of sunflower was

obtained when the crop was irrigated at 0.6 IW/CPE ratio as compared to 834 kg/ha in control and 1523 kg/ha when irrigated at 0.8 IW/CPE ratio. Sunflower gave a maximum yield of 2066 kg/ha at 120–150 NPK kg/ha as compared to 780 kg/ha in control.

#### 1.1.10. *Model Agronomy*

In an experiment on production potential and economics of high intensity crop rotations at Siruguppa, the highest net return of Rs. 19,084/ha was obtained by growing Blackgram (T-9) in *kharif* relayed with Varalaxmi cotton and followed by Morden sunflower. This was as against the net return of Rs. 11,558 with jawar-wheat-jowar rotation, which was considered standard for achieving high yields based on earlier research results.

### 1.2 Plant Breeding

#### 1.2.1. *Rice*

In the project for improvement of Intan for earliness, Intan-Mutant-1, maturing in 115–120 days, Intan Mutant-2, maturing in 130–125 days and Intan-Mutant-3, maturing in 140–145 days were isolated and tested over locations for reaction to diseases and pests and also for grain yield in research stations as well as on the farmers' fields. They were tested under normal and low fertility conditions. The mutants produced more grain yield than Pushpa and Madhu under low fertility conditions. At normal doses, however, they are on par with checks including Intan. These mutants are resistant to blast and have high straw production.

In breeding for adverse soil conditions (salinity and alkalinity), 30 highly tolerant lines have been selected for multi-location testing. The cultures SHB-1, Pragathi, RP-1163-101-5-1-3-1 and IR-46 exhibited strong tolerance under adverse conditions. It was seen that SHM-1, IR-46 and Pragathi were found to be better than SR-26-B for salt tolerance. The cultures KMP-133, KMP-134 and KMP-139 have been identified as resistant to gall fly and stemborer and they are in the minikit trials.

In the project on breeding for drought tolerance, it was observed that IET-5656, IET-5882, IET-5889 and Es-18 gave about 15 to 20 per cent higher yield over A-200. In breeding for red rice varieties resistant to gall midge, a high yielding variety KMP-2 has been developed from the cross IET 2886 × Red Annapurna, which has red rice, resistant to gall midge, giving about 43.7 q/ha as against 33.7 q/ha of Red Annapurna. This variety is found to be suitable for upland, midland gall midge endemic areas of South and North Kanara Districts and it is in the final stages of testing.

### 1.2.2 **Wheat**

As a result of continuous research efforts, over the past several years, a number of promising wheat cultures *i.e.*, DWR-16, DWR-39, DWR-40, DWR-48, D4-447 and DWR-51 have shown better performance in yield and rust resistance. Among these DWR-16 (Kirti) has been recommended for release by central varietal release committee for general cultivation in Peninsular India. These two varieties have done well under moisture stress as well as late-sown conditions, and they are resistant to both black and brown rust diseases. They give about 15 to 20 per cent higher yield over UP-301, and 10-15 per cent higher than HD-2189, besides having grain and chapati making qualities. The variety D-137 (Kiran) was released for general cultivation in Karnataka under rainfed conditions, since it is better in yield performance and also it is resistant to the new races of rust, 117-A1 and 42-B-2 compared to Bijga yellow.

### 1.2.3. **Sorghum**

The sorghum varieties SPV-391 (7715 kg/ha) and SPV-351 (7018 kg/ha) were found promising with almost double the fodder yield of CSH-5. In advanced hybrid trial, the experimental hybrids SPH-159 and SPH-176 were found better than CSH-5

The new hybrid - DSH-1 (296-A  $\times$  SB 1085) has undergone yield verification in cultivators' fields and was found to be highly promising. It is recommended for per-release multiplication. The variety SB-905 was released, as KDS-1 for the transition zone No. 7 and 8 in view of its superiority in grain, fodder yield, threshability, rust resistance and tolerance to charcoal rot.

### 1.2.4. **Groundnut**

In the national yield evaluation trial, on Spanish Bunch types, JL-24 gave the highest yield, while G-201 gave the highest 100 pod weight. In the coordinated varietal trial JL-25 gave the highest with 2076 kg/ha.

### 1.2.5. **Castor**

In castor, Bhagya gave 12 per cent higher yield over RC-8 and it was proposed for adoptive trials, the new castor hybrid VP-1  $\times$  1-21 gave 35 per cent higher yield over RC-8 and 30 per cent higher yield over G-AUCH-1.

### 1.2.6. **Niger**

No. 71 was released this year for general cultivation. Another selection RCR-18 is found to be better this year giving 30 per cent higher yield than the local. In the coordinated varietal trial N-12-3 gave the highest yield of 406 kg/ha, followed by NR-73-13 with 386 kg/ha.

### 1.2.7. Cotton

Jayalaxmi, a new inter-specific hybrid, superior to Varalaxmi both in yield and quality has been released for general cultivation. In addition, a new strain Sowbhagya (DS-59) superior to Hampi has also been released. Further, SRG-26 and DS-4 in *G. hirsutum* and DB-3-12 in *G. herbaceum* are in the final stages of testing. Three more strains, DS-27, DS-28 and DS-480-2 have performed well in the irrigated areas of south zone. These are found to be superior to the respective local varieties in earliness, seed cotton yield with a potential of 27 q/ha and 42 to 50 counts spinnability. Another strain JK-97 is under adaptive trials. Several synthetic strains, isolated from top crosses/and composite crosses are under study.

### 1.2.8. Sugarcane

128 clones including 56 exotics have been added to the existing gene pool. Four exotic clones B. 45181, H. 57--5174 L 61-52 and CB 38-22 were identified as potential parents for cane yield and quality and they are utilized in hybridization programme. H. 57-5174, IC.225 and B. 37-172 yield 9 tons or more per month per hectare for June and March planting, suggesting the potential as short duration clones for late crushing.

### 1.2.9. Tobacco

In the final evaluation trial of flue cured tobacco, out of 8 varieties tested during last 2 years, the varieties 2687-7 and 2531 gave maximum green and cured leaf compared to VFC special. In the final evaluation trial with 7 cultures, the culture 22-5-1 from Shimoga and GSH-3 (Jayashree) from Rajmundry gave a maximum yield of 155.8 q/ha of green leaf compared to 149 q/ha of VFC special. In the initial evaluation trial with 12 cultures the line 112-18-3 from Anand, 3-6-12 (f8) from Shimoga, 112-18-3 from Rajmundry gave a maximum green leaf, bright leaf and TBLE value compared to the rest. The lines 112-18-3, 3-6-12 and 621 gave 12 per cent more cured leaf than VFC special. In the trial on the performance of Burley tobacco with 10 cultures Bolsunoua white, broad Burley, Laburely Epea and Burley-21 gave maximum green leaf, air cured leaf as compared to the rest of the cultures.

## 1.3 Crop Physiology

### 1.3.1. Bajra

In an experiment conducted to investigate the effect of plant densities and fertilization on productivity in Pearl millet, three varieties of bajra viz., MBH 118, ICMS 7703 and BJ 104 were tried at 3 plant densities by altering the row spacings and with three levels of nitrogen, 0, 40 and 80 kg/ha. Grain yield increased at higher plant densities with increasing levels of nitrogen. In two

varieties MBH 118 and BJ 104, at high density an increase in yield was achieved only up to 40 kg/ha dose of N.

### 1.3.2. *Paddy*

Regarding the effect of LAD during different stages of growth on productivity in early types of rice the results indicated that, increasing LAD during GS<sub>1</sub> stage may increase productivity during *kharif* by enhancing the tiller number/unit area which is the main constraint to productivity.

## 1.4 Agricultural Chemistry and Soils

A significant increase in grain and straw yields of maize by the addition of neem cake was observed under irrigated conditions at Dharwad. Single superphosphate was found to be the best phosphatic fertilizer for leguminous crops like cowpea, soybean and lucerne leaving considerable residual nutrients like P, Ca and Mg. But diammonium phosphate had higher residual effect for the succeeding crop over dicalcium and/or single superphosphate.

It was observed that neem cake coated urea could increase the yield of rice up to 17 per cent, with 20 per cent saving N fertilizer. A study on N economy through organics manure indicated that N could be replaced by FYM, to a large extent, for rice in Mangalore.

Safflower responded to zinc application and gave an extra yield of 20 per cent by application of 20 ppm of Zn. It was also found that by application of Zn, native N could be made available more easily. Bengalgram responded to the application of Zn and Fe in vertisols recording highest yields. Foliar application of copper sulphate at 5 kg/ha resulted in a significant increased yield in groundnut.

Application of lime to VFC tobacco grown in acid soils responded well and increased the leaf yield. But reducing sugar content was at a lower side of the desirable limit. The quality ratio of total N to nicotine was slightly higher and reduction of sugars in nicotine was slightly lower than the desirable limit.

## 1.5 Horticulture

### 1.5.1. *Mango*

In studies on flowering physiology of mango, fruited twigs of the 'on' year made to flower in the next 'off' year by the application of three sprays of 100 ppm of TIBA + Ethrel in 2 per cent KNO<sub>3</sub> solution. Among the shoots treated 60 per cent flowered which otherwise would have remained unfruitful.

In standardization of wedge grafting in mango, it was observed that a high percentage of success could be obtained by using fruited stump with

dormant buds as scion as compared to the use of current season shoots as scion material.

#### 1.5.2. Vegetables

In trials to evolve varieties resistant to bacterial wilt caused by *Pseudomonas solanacearum*, *Solanum torvum* and *S. macrocarpum* exhibited a high degree of resistance. Among the existing brinjal cultivars West Coast Green Round, West Coast Purple Round, SM-6, Pusa Purple Long and Gulla were found to possess resistance for bacterial wilt. A fairly high degree of resistance to bacterial wilt was observed in the hybrids obtained from the combinations, West Coast Green Round × Pusa Kranthi and West Coast Purple Round × Pusa Kranthi. These hybrids, in addition to being resistant to bacterial wilt, were found to be high yielders with superior quality fruits.

#### 1.5.3. Aromatic and Medicinal Plants

A comprehensive collection of aromatic and medicinal plants has been built up at GKVK. A study on the effect of nutrients on growth and yield of *Abelmoschus moschatus* has been taken up with different levels of N, P and K.

### 1.6 Entomology

The study on pesticidal toxicity to natural enemies of coconut black headed caterpillar indicated that endosulfan was safe for the stages of parasitism and the most toxic chemical was monocrotophos.

Detailed studies carried out on the fungus *Beauveria brongniartii* in respect of ecology and utilisation against white grubs management indicated that this could be a potential pathogen to be used against them.

As regards evaluation of parasites and predators of *Nephantis serinopa* four species of larval parasites were bred in *Corcyra cephalonica* and released in the field. The parasite evaluation studies revealed the establishment and recovery of two larval parasites of *N. serinopa* namely *Bracon brevicornis* and *Peresierola nephantidis* in cooler months. Other two parasites did not establish at all and thus recovery could be made.

In respect of biology and control of cashew stem borer, it was observed that the peak period of emergence was January, and there was no emergence from June–October. The larvae took about 205 days to reach the pupal stage on cut-branches and adults formed from pupae in about 64 days. The survival period for male and female was 18 and 12 days respectively. Application of 1 per cent BHC dust after removal of larvae gave satisfactory control of the pest.

Bioecological studies carried out on the orange headed leafhopper (*Thaia subrufa*) on rice showed that it is a powerful sap feeder and causes 'hopper burn' under severe infestations. It occurs severely on ratoon crop.

Early stages of silkworm were found to be comparatively more susceptible to Kenchu disease. Pure Mysore breed developed Kenchu symptoms readily as compared to bivoltines viz., NB<sub>4</sub> D<sub>2</sub> NB<sub>7</sub> and NB<sub>18</sub>, while Hosa Mysore showed a susceptible intermediate between Pure Mysore and bivoltines.

The studies on the Uji fly were initiated consequent on the wide spread infestation of this fly in traditional areas of Karnataka causing extensive damage to sericulture. Extensive investigations were contemplated and executed towards a better understanding of the biology, ethology and management of the Uji fly. Based on the close observations of the behaviour, successful non-chemical techniques were evolved for the management of the Uji fly and demonstrated in farmers' rearings in different locations.

### 1.7 Plant Pathology

Studies made on murda syndrome of chilli revealed that, in addition to thrips, mites and leaf curl virus reported to cause this syndrome, sap and aphid transmissible viruses (Cucumber Mosaic Virus, Potato Virus Y and Pepper Vein mottle virus) were found to cause similar syndrome.

Pigeon-pea Phyllody and pigeon pea witches broom diseases were observed for the first time in India. Pigeon pea phyllody has been successfully graft-transmitted.

In the virus-vector relationship studies, it was found that *Bemisia tabaci* transmit cowpea mild mottle virus in a non-persistent manner and the virus could also infect groundnut and soybean. Out of 112 cultivars of soybeans tested for cowpea mild mottle virus by artificial inoculation with white flies showed that two cultivars did not develop symptoms, 12 showed moderate symptoms and the rest severe symptoms.

Two lines of tomato have been identified to be resistant to bacterial wilt caused by *Pseudomonas solanacearum*. These varieties are being used in breeding programme.

Out of 20 varieties of soybean tested against bacterial disease, KHSb-6, KHSb-7 and NP-3 were found to be resistant by having zero disease index and KHSb-4 was found to be resistant to bacterial pustule disease in AV trial.

Seven lines of cowpea 959 b, 1005, 1086, EC 124468b, EC 124481 and 1002 have been identified as highly resistant to bacterial blight of cowpea, a serious limiting factor in the cultivation of the crop.

Screening of improved varieties of ragi against blast revealed Indaf-9 being susceptible to leaf blast and moderately so to neck and finger blast.



The analysis of soil and plant samples in sugarcane fields of Bidar and Gulbarga districts revealed the presence of *Aphelenchus avenae*, *Helicotylenchus paragirus*, *Helicotylenchus* sp., *Rotylenchulus reniformis*, *tylenchorhynchus* sp., and *T. elegans*, *Helicotylenchus* sp. were abundant.

Based on international host differential reactions three races of root-knot nematode (*M. incognita*) have been identified in Karnataka, which fact goes a long way in suggesting effective control of this nematode. *Heterodera gambiensis* was found to a parasite on ragi the first of its kind, nematode from India.

### 1.8 Agricultural Microbiology

Inoculation with *Glomus* sp. resulted in increased dry weight of shoot and root in wheat. This increase was by 40 per cent and it was equivalent to that obtained with application of 50 per cent of recommended P level over control. Inoculation with *Azotobacter* alone also resulted in increased dry weight of plant but it was not significant over control alone or *Glomus fasciculatus* plus *Azotobacter*.

Mycorrhizal inoculation significantly increased native nodulation by 25 per cent in bengalgram which phosphorus application alone failed to do. Dry weights of root and shoot were increased by inoculation with *Glomus* or *Rhizobium* and both.

In an experiment to study the effect of maize or sunflower stalk incorporation to soil on the symbiotic nitrogen fixation in cowpea in dryfarming situations, there was increased nodulation and dry matter yield of cowpea inoculated with *Rhizobium* when grown in soil amended with sunflower stalks. After harvest of sunflower heads, the stalks, if incorporated into soil, would greatly benefit symbiotic nitrogen fixation in succeeding legume crops.

An indigenous *rhizobium* strain, the UAS IV gave 32 per cent seed yield increase in blackgram under field conditions and was superior to other two strains included in All India testing trials.

*Rhizobium* seed inoculation to bengalgram gave increased dry matter and seed yields both under farmers fertility and maximum fertility levels of soils. The bengalgram could meet its entire nitrogen requirement through symbiotic fixation and produced yields comparable to those supplied with 100 kg N/ha as urea.

Studies were conducted to improve the cultivation methods of oyster mushrooms, *Pleurotus sajorajju*. The result indicated successful production of spawn using jowar seed without chemical amendments at 60 per cent moisture level and autoclaving for 45 minutes at 120°C and 15 lb pressure.

This reduces sterilization time by one hour and the cost of spawn by 50 per cent as compared to earlier report.

### 1.9 Agricultural Economics

A study on the economics of sprinkler irrigation undertaken in Bagalkot area of Bijapur District and Davanagere area of Chitradurga District indicated that the investment on the sprinkler borewell farms (Rs. 42,913.84/farm) was 1.64 times the investment on non-sprinkler open well farms (Rs. 26,119.70/farm). Commercial crops, namely, groundnut and Varalaxmi cotton occupied a large proportion of the area under sprinkler irrigation. Net irrigated area as also the cropping intensity was higher on the sprinkler farms than on the non-sprinkler farm. Human labour was of higher use on sprinkler farm under bore well (1028 man days/farm) as compared to non-sprinkler farms (581 man days). Investment on sprinkler was found to be financially feasible through the tests (B.C. Ratio, Internal Rate of return and pay back period) of feasibility of capital investment.

An evaluation of investment in coffee estates in Coorg District indicated that the establishment and maintenance costs were higher in small and medium Arabica estates than in the Robusta estates, except in the case of large Robusta estates where these costs were higher than large Arabica estates. The average net returns per estate was highest in the large Robusta estates (Rs. 12,80,026.56) and the least in the small Arabica estates (Rs. 7,964.77 per estate). The average sizes of small, medium and large Arabica estates were 2,07,533 and 82.82 ha respectively, while they were 2,36,4.17 and 87.74 ha for small, medium and large Robusta estates respectively.

A comparative study of economics of change in production technology in rainfed ragi and groundnut in Tumkur taluk indicated that the per ha yield of ragi increased by 93.10 per cent under high yielding varieties over local varieties, whereas in groundnut it increased by 107.22 per cent in improved varieties over local varieties. The increased yields were significant at one per cent level.

A study of financial management by market intermediaries of fruits and vegetables in Bangalore City, revealed the existence of four main channels in marketing of fruits and vegetables. The quantum of fixed cost per month was directly related to the size of business — which was again associated with the type of market intermediaries. The results showed that 70 per cent of the sample market intermediaries borrowed, 67 per cent from non-institutional and 33 per cent from institutional agencies. The duration of the loan varied from one day to more than a year.

A comparative study of processing sugarcane into sugar, gur and khandasari in Mandya taluk showed that the Khandasari units worked 231 days followed by gur unit 134 days and sugar unit 128 days. The unit cost of processing per q was Rs. 70.50, Rs. 43.05 and Rs. 116.66 for sugar, gur and khandasari respectively. By and large, processing cane into gur was found to be more profitable than supplying cane to the sugar factory.

A study on investment strategies for the Development of forestry sector in Karnataka revealed that the increase in the output of specific sector needed to meet a unit increase in the final demand of each and every industry, the teak wood (2.08), soft wood (2.04) and other wood (1.77) were ranked in the descending order of priority preference. The results also clearly indicated that the handicrafts sector should get higher priority for investment relative to other sectors as Rayon grade pulp and eucalyptus, as this would facilitate speedy increase in the employment and income opportunities in the Karnataka forest economy.

A comparative economics of production and marketing of Robusta and dwarf cavendish varieties of banana in Bangalore District, indicated that the total planting cost per ha was Rs. 5,910.68 for Robusta and Rs. 6,014.52 for dwarf cavendish. The average net returns per ha over "Operational *plus* apportioned planting costs" were Rs. 20,253.55 and Rs. 17,346.11 from planted Robusta and dwarf cavendish respectively. Each rupee of investment yielded Rs. 1.57 and Rs. 1.50 from planted and Rs. 1.74 and 1.65 from ratoon Robusta and dwarf cavendish.

#### 1.10 Agricultural Extension

The small farmer members of Farmers Service Society had increased their knowledge about field crops and adopted a number of improved practices compared to non-members. The members of Farmers Service Society had developed a favourable response to Farmers Service Society and the village leaders opined that the programmes should continue to operate.

As far as perception of extension, teaching methods by extension personnel was concerned a majority of the village level workers possessed adequate knowledge about the extension methods like method demonstration, result demonstration, farm and home visits and trials. However, their knowledge was inadequate only in respect of such methods as radio, group meetings, newspaper, field visits, circular letters, film shows and campaigns.

Various principles of effective youth work were classified under five major categories and the opinion of experts has been obtained on the importance of

these principles. The findings revealed the need for providing leadership training for the youth club members, besides ensuring proper encouragement and financial assistance to the rural youth clubs.

## 2. Basic Sciences

### 2.1 Bio-chemistry

*Trypsin inhibitor of ragi*: The inhibition spectrum of the purified ragi trypsin inhibitor was investigated. The inhibitor has a species-specific action and completely inhibits bovine trypsin, while porcine trypsin is inhibited to a much lower extent. Other proteinases like elastase, subtilisin etc., are poorly inhibited. Proteinases like papain, chymopapain, bromelin and pepsin are not inhibited. The inhibitor also has no action on bovine alpha-chemotrypsin.

The proteins of fourteen varieties of Italian millet were fractionated by the Landry-Moureaux method (LM method). The major storage proteins of Italian millet are the albumins, globulins and prolamins. Glutelins are present in smaller amounts.

The protein contents of 25 varieties of winged bean of varying origin were estimated by the Kjeldahl method. The protein content of these varieties varied from 29.9–43.8 per cent. Trypsin inhibitor content and chemotrypsin inhibitor content of these varieties were also estimated by the method of Kakade *et al.* The content of trypsin inhibitor varied from 109.9 to 370.6 units/mg protein, while the chemotrypsin inhibitor content ranged from 278.4 to 620.1 units/mg protein.

### 2.2 Mathematics

Under the project 'Mathematical Distribution for Test Scored' by using beta, gamma functions and their properties, an independent proof has been evolved to show that the joint distribution of beta and binomial is negative hypergeometric.

There are six types of rodenticides as applied in India. When a rodenticide is applied, not only do the rodents succumb to them, but there is a possibility of other species also succumbing for whom it is not meant. Hence, a mathematical model has been evolved by using pattern recognition techniques so that this resort of diagnosis would be quicker.

Pulsatile flows in a rotating channel and effect of couple stresses on the dispersion of a solute have been studied.

### 3. Animal Sciences

#### 3.1 Animal Genetics and Breeding

A study on Danish cattle revealed that 5.91 per cent of calving resulted in still births. The 305 days' milk and butter fat yield were significantly lowered (by 433 kg and 19 kg) in lactations following the still births.

Occurrence and distribution of Haemoglobin and Potassium alleles in Bannur sheep were studied. Only slow moving Hb B was encountered in 272 pure bred Bannur ewes. The mean potassium concentration of low (LK) and high (HK) were 8.97 and 25.48 m Eq/ml of whole blood respectively. The gene frequency of HK was 0.69. The birth, weaning and six month's body weight were found to be independent of potassium type.

#### 3.2 Veterinary Microbiology

A seroepidemiological study in different species of animals was taken up. A leptospiral vaccine for use in dogs employing two serovars has been developed.

A pathogenic strain *Hemophilus* species *Agni* has been isolated from rams with a history of infertility.

*Immunological studies on the efficacy of strain 45-50 Brucella aborted vaccine*: Complement fixation test has been standardised to study the post-vaccinal efficacy of the vaccine.

*Sheep Pox*: Immunogenicity of the birds to various vaccination, developed in the Department, has been given.

#### 3.3 Veterinary Gynaecology and Obstetrics

Amongst different pathological conditions producing infertility in cows the gonadal abnormalities was found to be maximum. They varied from 3 to 33 per cent. The non-functional conditions of the gonads due to nutritional deficiencies were the maximum. Hormonal causes were next in the order. Copper, zinc and manganese were noticed in lesser concentrations in ovarian tissue and blood serum during anoestrus and non-functional conditions of the ovary.

Blood serum samples from 149 Bannur ewes were collected and processed for the study of copper, zinc, magnesium and iron concentrations. It was observed that, by additional feeding during non-breeding season, the increased fertility can be achieved from those animals which were maintained on mineral mixtures.

Among cattle and sheep the incidence of uterine pathology was less in sheep while ovarian adhesions were higher. The tubal impotency was equally distributed. Effect of breed or environment variations on their incidence was not evident.

Like Milavonov's resistance test with sodium chloride for sperm survival a 2.5 per cent glucose solution was found to be useful to test sperm resistance in extenders.

Efforts made to reduce the quantity of glycerol added for freezing of semen indicated that a minimum of 3 per cent of glycerol is needed in frozen semen extender.

### 3.4 Poultry Science

In a study involving Cornish, Plymouth Rock and control population, IC.2 strain matured earlier by nearly 5 days and laid 3 eggs more than that of the control line while the body weight at first egg and also at 40 weeks of age was less by 113.16 and 207.00 g respectively. Through the IR.2 strain laid 5 more eggs than that of the control strain, the latter strain matured earlier and weighed heavier at sexual maturity and 40 weeks of age.

IC.2 strain showed decline 14 per cent in fertility, 15 per cent in hatchability, day old body weight (1.400 g), feed efficiency (0.03) and mortality was higher (5 per cent). Eight week body weight and 8 week dressed weight were almost similar to the control strain. In the IR-2 strain, all the studies of the traits showed a decline, when compared to the control strain.

*Recurrent Reciprocal selection programme:* IC-3 and IR-3 purebred strains were identified as promising strains for production of crossbred chicks, when reciprocally mated, the fertility, hatchability, body weight at day old and 8 weeks of age, feed efficiency (8 weeks) and mortality (up to 8 weeks), were 88.88, 70.66 per cent, 38.25 and 1239.35 g, 2.44 and 10.76 in the IC.3 × IR.3 cross, whereas these figures in the IR.3 × IC.3 cross were, 90.75 and 73.20 per cent, 42.00 and 1185.80 g, 2.54 and 3.32 per cent respectively.

*Production of test crosses:* Males of IC-2 and IC-3 strains were mated with females of IR-2 and IR-3 strains for production of crossbred chicks. Crosses of IC-3 males with IR-2/IR-3 females were generally superior to all the traits except mortality.

With a view to developing new broiler varieties, some new strains have been produced.

**Red Hampshire :** Rhode Island Red males have been crossed with females of a New Hampshire strain (UH.3) to develop a new female line to observe the possibility of further improving the egg production performance of the UH-3 strain for ultimate cross breeding purposes and also to produce coloured chicks on cross breeding.

A separate male line of Cornish will be synthesised from three different pure strains. Simultaneously, a synthesised female line of White Rock will be developed as a female line. At present, single cross progenies of C.34 and C.24 have been produced. After separately synthesising the Cornish and White Rock lines, a new variety of broiler is envisaged to be produced.

**Development of a synthetic meat line male :** Females of the Chandigarh strain, which are three-way crosses were crossed with selected males of a Red Cornish strain to produce the males of this new line for cross breeding purposes in future.

The efficacy of some coccidiostats for routine incorporation in poultry rations were investigated and it was found that Amprol was better than Embazine and Dotci in improving growth rate and feed efficiency at 8 weeks of age.

The existing marketing situation of eggs and marketing costs in egg trade around Bangalore was investigated and it was found that the price index was highest during the months of December, January, June and July and lowest during April and October months.

A new strain of broiler poultry IBB 80, of better performance than earlier strains, has been evolved and is in the final stages of testing for release.

## 4. Fisheries Sciences

### 4.1 Fishery Biology

A preliminary survey of estuarine mullet resources of Netravathi-Gurpur and Mulki estuaries has revealed that the four species viz, *Liza dussumieri* (Valenciennes), *L. tade* (Forsk), *Valamugil seheli* (Forsk) and *Mugil cephalus* (Linnaeus) occurred. Among them, *V. seheli* constituted 30-50 per cent followed by *M. cephalus* 20-40 per cent and dominated the catches.

From the studies on the fishery and biology of silver pomfret, *Pampus argenteus* off Mangalore collected from fish market and fish landing centres at fortnightly intervals indicated that the small sized pomfrets followed by big ones were predominant in trawl nets (188 to 334 mm). The examination of stomach contents revealed that they are generally carnivorous, feeding mainly on smaller

and larger zooplankton such as copepods, smaller crustaceans, medusae, diatoms, filamentous algae and fish scales. Gonads from matured specimens when examined showed eggs with maturity stages II to III occurring throughout. But stage IV was common from January onwards.

While studying the spawning behaviour and early development of oyster *Crassostrea madrasensis*, it was observed that the spat could be maintained in the laboratory up to a maximum of 55 days after settlement on glass panels and oyster shells. Paucity of large quantities of algal food became a limiting factor for low survival and settlement rates.

Allometric growth in the estuarine clams, *Kateleyisia opima* and *Meretrix casta* was followed for one year in the Mulki estuary. Gonadal growth contributed to increase the condition and edibility indices in both species. Higher natural mortality was observed in *K. opima* during the monsoon months when the salinity was very low. Data on incidence of *Bucephalus* infestation and histopathology of infestation by this larval trematode in *K. opima* were studied in detail.

Weekly observations of wooden test panels of *Tectona grandis*, *Autocarpus integrifolia*, *Pterocarpus hirsuta*, *Michaelia champaka* and *Jambulina* sp. showed that *Teredo furcifera* and *Lyrudus pedicellatus* were the common teredinid borers infesting the timber. The onset of borer infestation commenced only after an initial 90 days of submergence. When the data relating to borer settlement gathered for 160 days and 360 days were tabulated for statistical analysis to assess timber vulnerability, it was found that in some of the timber panels of the same species the rate of settlement varied widely. The settlement was found to be more on the bottom surface of panels followed by the tops and sides in that order. The rate of settlement was also found to be more rapid during the initial 180 days with a decline in the latter phase, probably due to precolonization of surfaces available. Drift wood collections from Hoige Bazar, Mulki and Coondapoor consisted of Aini, Banappu, Jack and Mavu which were found infested heavily with *Teredo furcifera*, *Lyrudus pedicellatus* and the estuarine form *Nausitora* sp.

The parasitic infestations on the farmed carps in Tungabhadra Board fish farm, Munirabad fish farm, Vanivilas Sagar, Hesaraghatta fish farm and fish farm of the College of Fisheries were observed and their incidence and intensity were recorded. The parasitic infections such as of *Argulus*, leeches and isopods were observed in Vanivilas Sagar fish farm, whereas of *Lernaea* in Tungabhadra and Munirabad fish farms. The experiments on control methods were tried on *Argulus*, leeches and isopods using some of the organo-phosphates, commonly used disinfectants and dyes. The effective concentrations



of these chemicals that would kill these parasites *in vitro* were also obtained. Several bacterial cultures from the fish farms above mentioned were isolated from the normal and diseased fishes as well as from the pond waters. The clinical signs and extent of bacteraemic infections in various fish farms were also recorded. The isolates so obtained were purified and some of them have been identified and were found to belong to *Aeromonas*, *Pseudomonas* and *Streptococcus* sp. Studies on identification and antibiotic sensitivity of other bacterial cultures are in progress.

#### 4.2 Aquaculture

Catla, rohu, grass carp and common carp were grown on four artificial diets containing fish meal, shrimp waste powder, *Eichhornia* leaf powder and shrimp waste powder plus *Eichhornia* leaf powder respectively as the major protein source. After a period of 120 days, the growth of rohu, grass carp and common carp was found to be the best with the feed containing *Eichhornia* leaf powder, while the growth of catla was better with pellets having fish meal as the main source of protein. This finding indicates that fish meal which is a costly ingredient in artificial diets, could be replaced by cheaper proteins like *Eichhornia* leaf powder.

Tilapia fry of 9-14 mm size were subjected to test osterone treatment through the feed for one to two months duration, with a view to ascertaining the influence of the sex hormone on the gonads. Feeding 17-methyl testosterone incorporated diet for 2 months resulted in 90 per cent males among the treated fish, indicating the possibility of obtaining a progeny of only males of the species in culture ponds. Experiments conducted to monitor the sex of common carp through administration of methyl testosterone revealed that the brood produced consisted of 46 per cent males and 54 per cent sterile fish.

Indian major carps and exotic carps from a pond measuring less than one acre in Manjanady village over a period of one year gave an yield of 6.000/ kg/ha/year.

Observations made in composite fish culture ponds by replacing rohu with catla-rohu and mrigal with catla-mrigal hybrids have revealed that, after 3 months of stocking, the catla-rohu had grown better than rohu and catla-mrigal found to be poorer than mrigal.

Grass carp (*Ctenopharyngodon idella*) was cultured in cement cisterns and provided with lucerne *Medicago sativa* and *Hydrilla* (*Hydrilla verticillata*) separately (*ad. libitum*). The average net weight gained per fish was 997.1 g and 505.5 g in lucerne and *Hydrilla* fed cisterns respectively during the period of 120 days. The average growth increments recorded per day were 8.31 g and 4.21 g

in the case of fishes fed with lucerne and *Hydrilla* respectively. The conversion ratio worked out to be 16.46 : 1 for lucerne and 45.55:1 for *Hydrilla*. This indicates that lucerne forms an excellent food for grass carp.

The possibility of utilization of the leaves of soo-babul and lucerne as feed ingredients in carp feed was studied by using fingerlings of common carp. The average increments in weight of fishes during 112 days of growth was found to be highest 99.4 g in soo-babul based feed and 82.81 g in lucerne based feed. This indicates that soo-babul leaf based feed is more economical than lucerne based feed.

The combination of grass carp and common carp fingerlings stocked in a ratio of 2:1 and fed with known quantities of lucerne leaves everyday to study the growth of both the fishes. No feed was given for common carp. In a period of 120 days the net average weight recorded in cisterns where both the species were stocked was 176.58 g whereas, in cisterns where both the species were stocked the grass carp had attained an average weight of 168.05 g and common carp 125.0 g. The experiment clearly indicated that in combination, culture of two species together would give higher fish production than monoculture. Introduction of common carp would also maintain the quality of the water in grass carp ponds.

While testing the superiority of lucerne leaves and drumstick leaves as feed for grass carp, it was found that the grass carp had attained an average weight of 176.58 g when fed with lucerne leaves. The average growth of grass carp fed with drumstick leaves was 107.1 g only during a period of 120 days. It was observed from this experiment that the fingerlings of grass carp would grow better when fed with lucerne leaves than with drumstick leaves.

A comparative study on the growth on *Labeo rohita* and *Labeo fimbriatus* during the period of 120 days has indicated that the average growth attained by rohu was higher (94.29 g) when compared to the growth attained by *Labeo fimbriatus* (35.12 g). This shows that rohu grows better than *fimbriatus* under experimental conditions.

An experiment was conducted to test the efficiency of poultry droppings based feed and conventional feed by feeding them to fingerlings of catla, rohu, mrigal and common carp in composite fish culture earthen ponds. Fishes fed with poultry droppings based feed had registered a total net growth of 9.57 kg in a 6 months with a feed conversion ratio of 1.06 : 1 which was found to be better than the conventional feed. The fish production cost by using poultry droppings based feed was Rs. 0.73/kg as against Rs. 1.76/kg by the conventional feed.

Fingerlings of Indian major carps numbering 242 were examined for incidence of crustacean parasitisation in the ponds. It was found that 13

fingerlings of catla and 7 fingerlings of rohu were infected with *Lernaea*. Some of the infected fingerlings were found to be in stunted condition with emaciated growth.

A six species combination of fry raised in the paddy plots had attended on overall survival of 55.2 per cent in a period of 79 days. Among the 6 species, the percentage of survival was highest in common carp (76.4 per cent) followed by grass carp (67.0 per cent), mrigal (58.6 per cent), catla (49.8 per cent), rohu (35.1 per cent) and silver carp (30 per cent). Maximum growth of 25.2 g was attained by silver carp while a minimum of 3.16 g by rohu.

#### 4.3 Fishery Hydrography

Circulation studies in the Arabian Sea off Mangalore revealed a maximum surface current speed of 0.62 M/Sec. during September and a minimum surface current speed of 0.1 M/Sec. in December. Maximum and minimum bottom current speeds were 0.47 M/Sec. in September and 0.1 M/Sec. in December respectively. Surface current direction was generally southerly from April to September and northerly from November to February. Bottom current direction was generally westerly in April, north-easterly in May and September; easterly in November in February. Currents followed nearly the same trend both in speed and direction off Thannirbhavi and Someshwar also. Maximum and minimum temperatures of surface and bottom waters were 31.9°C in May and 30.2°C in April respectively. The lowest temperature for surface water was 26.9°C in January and for bottom water, lowest temperature was 24.0°C in September.

Studies on mixing in coastal waters off Mangalore this year also confirmed that during most of the seasons of the year the tidal influence is negligible beyond a depth of 7 to 8 fathoms. Observations showed that the water on the southern side of the estuarine mouth is influenced by the tidal mixing to lesser extent than the northern side. The lesser vertical gradient observed in the water temperature and the pattern of dissolved oxygen content variation indicated a reasonable tidal mixing at the estuarine zone.

From the analysis of the sample made during April and May on rocky shore communities of Dakshina Kannada, it was clear that the barnacles, and bivalves showed their secondary peak abundance. However, the primary peak abundance was noticed immediately after the monsoon. *Gracilaria*, *Ulva* and *Chaetomorpha* species of algae showed their peak abundance immediately after the monsoon which slowly declined during the months of November and December. Gravid individuals of *Perna* were collected from both the shores

during the months of August and September. Reduced barnacle numbers were recorded during the months of November and December. By far, the *Sabellariid* species of polychaete showed an increasing trend throughout the period of investigation, the bulk of which was more along the Surathkal shore. High numbers of littorinds were encountered during the months of November and December. Patellids and a few other gastropod species were not uncommon in the samples during this period.

Studies on marine pollution indicated that all the 7 stations at the discharge point off Thannirbhavi in the Arabian Sea continued to receive the effluents of the Mangalore Chemicals and Fertilizers Ltd. The nutrients, especially, the nitrogen category depicted variations between collections and stations. The concentration of ammonia, nitrite, nitrate and phosphate were recorded.

#### 4.4 Fishery Microbiology

A synthetic medium consisting of 3 amino acids serine, glutamic acid, mannitol, salts like NaCl, KCl and phosphates was formulated. This was found to support the synthesis of both heat stable and heat labile hemolysins, of *Vibrio parahaemolyticus*. It was also found that *V. parahaemolyticus* could survive in clams up to 2 months in a simulated natural environment irrespective of thier ability to produce hemolysins.

Occurrence of hydrocarbon degrading microorganisms around Mangalore showed, during winter months, significant numbers of hydrocarbon degrading bacteria belonging to the genera *Vibrio*, *Pseudomonas*, *Arthrobacter*, *Aeromonas*, *Staphylococcus* and *Moraxella*. Samples of coliforms capable of hydrocarbon degradation.

The studies reveal that chilled sea water suppresses the population of *Pseudomonas* in prawns which are considered to be the most important spoilage organisms.

#### 4.5 Fish Processing Technology

Canning operations, especially, the optimum precooking conditions, were standaradised for mackerel tuna (*Euthynnus affinis*). It was established that for tuna of less than 1 kg weight, precooking at 100°C for periods ranging from 45 min to 60 min (depending on their size) and processing the cans at 115.6°C (10 psig) for 70 min, resulted in the best quality product.

Effect of wood smoke on the preservation of oil sardine (*Sardinella longiceps*) for about six hours duration has indicated that they can be stored for

about 5 months without any spoilage. The products developed profuse growth of moulds which have been identified as *Aspergillus* spp. and *Pencillium* spp. between 5 and 6 months of storage.

Preliminary studies on the preparation of fining agent from catfish maws have been initiated to study its efficiency and for classifying different beverages like beer etc.

Canning of fish balls in 8-oz cans using different media and heat penetration studies have been completed. Among the different media tried, curry, oil tomato sauce, brine and dry pack without any medium were found to be acceptable.

The storage studies of mechanically deboned fish, meal of pink perch, ribbon fish, catfish and sole were carried out by chemical and organoleptical tests for a period of six months and all of them were found to be acceptable. No significant changes in TMA, VBN and peroxide values were noted in all the four varieties of fish meat stored at 20°C for a period of six months.

Rate of spoilage was faster in case of fish exposed to ambient temperature for 4 hours before icing. The total storage life of such samples at 0°C was only 7 days as against a storage life of 14 days in case of fish iced immediately after catch. It was also found that non-fatty fishes like *Lactarius* were kept, preserved under proportional iced condition, for a longer time than fatty fishes like mackerel and pomfrets.

Sardines were used to evolve new products out of minced meat. The samples prepared were accepted readily by taste panel judges.

Under the FAO sponsored project on improvement of handling techniques for small pelagic fishes, the benefits of good handling techniques and advantages of chilled sea water preservations were demonstrated. So far 54 tonnes of small sardines, 2 tonnes for carangids and 48 tonnes of catfish have been caught and sold.

#### 4.6 Fishery Biochemistry

Effect of dietary lipids on the growth of *Cyprinus carpio* indicated that fish feed with 10 per cent sardine oil in the diet was better than the groundnut oil containing feed at the same level. This was evident by the experiment conducted for a period of 16 weeks of aquaria.

#### 4.7 Fishery Economics

Under the Project Demand and consumer behaviour towards fish in urban areas of Shimoga and Chickmagalore districts, household survey has been completed.

#### **4.8 Fishery Statistics**

Studies on the biometry of mackerel populations along the coast of Karnataka showed that the mackerel populations are morphometrically different with regard to the total length, standard length, head length and jaw length when they were collected and examined from the purse seine boats off Mangalore, Gangolli and Karwar Centres.

#### **4.9 Fishery Engineering**

The assembling of various parts fabricated for continuous smoke generator and smoke chamber has been completed and kept ready for final testing.

Design and fabrication of manually operated shell opening device for shell fish has been completed and the equipment tested successfully.

**K. KARISHNA MURTHY**  
*Director of Research*

## **PART IV**

### **EXTENSION**

Special features of this year's extension work of the University can be listed as (1) Intensifying the promotional work on Bhagyalakshmi biogas plants in collaboration with the Karnataka State Khadi & Village Industries Board ; (2) Expansion of the Koobabul promotional work with farmers ; (3) Organising special workshops-cum-seminars in collaboration with the Government of India on biogas technology and bio-fertilizers ; (4) Starting of new Extension Education Unit at Mangalore and (5) Bringing out literature on Technology for Small farmers in collaboration with the Institution of Agricultural Technologists.

#### **Extension Education Council**

Two meetings of Extension Education Council (22nd meeting on 26-8-1981 and 23rd meeting on 27-2-1982) were held during the year under report. The important suggestions/recommendations are :

#### **22nd Meeting of the Extension Education Council**

- i) The University should have its own exhibition programme at selected places in the State every year.
- ii) It is desirable to publish regional literature rather than publishing only one set of literature for the entire State.
- iii) The Staff Training Unit should conduct regional training programmes to be in line with the NARP philosophy in addition to State Level Training Programmes.

#### **23rd Meeting of the Extension Education Council**

- i) The Council recommended that it is desirable to extend the jurisdiction of Extension Education Units in a phased way so as to provide one Extension Guide for each taluk.

#### **Agricultural Information**

The University in collaboration with the State Department of Agriculture brought out the following publications during the year :

1. Package of practices for high yields - 1981 (English)
2. Package of practices for high yields - 1981 (Kannada)

Seventeen new leaflets were printed during this period for the benefit of State Departments and farmers.

Information work done through the newspapers and periodicals consisted of: (1) 26 fortnightly press releases separately with the State Department of Agriculture and Horticulture giving hints to farmers, (2) 52 sets of question and answer columns in Prajavani as well as Kannada Prabha and (3) 12 monthly tips to farmers through Krishi Varthe and Mysore Vyavasaya Patrike.

The University organised five exhibitions during the year as follows :

1. An exhibition for the benefit of members of the Estimate Committee of the Government on July 4, 1981.
2. Exhibition at Lalbagh during Independence Day Celebrations from 8-15th August 1981.
3. An exhibition was organised on the eve of Krishi Mela at MRS, Hebbal, from November 13 to 15, 1981.
4. The University pavilion at the Indian National Science Congress Session at the University of Mysore during January, 1982.
5. A special exhibition was organised in connection with the visit of His Majesty the King of Spain during January, 1982.

#### **Press Visits and Conferences**

The Directorate of Extension also organised 13 special press visits and conferences during the year.

#### **Farm Advisory Services**

Extension functionaries and scientists of the University replied to 2,402 letters of farmers in the State. Further, they made 512 visits to the farmers' fields to advice them on various farming problems. The details are given below :

Unit/Department	No. of replies given to the queries of farmers	No. of farm visits made
1	2	3
i) <i>Extension Education Units</i>	620	261
<i>Farmers Training Institute</i>	373	—
ii) <i>Agricultural College, Hebbal</i>		
Horticulture	115	50
Seed Technology	502	2
Agril. Microbiology	72	10



	1	2	3
iii) <i>Agricultural College, Dharwad</i>			
Entomology		40	25
Plant Pathology		45	12
Agronomy		—	21
Horticulture		12	7
Farm Forestry		—	3
Agril. Marketing and Cooperation		6	2
iv) <i>Veterinary College, Hebbal</i>			
Gynaecology and Obstetrics		5	48
Dairy Technology		—	4
Animal Nutrition and Products Technology		—	3
v) <i>Agricultural Engineering Institute Raichur</i>		6	6
vi) <i>Raichur Stations</i>			
ARS, Navile		120	14
ARS, Mudigere		163	27
ARS, Gulbarga		126	15
v) <i>Others</i>			
Soybean Scheme, Hebbal		2	2
Wheat Breeder, Dharwad		195	—
Total		2,402	512

#### Field Days and Krishi Melas at Research Stations

During the year under report, the University Research Stations conducted field Days and Krishi Melas as detailed below :

	Month	Research Station	No. of days	Approx. No. of farmers participated
	1	2	3	4
1981	August	Bailhongal	1	254
	September	Raichur	1	200
	September	Mudigere	1	350
	September	Mangalore	1	250
	September	Bidar	1	150
	October	Arabhavi	1	300
	October	Hiriyur	1	120
	October	Madenur	1	100
	October	Siruguppa	1	280

	1	2	3	4
1981	November	World Food Day in all Research Stations		
	November	Siruguppa	1	200
	November	Nagenahalli	1	400
	November	Hebbal & GKVK Campuses	3	3,879
	November	Chintamani	1	400
	November	Mandya	3	2,000
	December	Siruguppa	1	250
	December	Madakeri	1	300
1982	January	Annigeri	1	230
	January	Bijapur		2,000
			Total	11,663

#### **Farmers Training**

i) *Training of farmers by Farmers Training Institute, Hebbal:* The Farmers Training Institute, Hebbal conducted institutional and peripatetic training programmes for farm men, women and convenors of Charchamandals. Details are given below :

Type of training programmes	No. of training programmes	No. of persons trained
a) <i>Institutional training</i>		
i) For farm men	8	222
ii) For farm women	8	208
b) <i>Peripatetic training</i>		
i) For farm men	51	1,556
ii) For farm women	50	1,563
c) <i>Training for Charchamandal Convenors</i>		
i) For men	2	48
ii) For women	2	54
d) <i>Other training programmes on     specialised topics</i>	8	406
Total	129	4,257

The Farmers Training Institute also organised 14 Charchamandals enrolling 334 farmers as members.

ii) *Training of farmers by Krishi Vignana Kendra, Hanumanamatti:* The Krishi Vigyana Kendra has organised 43 on-campus training programmes and 53 off-campus training programmes.

Subject area	On-campus training programme	No. of persons trained	Off-campus training programme	No. of persons trained
1. Agriculture	19	386	20	558
2. Agril. Engineering	10	141	30	939
3. Animal Science	8	129	—	—
4. Home Science	6	88	3	80
Total	43	744	53	1,577

In all, 2,321 farmers have been trained.

The KVK has collaborated with India Development Service, Medleri; Krishi Vichara Vinimaya Kendra: Shidenur, Future Farmers Club and Syndicate Bank, Tumminakatti in extension work.

iii) *Training of farmers by Extension Education Units:* The Extension Education Units have organised 1,786 group meetings, 560 training sessions and 432 field days/field trips involving 27,242, 11,592 and 8,063 farmers, respectively. The details are given below :

Extension Education Units	Group meeting, No. of farmers involved		Training sessions No. of farmers involved		Field days/field trips No. of farmers involved	
Bangalore	749	12,998	313	4,284	142	2,947
Raichur	207	2,948	27	1,656	133	1,206
Mandya	401	4,346	117	1,603	6	677
Mangalore	—	—	3	77	3	240
Dharwad	429	6,950	100	4,063	148	2,993
Total	1,786	27,242	560	11,592	432	8,063

#### **Training of Extension Functionaries**

The Staff Training Unit organised training programmes for the extension workers of the State Departments of Agriculture, Horticulture, Animal Husbandry and Fisheries. Further, the Unit also organised training programmes for Central sectors and some ad-hoc training programmes. The details are given below :

Name of the Department/ Institution	No. of training courses organised	No. of participants
i) Department of Agriculture	4	54
ii) Department of Horticulture	1	14
iii) Department of Animal Husbandry	4	33
iv) Department of Fisheries	1	13
v) Government of India sponsored training programmes	12	304
vi) Other adhoc training programmes	3	10
<b>Total</b>	<b>25</b>	<b>428</b>

The Unit continued to provide training support to the subject matter specialists of the State Department of Agriculture under T & V system.

#### *Limited Field Extension Work*

(a) *Block Demonstrations* : Details of block demonstrations conducted by the Extension Education units are given below :

Extension Education Unit/Season	No. of block demonstrations organised	No. of farmers involved			Area covered in acres
		Small	Others	Total	
<b>Bangalore</b>					
Kharif ' 81	9	222	73	295	250.0
<b>Mandya</b>					
Kharif ' 81	2	24	46	70	107.0
Rabi ' 81	1	10	25	35	58.0
Summer ' 81	4	62	48	110	150.0
<b>Mangalore</b>	—	—	—	—	—
<b>Raichur</b>	—	—	—	—	—
Kharif ' 81	9	12	92	104	216.0
<b>Dharwad</b>					
Kharif ' 81	12	—	—	234	209.0
<b>Total</b>	<b>37</b>	<b>330</b>	<b>284</b>	<b>848</b>	<b>990.0</b>

In all 37 block demonstrations were conducted by the Extension Education Units on an area of 990 acres involving 1462 farmers.

### Agencies involved in Block Demonstrations

Mainly the Department of Agriculture was the agency collaborated with in conducting the block demonstrations. The details are given below :

Extension Education Units	Involvement of agencies			
	Only Devt. Dept.		Technical + In put agency	Technical + Financing
	Agril.	Hort.		
Bangalore	5	--	--	3
Mandya	7	--	--	--
Mangalore	--	--	--	--
Raichur	9	--	--	--
Dharwad	11	1	--	--
<b>Total</b>	<b>32</b>	<b>1</b>	<b>1</b>	<b>3</b>

### Results of Block Demonstrations

Following are the results of some of block demonstrations conducted by various Extension Education Units :

Taluk/village	Crop	No. of farmers involved	Area covered	Ave. yield in kgs per acre		% increase over BM year
				BM. Year	Demon. Year	
1	2	3	4	5	6	7

#### (i) Extension Education Unit, Bangalore

*Kharif 1980*

Anekal/Neralur	Redgram	35	40.0	—	360	
Bangalore South/Agara	Redgram	40	20.0	510	535	5
Magadi/Pura	Redgram	32	13.0	300	329	7.6
Sidlaghatta/Thippannahally	Ragi + Redgram	32	32.0	380 + 0	610 + 170	40% (Ragi)
Chintamani	Ragi +	24	24.0	425	600	30% (Ragi)
Kodihalli	Redgram					

#### (ii) Extension Education Unit, Mandya

*Kharif 1981*

Mandya/B.G. Halli	Paddy	35	49.0	1600	2500	58
	Sugar cane	35	58.0	37 tons	51 tons	43

1	2	3	4	5	6	7
<i>Summer 1981</i>						
Mandya/B. G Halli	Ragi	14	15.0	—	1800	—
Mysore/ Gudemaranahalli	Ragi	28	30.0	—	1337	—
(iii) Extension Education Unit, Raichur						
<i>Kharif 1981</i>						
Manvi/Katarki	Paddy	13	31.0	653	848	30
Sindhanur/ Javalgere	Sunflower	8	33.0	370	546	47
Sandur/ Dharmapur	Hy. Jowar	8	25.0	1262	1637	30
Yadgir/Yadahalli	Paddy	9	37.0	977	1328	35
Gulbarga/Sannur	Tur	6	30.0	100	243	143
Sindhanur/Jawalgere	Cotton	15	15.0	916	1390	51
Bellary/Amrapur	Cotton	15	15.0	876	1153	31

## (iv) Extension Education Unit, Dharwad

Results are yet to be collected

## (b) Trials conducted by the Extension Education Units

The Extension Education Units conducted 552 trials – 103 in summer, 346 in kharif and 103 in rabi.

Extension Education Unit	No. of trials conducted			Total
	Summer 81	Kharif 81	Rabi 81	
Bangalore	82	175	50	307
Mandya	16	95	28	139
Mangalore	—	—	—	—
Raichur	—	32	11	43
Dharwad	5	44	14	63
Total	103	346	103	552

Trials conducted by the Extension Education Units were as follows:

## (i) Extension Education Unit, Bangalore

*Summer 1981*

<i>Title of trial</i>	<i>No.</i>
1. Comparing IIHR variety of bottle gourd with local variety	12
2. Effect of alternative furrow irrigation in Hebbal Avare	5

3. Comparing sulphur based fertilizers vs Non-sulphur based fertilizers	2
4. Response of paddy to Azolla	5
5. Response of paddy to BGA	26
6. Response of paddy to neem cake blended urea vs urea alone	6
7. Use of urea briquets vs urea alone to paddy	6
8. Control of watermelon diseases by Bavistin	10
9. IHR cowpea selections vs C-152	5
10. 161-B.XI vs S-288	5

*Kharif 1981*

1. Performance of urea briquets vs normal urea on paddy	8
2. Comparing Mandya Vani vs Pushpa	6
3. Mixed cropping of maize with soyabean	17
4. Mixed cropping of groundnut with redgram ✓	31
5. Mixed cropping of redgram with blackgram and cowpea	32
6. Relay cropping of redgram with tomato	12
7. Performance of IHR French beans selections	12
8. Comparing TMV-2 with TG-3, TG-17 varieties of groundnut	7
9. Comparing LRG-30 and 36 vs TTB-7 redgram varieties	17✓
10. Performance of IHR capsicum Sel-13 and Sel. 16 vs California Wonder	4
11. Response of groundnut to split doses of gypsum application	8
12. Seed treatment of groundnut with Dithane-M-45	8
13. Seed treatment of onion with Vitavax against smut	5
14. Comparing Mussorie phos vs single super phosphate in redgram	5
15. Comparing Mussorie phos vs single super phosphate in dryland ragi	3

*Rabi 1981*

1. Response of potato to Mussorie phos vs single super phosphate	27
2. Mushroom cultivation and utilization	10
3. Split application of nitrogen to potato	1
4. Performance of cowpea KBC-1 vs C-152	10
5. Foliar application of urea Vs Urea soil application for potato crop	12

**(ii) Extension Education Unit, Mandya**

*Summer 1981*

1. Performance of ragi varieties Indaf-5 vs Indaf-9	6
2. Performance of cowpea varieties S-488 (white) vs C-152	4
3. Use of urea super granules in paddy	4
4. Use of Azolla in paddy	2

*Kharif 1981*

1. Use of urea super granules in paddy	17
2. Use of Azolla in paddy	4
3. Paddy varieties KMP-38 vs IR-20	6
4. Paddy varieties ES-18 vs local for late sowing	2
5. Paddy varieties – Mashuri derivative varieties	5
6. Paddy varieties-Intan mutant	8
7. Use of weedicide benticalb in transplanted paddy	6
8. Ragi varieties Indaf-8 vs Indaf 1 and 3 in dryland	10
9. Indaf-9 vs local for late sowing in dryland	10
10. Redgram varieties TTB-7 vs Hyderabad 3C under irrigation ✓	8
11. Redgram varieties TTB-7 vs Hyd. 3C on drylands ✓	7
12. Efficacy of Oftonal SG vs Furadon 3G against paddy pests	6
13. Efficacy of Tamaron-50 EC against Tobacco pests	6

*Ragi 1981*

1. Trial on ragi varieties Indaf-7 Vs Indaf-9	6
2. Watermelon varieties Arka Manik vs Ashiyamoto	6
3. Raddish varieties Arka Nishant vs local	6
4. Tomato varieties S-4 and S-22 vs local	6
5. Trial on capsicum varieties S-16 vs local	4

**(iii) Extension Education Unit, Raichur***Kharif 1981*

1. Split application of fertilizers to chilly	4
2. Introduction of Hebbal Avare-4 (vegetable)	3
3. Micronutrient application to groundnut	3
4. Use of CCC in combination with closer spacing in hybrid cotton	4
5. Micronutrient application to maize	4
6. Skip irrigation in hybrid cotton	2
7. Hybrid castor KRC vs local	1
8. Tur varietal trial G. 3-2 vs PT-221	7
9. Use of Pyrethroid chemicals in cotton	2

*Rabi 1981*

1. Varietal trial of cotton rainfed DP-197, DB-3-12, DP-452, Sharada vs Laxmi or W-1	5
2. Varietal trial Bengalgram 2375 vs A-1	4
3. Effect of plant population on the yield of local brinjal	2

**(iv) Extension Education Unit, Dharwad***Summer 1981*

1. Performance of DH-8 vs DH-3-30	5
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*Kharif 1981*

1. Jowar + redgram (3 : 3) intercropping	9
2. Weed control in Hybrid jowar + redgram crop with terbutrin	8
3. Paddy varietal trials :	
a) Performance of Gama 318, IET-5656 vs local	2
b) Performance of IET-5882, 5897, 5899 vs local	4
c) Performance of IET-5656, 5699, Gama 368 vs local	2
4. Performance of SB-905 vs SB-1079 jowar	5
5. Performance of SB-2413 and SB-2415 vs CSH-5	1
6. Performance of 296 A × SB-1085 CSH-1 jowar	5
7. Performance of DP-452 vs Laxmi or Jayadhar cotton	3
8. Performance of SB-516, 905 and 296-A × SB-1085 vs SB-1079 jowar	3
9. Chemical control of cotton bollworms with dust formulations	1
10. Use of Pyrethroids against pests on Varalaxmi cotton	1

*Rabi 1981*

1. Nitrogen levels in rabi jowar	1
2. Rabi jowar vs Wheat after kharif groundnut	4
3. Bengalgram + Safflower vs entire Bengalgram	2

**(c) Results of trials conducted by Extension Education Units**

The following are the results of trials conducted by the Extension Education Units during the year.

Name of the trial	No.	Yield in kg/acre		% increase over check
		Check plot	Treatment plot	
1	2	3	4	5

**(i) Extension Education Unit, Bangalore***Summer 1981*

<i>IIHR cowpea selections vs</i>				
C-152	5	485	700	44
IIHR 61-B-1 vs S-288	5	2167	2924	35
<i>Comparing sulphur based fertilizer vs non-sulphur based fertilizer</i>				
	2	1425	1789	25
<i>Control of watermelon diseases by Bavistia</i>				
	10	11045	12339	12

1	2	3	4	5
<i>Kharif 1981</i>				
Mixed cropping of groundnut with redgram	31	349	254 + 290	56
Comparing TMV-2 with TG-3 and TG-17 groundnut varieties	7	392	494 457 (TG3) (TG17)	26 16
Performance of IHR French beans selections vs Contender	12	3741	4757 5062 (Sel-5) (Sel-9)	35 27
Performance of capsicum Sel-13, Sel-16 vs California Wonder	4	1753 Sel-13, (CW) Sel-16	3126 3041	74 73
Response of groundnut to split dose of gypsum	8	404	T1—462 T2— 520	14 29
Comparing Mussorie Phos vs super phosphate in dryland ragi	3	926	1128	22

## (ii) Extension Education Unit, Mandya

*Summer 1981*

Trial on performance of ragi varieties Indaf-9 and Indaf-5 during summer	6	1593	1635	3%
Trial on cowpea varieties S-488 (white) vs C-152	4	416	316	24%
Trial on use of urea supergranules in paddy	4	2547	2685	5%

*Kharif 1981*

Trial on use of urea supergranules in paddy	—	2480	2447	(—)
Use of Azolla in paddy	4	2405	2323	4%
Trial on performance of Indaf-9 during late kharif under dryland agriculture	7	509	732	44%

1	2	3	4	5
Trial on ragi varieties Indaf-8 vs Indaf-1 and Indaf-3 in dryland agriculture	7	Indaf-1 : 853 Indaf-3 : 843 Indaf-8 : 1066		20%
Trial on redgram varieties TTB-7 vs Hyderabad 3-C under irrigation	5	436 (Hyd 3C)	398 (TTB-7)	-8.7%

## (iii) Extension Education Unit, Raichur

*Rabi 1980*

Effect of cycocel on tomato on yield	5	2561	2958	15%
Cotton varietal trial	1	93	T1-187 T2-152 T3-176 T4-132	101% 63% 89% 42%

*Kharif 1981*

Application of micronutrients to groundnut	3	450	527	17%
Application of micronutrients to maize	4	1647	T1-1719 T2-1772	4% 8%
Hybrid castor KRC 1 vs local	1	250	300	20%
Tur varietal trial	6	440	459	4%

## (iv) Extension Education Unit, Dharwad

Name of the trial	No.	Yield in kg/acre				% increase over check		
		Check plot	Treatment plot			DCH 337	DP 452	DS 44
			DCH 337	DP 452	DS 44			
1	2	3	4	5	6	7	8	

*Rabi 1980-81*

Performance of DCH-337, DP-452 and DS-44 vs Laxmi or Jayadhar cotton	14	164	199	217	204	8%	22%	29%
Performance of A-83 vs A-1 safflower	8	402		375			-6.5%	

1	2	3	4	5	6	7	8
<b>Performance of KDW-16 vs</b>							
HD 2189 or UP 301 wheat	12	804		890			11%
<b>Performance of KDW-137 vs</b>							
B. Yellow (Rainfed)	7	328		383			17%
<i>Summer 1980-81</i>							
<b>Performance of DH-8 vs Sp.</b>							
Improved or DH-3-30 groundnut	4	690		713			4%
<i>Kharif 1981-82</i>							
<b>Performance of SB 905 vs SB</b>							
1079 jowar	5	859 (SB 945)		876 (SB 1079)			-2%
<b>Performance of 296 A × SB 1085</b>							
vs CSH-1 jowar	5	1136		1536			35%
<b>Performance of DH-8 vs Sp.</b>							
Improved or DH-3-30 groundnut	7	404		593			47%
<b>Performance of new paddy</b>							
varieties	2	1000	IET 5882-1640				64%
			IET 5897-1130				13%
			IET 5899-1500				50%
-do-	2	2100	Gama 318-3200				19%
			IET 5656-2500				19%
			IET 5699-3200				52%
			IET 5697-3200				52%
			IET 5682-2900				38%
			BKN 6986-				
			147-2-2400				14%

(d) *Demonstrations conducted by the Extension Education Units*

The four Extension Education Units have organised 463 demonstrations during the year of which 128 were in summer, 262 in kharif and 73 in rabi.

*No. of Demonstrations conducted*

Unit	Summer 1981	Kharif 1981	Rabi 1981	Total
Bangalore	79	176	22	277
Mandya	9	31	13	53
Mangalore	Nil	Nil	4	4
Raichur	10	35	20	65
Dharwad	30	20	14	64
<b>Total</b>	<b>128</b>	<b>262</b>	<b>73</b>	<b>463</b>

Following are the titles of important demonstrations conducted by the various units.

(i) **Extension Education Unit, Bangalore**

*Summer 1981*

<i>Title of Demonstrations</i>	<i>No. conducted</i>
Hebbal Avare-3	7
Performance of Arka Manik Watermelon	13
Biogas plants	16
Poultry units	8
Dairy units	10
Fodder demonstrations	9
M-5 mulberry demonstrations	6
Piggery units	10

*Kharif 1981*

Redgram demonstration	80
Biogas plants	8
Dairy units	10
NB-21 fodder demonstrations	9
Nutritional gardens	14
Farm Forestry	14
Kubabul demonstrations	14
Split application of 'N' to chillies	5
Sheep units	3
Poultry units	3
Hebbal Avare-3 demonstrations	4
Arka Nishanth raddish	3
M-5 mulberry demonstrations	2
Sterility camps	3
Mass vaccinations	4

*Rabi 1981*

Arkamanik vs Ashayi Yamato	12
Demonstration on adopting ridge method vs local	4
Biogas plants	6

(ii) **Extension Education Unit, Mandya**

*Summer 1981*

Demonstration of cowpea cultivation	3
Demonstration of Hybrid jowar cultivation	3
Demonstration of groundnut cultivation	3

*Kharif 1981*

Use of zinc sulphate in paddy fields	7
Use of weedicides in paddy	6
Drill sowing of ragi or broadcasting	5
Topping and desuckering in VFC tobacco	7
Demonstration on sugarcane cultivation	6

*Rabi 1981*

Demonstration of cabbage cultivation	3
Demonstration of sugarcane cultivation	4
Demonstration of banana cultivation	1
Demonstration of watermelon cultivation	5

**(iii) Extension Education Unit, Raichur***Summer 1981*

Chemical control of brinjal pests	6
Cultivation of watermelon	3
Sugarcane cultivation with full package of practices	1

*Kharif 1981*

Popularising Pusa Kranti brinjal	5
Popularising BSH-1 sunflower	8
Entire tur crop demonstrations	3
Pest control in cowpea	5
Pest control in brinjal	4
Fodder demonstration NB-21	6
Popularising E 8 sesamum	4

*Rabi 1981*

Introduction of Hybrid Karnataka tomato	5
Control of insect pests on cabbage	6
Demonstration on wheat HD 2189	5
Entire safflower crop demonstration	4

**(iv) Extension Education Unit, Dharwad***Summer 1981*

Gypsum application to groundnut	30
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*Kharif 1981*

Demonstration on plant protection in chilli crop to control Murda complex	12
Demonstration of Varalaxmi cotton bollworm control	8

*Rabi 1981*

Entire safflower vs wheat + safflower	6
Demonstration on safflower post control	14

(c) *Results of demonstrations conducted by the Extension Education Units:*  
The following are the results of demonstrations conducted by the Extension Education Units :

Title of the Demonstration	No. Con- ducted	Av. Yield in kgs/acre		% increase over check
		Check	Demons.	
1	2	3	4	5

**(i) Extension Education Unit, Bangalore***Summer 1981*

Hebbal Avare-3 demonstration	7	2,300	3,262	42
Performance of Arka Manik water-melon vs Ashai Yamato	13	11,604	14,884	28
M-5 mulberry demonstrations	6	9,861	10,996	11.5
Fodder demonstration				
NB-21 <del>vs</del> BH-18	9	No check 26 tons		—

*Kharif 1981*

Redgram demonstrations	80	335	367	10 ✓
Split application of nitrogen to chillies	5	631	692	10
Hebbal Avare-3 demonstrations	4	No check	2,400	—
Arka Nishanth raddish	3	10,450	13,700	31

**(ii) Extension Education Unit, Mandya***Rabi 1980*

Demonstration to grow watermelon	7	11,075	12,701	15
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*Summer 1981*

Demonstration of cowpea cultivation	3	463	447	23
Demonstration to grow Hybrid jowar	3	1,827	2,107	16
Demonstration on groundnut cultivation	3	555	687	24

*Kharif 1981*

Demonstration on use of zinc sulphate in paddy fields	7	1,913	2,304	20
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1	2	3	4	5
Demonstration on use of weedicides in paddy	6	2,181	2,408	10
Demonstration on drill sowing of ragi vs broadcasting in drylands	4	731	874	20
Demonstration on topping and desuckering UFC tobacco	8	374	443	18.5

## (iii) Extension Education Unit, Raichur

*Rabi 1980*

Demonstration on the use of rabi jowar M-35-1 variety	2	375	425	14
Demonstration on cabbage cultivation	4	No check	4,621	—
Demonstration integrated control of pests on onion	5	5,030	6,322	26

*Summer 1981*

Demonstration of cultivation of watermelon Ashai Yamato	3	—	1,933	—
Demonstration on control of pests of brinjal	6	3,800	6,583	73

*Kharif 1981*

Demonstration on BSH-1 sunflower	8	405	518	27
Demonstration on pest control in cowpea	5	281	536	70
Demonstration on the cultivation of Pusa Kranti, brinjal	4	No check	7,980	—
Demonstration on whole crop of redgram	3	No check	481	—
Demonstration on pest control of brinjal	3	1,230	5,793	371
Demonstration on sesamum E-8 variety	4	156	171	9

## (iv) Extension Education Unit, Dharwad

*Summer 1981*

Gypsum application to groundnut	6	759	815	—
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*Kharif 1981*

Results are awaited



1	2	3	4	5
<i>Rabi 1981</i>				
1. Entire safflower vs wheat and safflower mixed cropping	3	Entire safflower Safflower Wheat	326 78 220	
2. Demonstration on chemical control of safflower insect pest	4	248	315	28

(f) *Whole farm demonstrations:* During the year under report, the four Extension Education Units had 118 whole farm demonstrations as detailed below :

Extension Education Unit	Completed 3 years	No. of whole farm demonstrations		
		Completed two years	Completed one year	Total
Bangalore	11	19	13	43
Mandya	7	2	6	15
Mangalore	Nil	Nil	Nil	Nil
Raichur	7	14	14	35
Dharwad	25	—	—	25
Total	50	35	27	118

Following are some of the results of whole farm demonstrations conducted by various Extension Education Units.

Demonstration		Yield in kg/acre		% increase
		B.M. year	Present year	
1		2	3	4
(i) Extension Education Unit, Bangalore				
1. Ragi (Kharif 81)	1	300	650	117
	2	300	650	117
	3	180	350	94
	4	350	450	29
	5	236	415	74
	6	800	936	16
	7	600	800	33
	8	500	1,000	100
	9	350	800	160
	10	600	800	33
2. Paddy (Kharif 81)	1	600	2,200	267
	2	400	2,400	500

1	2	3	4	5
	3	2,154	2,386	11
	4	No check	1,000	—
	5	1,100	2,200	100
3. Mulberry	1	No check	240	—
	2	No check	300	—
	3	No check	150	—
	4	150	200	33
	5	200	400	100

## (ii) Extension Education Unit, Mandya

1. Sugarcane	1	—	40 tons	—
	2	—	56	—
	3	40 tons	52	8
	4	—	56	—
	5	49 tons	69	31
	6	49	53	8
	7	45	53	18
	8	40	56	40
	9	40	52	32
	10	45	62	39
2. Paddy	1	800	2,480	15
	2	2,500	2,700	8
	3	1,950	2,320	13
	4	2,200	2,420	10
	5	2,000	2,425	21

## (iii) Extension Education Unit, Raichur

1. Cotton (Rainfed)	1	80	93	15
	2	60	84	21
2. Onion (irrigated)	1	2,000	4,500	125
	2	2,500	4,800	92
	3	—	9,000	—
	4	4,000	7,000	75
	5	1,000	2,500	250
	6	5,000	5,733	15
	7	5,000	5,750	15
3. Groundnut	1	300	450	50
	2	—	475	—
	3	100	200	100
4. Hybrid jowar	1	500	2,100	320
	2	—	1,750	—
	3	1,000	2,100	110

1	2	3	4	5
<b>(iv) Extension Education Unit, Dharwad</b>				
<i>Kharif 1981</i>				
Onion		3,000	4,138	38
Jowar		588	1,300	55
Hy. Jowar	1	400	1,193	66
	2	400	1,400	71
	3	1,200	1,800	33
	4	1,000	1,500	33
<i>Rabi 1980</i>				
Wheat	1	750	1,500	52
	2	324	900	64
Bengalgram	1	100	183	45
Rabi jowar	1	300	500	40
	2	300	400	25
<i>Summer 1981</i>				
Groundnut	1	900	1,100	18
	2	492	1,200	143
Bhendi	1	500	600	17

New enterprises started by the Whole Farm Demonstrators during the year.

The new enterprises started by the Whole Farm Demonstrations are as follows :-

Unit	Dairy	Poultry	Piggery	Fishery	Sericulture	Others	Total
Bangalore	21	9	1	3	4	6	44
Mandya	11	-	-	1	1	-	13
Raichur	6	-	-	-	-	-	6
Dharwad	2	-	-	-	-	1	3
Total	40	9	1	4	5	7	66

**(g) Working with Youth Clubs**

The Extension Education Units have continued to involve voluntary agencies like youth clubs in their work. During the period 31 youth clubs were involved in the extension activities organising 219 demonstrations, 179 lecture sessions, 169 training sessions and 23 film shows and many other activities. The details are given below :

Unit	Working with No. of youth clubs	Demonstra- tions	Lectures	Training sessions	Film shows
Bangalore	19	189	171	140	18
Mandya	3	20	8	20	-
Mangalore	-	-	-	-	-
Raichur	7	10	7	9	5
Dharwad	2	-	-	-	-
Total	31	219	186	169	23

#### **h) Working with high schools**

The Extension Education Units worked with high schools to provide lessons on agriculture and to encourage students to develop a better attitude towards agriculture. In all, the Units worked with 36 high schools during the year. They have provided 156 lesson plans, to the schools. The staff of the Units made 205 visits to the schools. The details are as follows :-

Unit	Working with No. of schools	No. of visits made	No. of lesson plans provided
Bangalore	19	110	94
Mandya	8	54	18
Mangalore	-	-	-
Raichur	6	29	29
Dharwad	3	12	15
Total	36	205	156

#### **i) Innovative projects on hand and magnitude of impact**

##### **i) Extension Education Unit, Bangalore**

The village Majure Hosahalli was selected in 1975 for innovative project programme to improve the yields of dry land crops. Improved dry farming technology was advocated. During *Kharif* 1981, Mussoriphos was undertaken on potato crops. It is proposed to introduce Mussoriphos to all the vegetable crops in the coming seasons.

##### **ii) Extension Education Unit, Mandya**

a) *Community Poultry Project*: Bringing all the Lab-to-land farmers in a village for the purpose of rearing poultry birds on community basis has been tried in two lab-to-land villages of the Unit. The farmers have appreciated very much the experience of collective working and collective sharing of the profits.

b) Hyderabad-3C variety of redgram is introduced as a whole crop in the drylands and as an intercrop in jowar. Drill sowing of ragi in drylands has been made popular.

c) Efforts are being made to educate farmers to use weedicides in paddy and sugarcane fields.

### iii) Extension Education Unit, Raichur

a) As an innovative project, familywise approach has been adopted in a selected village. In one of the village, *Rhizobium* treatment to groundnut was done by 32 families covering 150 acres. Application of basal dose of fertilizer to rabi jowar and rainfed cotton (which the farmers were not doing hitherto, was taken up during the year on 100 acres and 16 acres respectively. About 95 per cent of families adopted seed treatment to rainfed cotton.

### iv) Extension Education Unit, Dharwad

The Unit was undertaken the following innovative projects :

- Plant protection in chilli crop for the control of the Murda complex
- Use of pyrethroids in controlling Varalaxmi cotton pests.

### j) Bhagyalakshmi gobar gas

The Extension Education Units have helped 111 farmers to construct Bhagyalakshmi Gobar gas plants of which 44 have been commissioned for work. Details are given below :

Unit	No. of farmers involved	Work started No.	Work completed No.	Plants commissioned No.
Bangalore	67	37	30	30
Mandya	48	7	1	1
Mangalore	-	-	-	-
Raichur	34	28	11	11
Dharwad	2	2	2	2
Total	151	74	44	44

### k) Koobabul Plantation work

The Extension Education Units helped 810 farmers in establishing Koobabul plantations and 1,09,842 seedlings were planted.

Units	No. of farmers involved	No. of seedlings planted
1	2	3
Bangalore	301	1,00,740
Mandya	187	4,555

1	2	3
Mangalore	—	—
Raichur	41	2,777
Dharwad	281	1,770
Total	810	1,09,842

**l) Balanced Agricultural Programme**

The Extension Education Units have undertaken programmes other than crop production enterprises in order to diversify the extension programmes. The details are given below :

Enterprise	Extension Education Units					Total
	Bangalore	Mandya	Mangalore	Dharwad	Raichur	
Poultry	46	4	—	30	—	80
Dairy	92	48	—	36	17	193
Piggery	30	2	—	—	—	32
Sericulture	146	22	—	3	—	171
Fisheries	—	—	—	3	—	3
Farm Forestry	—	319	—	3	—	322

**m) Coordinated programmes taken up by the Extension Education Units with other agencies**

The Extension Education Units conducted the following programmes in collaboration with other departments/agencies.

**(i) Extension Education Unit, Bangalore**

<i>Title of the programme</i>	<i>Number</i>
Sterility camps	36
Mass vaccinations	45
Special training programmes	17
Special seminars conducted for farmers	22

**(ii) Extension Education Unit, Mandya**

Sterility camps	2
Mass vaccinations	2
Special training programmes	4
Special seminars for farmers	1

**(iii) Extension Education Unit, Raichur**

Sterility camps	10
Mass vaccinations	13

Special training programmes	20
Special seminar for farmers	3

(iv) Extension Education Unit, Dharwad

Sterility camps	4
Mass vaccinations	1
Special training programmes	8
Special seminars conducted for farmers	2

n) Village adoption by Extension Education Units

The Extension Education Units adopted 42 villages during the year under report and conducted the following programmes in those villages.

Programme	Extension Education Unit			
	Bangalore	Mandya	Raichur	Dharwad
No. of villages adopted	19	6	9	8
No. of meetings conducted	484	257	104	165
Mixed cropping demonstrations	153	10	15	20
Vegetable demonstrations	86	5	20	30
Nutritional gardens	4	—	2	—

o) Special programmes conducted by Extension Education Units

(i) Extension Education Unit, Bangalore

1. Training for farmers in mushroom cultivation.
2. Promotion of biogas plants undertaken in collaboration with Rotary Clubs and Commercial Banks.
3. Uzi fly control programme has been taken up.

(ii) Extension Education Unit, Mandya

1. Farmers have been educated to raise Koobabul seedlings
2. A sugarcane seminar was organised in collaboration with Mangala Chemicals and Fertilizers, the KSDA and Sri Rama Sugar Factory, Chunchanakatte.
3. Special field day for Lab to Land farmers was organised.

(iii) Extension Education Unit, Raichur

1. Soil maps have been developed for selected villages.
2. A new insecticidal trial on cotton bollworms has been taken up.
3. Demonstrated the use of improved implements.

## (iv) Extension Education Unit, Dharwad

1. Organised two exhibitions

## (v) Extension Education Unit, Mangalore

1. A survey was undertaken to identify the existing cropping pattern and the problems faced by farmers.
2. A survey is undertaken on the incidence of cardamom having caterpillar in Coondapur taluk.
3. The process of collecting the basic data about all the taluks in the unit has been initiated.

## National Demonstrations

The National Demonstration units are located at Bijapur district, Siruguppa (Bellary district) and Mangalore (Dakshina Kannada district). The units have organized the demonstrations as detailed below :

Unit	No. of specialists working	No. of demonstrations established					Field days and P & Ds	
		One crop	Two crop	Three crop	Spl. Demn.	Total	No.	Participants
Bijapur	3	6	16	—	—	22	17	765
Siruguppa	3	7	11	1	—	19	9	244
Mangalore (Ullal)	3	4	13	—	—	17	27	554
<b>Total</b>	<b>9</b>	<b>17</b>	<b>40</b>	<b>1</b>	<b>—</b>	<b>58</b>	<b>53</b>	<b>1563</b>

The units conducted 53 Production-cum-Demonstration camps/field days involving 1,563 farmers.

## Pilot Bakery Project

The Pilot Bakery Project at Hebbal and Bakery Training School at Dharwad conducted various training programmes during the year under report. The details are furnished below :

Type of course	No. of batches	No. of participants
<i>at Bangalore</i>		
(i) Long term training programme	1	19
(ii) Three-weeks course	1	12
(iii) One-week course in cake making	7	182
(iv) Three-days short course for ladies only	27	1032
(v) Ad-hoc training programme	1	8
<i>at Dharwad</i>		
(i) Three-days short course for ladies	9	146



### Extension Work Carried out by College Departments

The staff members of the departments of colleges have conducted demonstrations/trials, produced extension literature, given radio talks and conducted training programmes. The details are given below :

Department	Demonstrations/trials	Extension literature	Audio talks	Trng. Programme
<i>Agril. College, Hebbal</i>				
Agronomy	1	2	2	1
Agril. Microbiology	—	2	1	5
Seed Technology	20	17	3	3
Agril. Economics	—	—	—	18
Horticulture	—	41	8	12
Plant Pathology	38	—	4	—
<i>Agril. College, Dharwad</i>				
Farm Forestry	—	6	1	2
Plant Pathology	1	5	6	18
Horticulture	—	—	2	2
Entomology	7	3	6	13
Agril. Microbiology	—	1	2	3
<i>Veterinary College, Hebbal</i>				
Animal Nutrition	—	15	—	1
Vety. Microbiology	—	7	—	—
Animal Genetics and Breeding	—	1	2	4
Dairy Technology	—	4	—	3
Poultry Science	—	6	5	21
<i>Fisheries College, Mangalore</i>				
Fishery Hydrography	—	—	4	—
Aquaculture	2	—	2	—
Fishery Microbiology	—	—	2	—
Fish Processing Technology	—	—	4	—
Agril. Engg. Institute, Raichur	—	—	—	6

### Village Adoption Work by Research Stations

Each Research Station has adopted one or more villages and some extension work has been conducted in those villages. The details are given below :

Research Station	Name of the village adopted	Extension activities conducted	
		Meetings	Demonstrations
1. Dharwad Farms	1) Gojnakoppa 2) Dandikoppa 3) Somapura 4) Gangadikoppa	—	35
2. ARS, Hiriur	Alur	—	2
3. ARS, Bailhongal	Devalapura	3	2
4. ARS, Annigeri	Basapura	2	—
5. ARS, Chintamani	Gadasanahally	—	—
6. RRS, Raichur	Eklaspur	2	4

#### Lab to Land Programme

The lab to land programme continued to be in operation in the University during the year under report. There were three units under the programme supervised by the Directorate of Extension, by the ICAR Co-ordinated Schemes and by the college campuses and regional research stations.

The centres, in all, adopted 2,228 families as against a target of 2,340 families. The details of families involved in crop demonstrations, dairy, poultry, sheep and piggery enterprises are given in the Table.

**Lab to Land Programme Progress-Involvement of Families in Crop Demonstrations and other Enterprises**

Name of the Centre	No. of families			No. of families involved in crop demonstrations		No. of families involved in other enterprises				
	Allotted	Adopted	2	3	4	5	Dairy	Poultry	Sheep	Piggery
					Kharif	Rabi				
1			2	3	4	5	6	7	8	9
<b>Unit-I</b>	<b>Centres under the direct supervision of the Director of Extension</b>									
E.E.U., Hebbal	660	660			410	—	487	186	237	—
F.T.I., Hebbal	40	39			38	34	—	—	—	—
E.E.U., Dharwad	280	280			270	196	—	40	—	—
N.D. Unit, Bijapur	60	39			45	39	—	—	—	—
K.V.K., Hanumanamatti	60	54			27	—	—	—	27	—
E.E.U., Raichur	120	120			48	68	14	22	74	—
E.E.U., Mandya	270	260			248	112	46	12	11	—
N.D. Unit, Siruguppa	30	20			18	20	—	—	—	—

**Unit-II**  
Centres under the direct supervision of the ICAR Coordinated Scheme under the administrative control of the University

Dry Farming Scheme, GKVK	50	50			45	18	11	—	—	—
Sunflower Scheme, GKVK	50	40			36	36	8	—	—	—
AICRP (Pulses), GKVK	40	50			50	5	—	—	—	—
AICRP (Millets), GKVK	30	30			14	12	18	—	—	—
AICRP (Sorghum) Dharwad	50	50			50	—	4	—	—	—

1	2	3	4	5	6	7	8	9
AICRP (Cotton), Dharwad	50	35	50	34	—	—	—	—
W.W. & S.S. Unit, Dharwad	50	50	44	—	4	2	—	—
Buffaloe Project, Dharwad	50	50	50	51	—	—	—	—
AICRP (Paddy), Mandya	50	50	43	50	1	6	—	—
AICRP (Pulses), Gulbarga	50	39	34	39	—	—	—	—
AICRP (Tobacco), Shimoga	50	12	—	—	16	—	8	—
<i>Unit-III</i>								
<i>Centres under direct supervision of the campus Heads and Regional Research Station</i>								
Hebbal/GKVK Campus Unit	50	50	37	38	12	13	—	—
Dharwad Campus Unit	50	50	44	36	—	10	—	—
R.R.S., Mandya	50	50	50	50	—	—	—	—
R.R.S., Mudigere	50	50	50	—	—	—	—	—
R.R.S., Raichur	50	50	47	—	3	—	—	—
Fisheries College, Mangalore	50	50	35	—	—	9	—	—
Grand Total	2,340	2,228	1,781	838	624	309	357	24

K. A. JALIHAL  
Director of Extension

## **PART V**

### **COMMUNICATION CENTRE**

Dr. K. A. Jaliha, Director of Extension continued to be incharge of the Editor's post till 10-2-1981. Prof. J. Srinivasamurthy took over as Editor incharge, in addition to his regular charge of the Professor of Agril. Extension (Dev. Education) on 11-12-1981.

The I/c. Editor was assisted by i) The Professor of Agril. Extension, Hebbal in respect of Mysore Journal of Agricultural Sciences and Current Research, ii) The Assistant Editor in respect of Technical Series and Annual Reports and iii) The Sr. Information Specialist in respect of U.A.S. Diary and Krishi Vijnana.

#### **Periodic Issues**

*U.A.S. Diary*: The Diary entered its 17th Volume on October 1, 1981. This publication has covered the important Board decisions, Circulars issued by the University and the list of the persons appointed in addition to regular features such as functions organised, important visitors etc. A few photographs are included in each issue.

*Mysore Journal of Agricultural Sciences*: This publication covers original research articles, book reviews and the postgraduate thesis abstracts of Agricultural and Animal Sciences. The journal continued to be covered in many national and international abstracting agencies including 'Current content' besides xerox microfilm agencies. One issue of Volume 15 was published during the period.

*Current Research*: This monthly research journal contains research news items, short research communications and feature articles. Number of issues published during the period was four.

*Annual Report*: The 243 page crown quarto report for the period April 1, 1980 to March 31, 1981 was brought out during January 1982.

*Krishi Vijnana*: This Kannada quarterly is in its eighth Volume. It covers question-answer series, tips to farmers and feature articles on various fields of agricultural sciences. The number of issues published during the period was one.

**Series Publications****A. U.A.S. Technical Series**

1. Soo-Babul [*Leucaena leucocephala* (L)] No. 38
2. Karnatakadalli Hasiru Mevugalu Mathu Avugala Besaya  
(in Kannada) No. 39

**B. U.A.S. Education Series**

1. Grading Standard in Internal Evaluation—An  
Exploratory Study No. 7

**C. U.A.S. Extension Series**

1. Summary report on the analysis of Demonstrations  
Conducted by the Extension Education Units, UAS  
Bangalore No. 9
2. Technology for Small Farmers No. 10
3. Manual for Training Rural Development Workers No. 11

**D. U.A.S. Text Book Series**

1. Weeds of Karnataka No. 2

**E. Miscellaneous Series**

1. Pace and Pattern of Agricultural Output growth in  
Karnataka No. 30

**F. Miscellaneous**

1. Annual Report 1980-81
2. Budget 1981-82

The University brought out a Wall Calendar for 1982 in Kannada.

**Books published under G.O.I. Text Book Project****Original**

1. Bhusara Samrakshane (Soil Conservation) — Virupaksha Badigera
2. Keetashastra Paribhashika Sabdakosha (A Glossary of Entomology)  
— S. B. Ravikala
3. Sasyaposhakagalu Mattu Avugala Patra (Plant Nutrient)  
— Dr. K. S. Krishnashastry and Mohan Kumar
4. Enne Koduva Kelavu Hosa Sasyagalu (Oil Yielding of Some New  
Plants) — S. K. Kallapur
5. Poustika Ahara (Nutrition) (Reprint) — Dr. P. S. Shankar
6. Pashuvaidyakeeya Vignana (Veterinary Science) (Reprint)  
— Dr. K. A. Alur

7. Kolisakane Kaipidi (Hand Book of Poultry Keeping) — Dr. G. Devegowda, Dr. M. Satyanarayana Rao and Dr. B. S. Ramappa
8. Santhanothpatti Shareera Kriyashastra (Reproductive Physiology) — Dr. K. Thimmaiah

#### **Translation**

1. Sachitra Battada Bele (Farmers Primer on Growing Rice) — Dr. M. Mahadevappa
2. Krishi Yanthropakaranagalu (Farm Machinery and Equipments) — D. Satyanarayana
3. Vairassugalu (Microbial World - Part-III) — Dr. H. Onkaraiah and Mrs. Shantha
4. Adhunikah Aharasukshmajeevi Vignana (Modern Food Microbiology) — M. G. Shenoy

#### **U.A.S. Printing Press**

Important printing works executed in the press during the year under report include periodicals mentioned earlier and other items such as Annual Report, UAS Budget and Technical Series.

The UAS Printing Press was shifted to the new premises during this period. The process of shifting the press started during June 1981 and the regular commissioning of machines at the new premises was during August 1981. Besides, the frequent power interruptions during the latter part of the year under report, some of the machines were not working to full capacity for want of repairs, renewals of spares and servicing. Only the treadle printing machine could be worked to full capacity during the whole year.

The total number of works completed during the year was 216 valued at Rs. 1,07,742-10 (labour charges only) inclusive of binding charges.

#### **Photographic Unit**

The Unit continued to serve the needs of teaching, research and extension staff in respect of developing slides, photographs and arranging exhibitions. The details of work done during the year.

1. Photographs taken and Exposed	1,095
2. Film Developed (Roll)	118
3. Preparation of Slides (B&W and Colour)	661
4. Enlargements (assorted)	1,714
5. Photo Micrographs	66
6. Specimen Photographs	97
7. Line Drawings	10

8. Map Drawings	4
9. Recopying	646
10. Functions covered	40

***Exhibitions***

The senior artist cum photographer participated in the following exhibitions.

- a) Science Exhibition at the Indian Science Congress Meet, Mysore
- b) Exhibition for the visit of King of Spain to UAS (29-1-82)

J. SRINIVASA MURTHY  
*Editor, Communication Centre*



## **PART VI**

### **CAMPUS DEVELOPMENT**

The developmental activities of the University during the year recorded a good progress. A sum of Rs. 65 lakhs was spent under Development Grants as well as Scheme Grants and a sum of Rs. 22.5 lakhs was spent under '8-University Works Expenditure' during the year. The developmental activities Campuswise are as follows :

#### **GKVK**

The incomplete of I and II floor building over the 7th and 8th Block of the B.S.H. College, taken up by the Department at a cost of Rs. 15.2 lakhs, has been completed in all respects.

The construction of C, D, E and F type quarters costing Rs. 13.25 lakhs is in the final stages of completion.

The construction of Health Centre costing Rs. 2.6 lakhs at GKVK is under progress and the building will be completed by the end of December, 1982.

The construction of Sericulture building costing Rs. 16.00 lakhs under World Bank Project at GKVK, has been taken up for execution.

Plans are under way to take up the construction of Agricultural College building and the U.G. Hostel during 1982-83 with the financial assistance from the ICAR and the State Government.

#### **Hebbal Campus**

The construction of Postmortem building (Rs. 5.00 lakhs), Bull Centre Building (Rs. 3.36 lakhs), additions to Girls' Hostel (Rs. 2.30 lakhs) was completed during 1981-82. The construction of over-head tank costing Rs. 60,000 at Dairy is under progress and this will be completed by December 1982. Construction of 'D' type quarters (8 nos.) costing Rs. 5.2 lakhs is under progress and the same will be completed by August 1982. Construction of Animal Science Laboratory building costing Rs. 7.00 lakhs under KDDC has just commenced. The construction of first floor over the Veterinary Hospital, costing Rs. 7.00 lakhs, duly financed by the I.C.A.R. and the K.D.D.C., is taken up for execution.

The construction of Mangala Raitha Bhavan costing Rs. 4.00 lakhs, with the financial assistance from M/s Mangalore Chemicals and Fertilizers, will be taken up during this year. The work of the first floor over the existing F.T.I. Building under TRYSEM will be taken up during this year. The construction of "EMPLOYEES HOUSE" with the aid of Employees Association will be taken up for execution during this year. The work of providing additional accommodation to the Nursery School will be taken up shortly.

#### ***Dharwad Campus***

The Home Science College building costing Rs. 3.10 lakhs has been completed and is under occupation except for the auditorium which is in final stages of completion. The Library building at an estimated cost of Rs. 25 lakhs was also completed, during the year under report, and occupied. Construction of P.G. Hostel costing Rs. 20.00 lakhs and addition to Administrative building costing Rs. 8.15 lakhs have also been completed and are under occupation. The construction of Bullock Shed (Rs. 95,000), Sericulture building (Rs. 3.6 lakhs), Office-cum-Laboratory under ICRISAT (Rs. 1.65 lakhs), Breeders Seed building (Rs. 2.00 lakhs), the building for Weigh bridge (Rs. 90,000) have also been completed and are being handed over to the Users' Department. The work of Animal Science Laboratory building (Rs. 5.00 lakhs), Field Laboratory for Horticulture Section (Rs. 1.65 lakhs), Field Laboratory for Botany Section (Rs. 1.97 lakhs), and Glass House for P.G. Course (Rs. 2.50 lakhs), and House-hold Industry for Home Science College (Rs. 95,000) are in progress. The construction of (six) D type quarters and the U. G. Hostel estimated to cost Rs. 2.5 lakhs and Rs. 15.00 lakhs respectively will be taken up for execution during 1982-83.

#### ***Mangalore Campus***

The construction of Swimming Pool Complex with Indoor Games building costing Rs. 12.4 lakhs has been completed during the year under report. Plans are under way to take up the construction of P.G. Hostel and Masonry Ponds at an estimated cost of Rs. 1.16 lakhs and Rs. 5.00 lakhs respectively during 1982-83.

#### ***Raichur Campus***

The water supply scheme to provide municipal water to the staff quarters and hostels was completed during the year under report. The cost involved is Rs. 7 lakhs.

#### ***Out-Stations***

*A.R.S., Bijapur* : The construction of A, B, C and D type quarters costing Rs. 9.15 lakhs is in progress. The work of Hostel and the Laboratory building

costing Rs. 20.18 lakhs, duly programmed under World Bank assistance, will be taken up during this year.

#### **N.A.R.P.**

Plans are under way to implement the World Bank Project proposals at Mudigere, Brahmavar, Bidar and RTRS, Navile under N.A.R.P. during 1982-83.

#### **RTRS, Shimoga**

The Laboratory building and staff quarters costing Rs. 11.5 lakhs were completed during the year under report and the buildings are under occupation.

#### **ARS, Kathalagere**

Construction of staff quarters costing Rs. 4.30 lakhs has been completed and they are under occupation.

Lift irrigation work at ARS, Honnaville costing Rs. 1.85 lakhs has been completed. The work of Laboratory building costing Rs. 2.50 lakhs at ARS, Madenur has been taken up and this will be completed by the end of June, 1982. Lift irrigation work at ARS, Kandli and construction of residential quarters and Office-cum-Store building under N.S.P.-II Programme will be taken up during 1982-83.

In addition to the above developmental works, infrastructure facilities for many of our Research Stations were provided during the year under report.

The Works Committee, a Sub-Committee of the Board, held four meetings during the year and reviewed the progress of the works at all the Campuses and Research Stations. Several of our Developmental works under ICAR and State Government Budget, including those of the Sericulture and KDDC Projects, were considered by the Works Committee and recommended to the Board for sanction. The Committee also took some important decisions for providing physical and irrigation facilities at various Campuses and Research Stations of the University during the coming years.

#### **Land Acquisition**

An extent of 213 acres 03 guntas of land at Bijapur was taken into possession for implementing the World Bank Projects. An amount of Rs. 10.84 lakhs was also deposited with the Revenue Authorities towards the cost of land acquisition. An extent of 298 acres and 15 cents of Government land has been proposed for transfer near Brahmavar in Udupi Taluk. An extent of 57 acres of private lands is also proposed for acquisition near Brahmavar, Udupi Taluk and an amount of Rs. 3,36,706-20 is deposited towards its cost. An extent of 36 acres 24 guntas of land is proposed for acquisition at Bidar and a sum of Rs. 1,26,100 has been deposited towards acquisition.

The acquisition proceedings in respect of 141 acres under First Phase at ARS, Gulbarga is taken up afresh in view of High Court's decision. In addition, an extent of 130 acres 10 guntas of land has been proposed for acquisition under II Phase at ARS, Gulbarga and the Dy. Commissioner, Gulbarga has been requested to hand over possession of lands from the land owners. The matter is being pursued vigorously.

**General**

The security arrangements at GKVK have been entrusted to a private agency viz., M/s Advisers on Security Investigation and Accidents (ASIA), Bangalore for a period of one year from 1st October 1981. Similarly at Dharwad the security arrangements is entrusted to M/s Hanuman Security Agency, Dharwad.

It was possible to add two more Buses, one car and ten Vans during the year under NARP and KDDC Projects.

B. VENKATASWAMY  
*Estate Officer*

## PART VII

### RESOURCES AND FINANCIAL ESTIMATES

The non-lapsable lump sum Block Grant payable to the University under Section 35 of the Act has been increased from Rs. 425 lakhs during the year 1980-81 to Rs. 450/- lakhs during the year 1981-82. The request of the University was for increasing the Block Grants to Rs. 544 lakhs for the year 1981-82 to cover the payments arising out of issue of Govt. Orders enhancing D. A, H.R.A., C.C.A., etc. This has not yet been finalised. The matter is being pursued by the University with the State Government.

The development grant released to the University for the year 1981-82 is Rs. 100.70 lakhs as against an allocation of Rs. 86.85 lakhs for 1980-81. Out of Rs. 100.70 lakhs a sum of Rs. 40 lakhs is for 25 per cent share of State Government for ICAR Co-ordinated Research Projects. The remaining Rs. 60.70 lakhs is for development items which includes the amount required for the NARP Project. The amount that is being released by the State Government is not in proportion to the development programmes of the University on hand. The State Government has been requested to step up allocation for the years 1982-83 and onwards. The total amount due during the Sixth Plan Period is Rs. 850 lakhs and a sum of Rs. 187.55 lakhs has only been released to end of 1981-82. The allocation of funds for the year 1981-82 over the previous allocation is detailed below :

Particulars	Budget for 1980-81	Budget for 1981-82
(Rupees in lakhs)		
Direction	161.35	185.88
Teaching	223.47	246.21
Research	186.65	198.32
Extension	33.84	36.52
Miscellaneous items	12.36	24.21
Schemes sponsored by other agencies	33.93	53.66
Total	651.60	744.80

**Five Year Plan Schemes of the University (Rs. in lakhs)**

a) Development Expenditure	117.80	125.00
b) ICAR/IBRD/NARP Project	173.05	139.06
c) University Seed Production Programme	—	4.79
d) ICAR Co-Ordinated Res. Projects	146.04	153.30
e) Govt. of India Schemes	10.72	9.51
f) State Plan Schemes (Adhoc Schemes)	7.32	8.76
g) Second National Seed Project	2.08	0.91
Total	457.01	441.33

The bulk of increase in expenditure under items 1 to 4 has been due to additional allowances and wages and increase in rates of essential commodities. As a result of non-receipt of additional grants requested by the University from the State Government, the allotment with regard to laboratory equipments and other teaching aids could not be released in full as requested by the teaching departments. The essential facilities required by the Research Stations such as irrigation, fencing the farm and other necessities such as building cages, glass houses, threshing yard, cattle sheds could not be provided to the extent required.

Number of All India Co-ordinated Research Projects assigned to this University during the year 1981-82 is 114 involving a total sum of Rs. 187.49 lakhs during the year 1980-81, the number of ICAR schemes that were in operation were 95 involving a total amount of Rs. 135.23 lakhs. 25 per cent of the expenditure in respect of major number of schemes is met out of the grants received from the State Government and balance from the ICAR.

The statement showing summary of Revised Budget Estimates of Receipts and Expenditure for the year 1981-82 and the Budget Estimates for 1982-83 is as follows: The abstract of Receipts and Expenditure is given in Appendix-III.

Head of Account	Original estimates for 1981-82	Revised estimates for 1981-82	Budget estimates for 1982-83
1	2	3	4
<b>Receipts</b>	<b>(Rupees in lakhs)</b>		
1. Grants from State Govt.	641.05	664.42	785.10
2. ICAR, Govt. of India and other Agencies	361.64	375.84	362.25
3. Income from fees	5.00	6.00	7.00
4. Income from Univ. Property : Farms, Rent and other Misc. receipts	105.76	112.00	140.53
5. Other misc. income	7.76	18.95	0.05
<b>Total Receipts</b>	<b>1,121.21</b>	<b>1,177.21</b>	<b>1,294.93</b>

1	2	3	4
<b>Expenditure</b>			
1. University Administration	185.89	199.59	200.33
2. Resident Teaching	246.21	251.44	273.25
3. Research	198.32	197.12	207.18
4. Extension	36.52	32.45	38.75
5. Other misc. items	24.21	11.63	14.13
Total	691.15	692.23	733.64
6. Schemes sponsored by other agencies	53.66	139.81	40.61
Grand Total	744.81	832.04	774.25
<b>Five Year Plan Schemes (Rupees in lakhs)</b>			
6. a) Development schemes financed by ICAR and State Government	125.00	135.00	185.00
b) NARP Project financed by World Bank thro' ICAR and State Govt.	139.06	96.04	104.15
c) Univ. Seed Production Programme	4.79	3.90	4.00
d) ICAR Co-ordinated Res. Projects	153.30	187.50	175.68
e) Govt. of India Schemes	9.51	9.97	9.79
f) State Plan schemes (Ad-Hoc schemes)	8.76	20.42	20.10
g) Second National Seed Project	0.91	3.95	26.42
Total	441.33	456.78	525.14
Total under Five Year Plan schemes	1,186.14	1,278.82	1,279.39
Anticipated Savings	(—) 10.00	(—) 10.00	(—) 20.00

Assistance received from the State Government, ICAR, KDDC and other Agencies towards Development Schemes during the year 1981-82 is furnished below :

	(Rupees in lakhs)
1. State Government (Development grant)	100.70
2. State Government Ad-hoc Schemes	11.91
3. Government of India	4.32
4. ICAR Coordinated Research Projects	59.02
5. ICAR Centrally Sponsored Schemes	86.42
6. NARP Project	23.80
7. Second National Seed Project	0.10
<b>Grants from other Sources</b>	
8. PL-580	3.29
9. Wheat Associates	0.22
10. Dept. of Atomic Energy	0.66
11. KDDC	19.00
12. State Bank of India	2.31
13. World Bank - for Sericulture Project	85.27
14. ASPE Agricultural Research and Development Foundation	0.30
15. UNICEF	0.42
16. Mangalore Chemicals and Fertilizers	0.44
17. Indian Council of Soil Science Research, New Delhi	0.04
18. Indian Council of Medical Research	0.54
19. Dept. of Agriculture, Ferro, American Embassy, New Delhi	1.67
20. F.A.O.	1.19
<b>Total</b>	<b>356.12</b>

The University gratefully acknowledges the assistance received from these agencies.

H. M. NAGABHUSHANA  
Comptroller



## APPENDICES

## APPENDIX I

### LIST OF PERSONS APPOINTED IN THE UNIVERSITY DURING 1981-82

Sl. No.	Name	Designation/ Discipline	Date of reporting for duty
1	2	3	4
<b>OFFICERS</b>			
1.	Dr. K. S. Krishna Sastry	Director of Instruction (Agri) Agri. College, Hebbal	22-3-1982 (a.n)
2.	Dr. K. Trivikrama Rao	Director of Instruction (Vety), Vety. College, Hebbal	22-3-1982 (a.n)
<b>PROFESSORS</b>			
<i>Teaching</i>			
1.	Dr. S. J. Seshadri	Director, KDDC Project Vety. College, Hebbal	27-1-1982
2.	Dr. K. Atmaram	Prof. of Dairy Technology Hebbal	24-7-1981
3.	Dr. M. Mahadevappa	Prof. of Seed Technology Hebbal	13-8-1981
<i>Research</i>			
4.	Dr. R. Parameshwarappa	Sr. Scientist, ICAR (Pulses), ARS, Gulbarga	22-8-1981
<b>ASSOCIATE PROFESSORS</b>			
<i>Teaching</i>			
1.	Mr. K. T. Ramachandra	Assoc. Prof. of Agril. Extension, Hebbal	19-6-1981
2.	Mr. V. Veerabhadraiah	Assoc. Prof. of Agril. Extn., Dharwad	29-6-1981
3.	Mr. G. Francis Xavier	Assoc. Prof. of Co-operation Hebbal	10-7-1981
4.	Mr. S. C. Hiremath	Assoc. Prof. of Co-operation Dharwad	17-6-1981
5.	Dr. R. R. Mallikarjunaiah	Assoc. Prof. of Microbiology, GKVK	22-6-1981
6.	Dr. P. G. Chengappa	Assoc. Prof. of Marketing Hebbal	6-7-1981
7.	Dr. M. M. Kailas	Assoc. Prof. of Dairy Prodn., Hebbal	24-7-1981
8.	Dr. P. A. Shankar	Assoc. Prof. of Dairy Microbiology, Hebbal	24-7-1981

1	2	3	4
9.	Dr. S. M. Jayadevappa	Assoc. Prof. of Surgery Hebbal	24-7-1981
10.	K. R. Lakshmaiah	Assoc. Prof. of Vety. Hospital, Dharwad	9-1-1982
<i>Research</i>			
11.	Mr. M. I. Belgaumi	Agril. Engg., NARP, ARS, Bijapur	6-7-1981
12.	Mr. B. Sunderswamy	Agril. Extension, NARP, ARS, Bijapur	6-7-1981
13.	Mr. T. Guruswamy	Agril. Engg. (Implements) NARP, Bijapur	24-7-1981
14.	Mr. S. S. Kumathe	Drainage Engineer Agril. College, Dharwad	24-7-1981
15.	Mr. N. Jayasheela	Microbiologist, AICRP on Soyabean, GKVK	24-6-1981
16.	Dr. J. Raj	Microbiologist, BNF (Scheme) GKVK	19-6-1981
17.	Mr. H. S. Gopala Gowda	Microbiologist, BNF Scheme GKVK	19-6-1981
18.	Mr. M. Chowde Gowda	Training Organiser (Agril. Engg) GKVK, Hanumanamatti	24-7-1981
19.	Mr. G. S. Chandrasekhar	Assoc. Prof. of Agril. Economics, NARP, GKVK	15-7-1981
<i>Extension</i>			
20.	Mr. A. Seshadri Iyer	Senior Information Specialist Hebbal	4-6-1981
21.	Mr. K. S. Krishna	Extn. Leader, ARS, Mandya	25-6-1981
22.	Mr. Venugopal	Extn. Leader, Fisheries College, Mangalore	29-6-1981
ASSISTANT PROFESSORS			
<i>Teaching</i>			
1.	Mr. S. N. Sathyanarayanappa	Asst. Prof. of Fishery Engg. (Gear)	29-10-1981
2.	Mr. R. N. Ramachandra	Asst. Prof. of Fishing Technology	1-1-1982
3.	Mr. K. A. Narayana Bhat	Asst. Prof. of Fishery Engg.	1-3-1982
4.	Mr. C. M. Krishna Bhat	Asst. Prof. (Statistics)	4-3-1982
<i>Research</i>			
1.	Mr. R. C. Hullikari	Asst. Agril. Engineer Dharwad	12-6-1981
2.	Mr. H. C. Narayana	Jr. Agril. Engg., AICRP ARS, Bijapur	25-6-1981
3.	Mr. B. S. Venkatarami Reddy	Farm Manager (Poultry) Control Population Unit (Meat), Poultry Project Hebbal	16-12-1981 (a.n.)

1	2	3	4
4.	Mr. G. B. Mallikarjuna	Asst. Prof. (Statistics) KDDC (HCP), Hebbal	31-12-1981
5.	Dr. S. Venkatesha Kaveri	Asst. Prof. (Rinderpest) KDDC (HCP), Hebbal	9-1-1982
6.	Dr. Gideon Glori Doss	Asst. Prof. (Experimental Animals) KDDC (HCP), Hebbal	1-1-1982
7.	Dr. Placid Eugene D'Souza	Asst. Prof. (Parasitic Diseases) KDDC (HCP), Hebbal	9-1-1982
8.	Dr. T. Ganesh	Asst. Prof. (Parasitic Borne diseases) KDDC (HCP) Hebbal	9-1-1982
9.	Dr. T. G. Honnappa	Asst. Prof. (Female Infertility) KDDC (HCP), Hebbal	9-1-1982
10.	Dr. L. Muniyappa	Asst. Prof. (Infectious Inferti- lity) KDDC (HCP), Hebbal	29-1-1982
11.	Mr. K. Seenappa	Jr. Statistician, Project Co- ordinator (Sunflower and Safflower) GKVK	4-3-1982
<i>Extension</i>			
12.	Mr. P. S. Jagadish	Asst. Plant Protection Specialist (Extn), Hebbal	10-6-1981
13.	Mr. Khadar Khan	Pl. Protection Splt., Mangalore	7-7-1981
14.	Mr. M. S. Ganesha Babu	Asst. Crop Splt., N.D.S. Siruguppa	29-6-1981
15.	Mr. B. N. Patil	Asst. Crop Specialist, Raichur	2-7-1981
16.	Mr. Abdul Haseeb	Asst. Crop Specialist, NDS, Mangalore	23-6-1981
17.	Mr. V. Ramakrishnappa	Asst. Agril. Engg. Splt., ND Scheme, Siruguppa	29-6-1981
18.	Mr. K. Parameshwarappa	Asst. Agril. Engg. Splt., NARP, Bijapur	6-7-1981
<i>Research</i>			
19.	B. M. Paramashivaiah	(A. Science) NARP, GKVK	17-12-1981
20.	Patil Chandrasekar	Soil Physicist, Dharwad	25-2-1982
21.	H. C. Parvathappa	Soil Physicist, Dharwad	30-1-1982
22.	S. Shamanna	Soil Chemist, Agril. College Hebbal	29-1-1982
23.	S. C. Shivamurthy	Assoc. Prof. (Soil Sc.) Mudigere	18-2-1982
24.	A. M. Krishnappa	Assoc. Prof. (Soil Sc.) Bramhavar	4-2-1982
25.	R. Ananthanarayana	Agril. Chemist, RRS, Dharwad.	31-3-1982
26.	H. M. Manjunathajiah	Soil Chemist, RRS, Dharwad.	1-2-1982

1	2	3	4
27.	B. N. Kavalappa	.. Scientist, KVK, Hanumanamatti	25-2-1982 (a.n)
28.	G. R. Lokanath	.. Poultry Geneticist, Hebbal	31-12-1981
29.	R. Bhaskaran	.. Assoc. Prof. of Gynaecology Hebbal	31-12-1981
30.	L. Ramachandra Rao	.. Assoc. Prof. of Gynaecology KDDC Project, Mysore	7-1-1982
31.	N. Madhu Rao	.. Assoc. Prof. of Gynaecology KDDC Project, Hassan	1-1-1982
32.	Margoob Hussain	.. Assoc. Prof. of Gynaecology KDDC Project, Tumkur	4-1-1982
33.	R. N. Ramachandra	.. Assoc. Prof. of Gynaecology KDDC Project, Bangalore	31-12-1981
34.	M. Rajashekar	.. Assoc. Prof. Rinder Pest Project, Hebbal	31-12-1981
35.	Syed Zaki	.. Assoc. Prof. of Infections Fertilizing, Hebbal	7-1-1982
36.	K. Narayana	.. Assoc. Prof. of Female Infertility, Hebbal	28-12-1981
37.	M. S. Jagannath	.. Assoc. Prof. of Parasitic Disease, Hebbal	31-12-1981
38.	D. R. Lakshminarayana Setty	.. Assoc. Prof. of Parasitic Disease, Hebbal	31-12-1981
39.	K. Syed Ziauddin	.. Assoc. Prof. of Pathology Hassan	21-1-1982

Name	Date of report	Name	Date of report
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#### Assistants

<i>Messrs</i>		R. Lalitha	8-6-81
Bhadregowda	24-4-81	M. Kuberappa	15-4-81
R. Chandrappa	8-4-81 (A.N.)	K. R. Krishna Murthy	3-4-81 (A N)
Chennakeshavagowda	3-4-81	B. N. Kotihal	6-4-81
G. Chandrashekar	8-6-81	V. R. Kamle	24-4-81
H. S. Devaraj	5-6-81	Krishne Gowda	13-4-81
Gopinath Desai	7-4-81	M. C. Kanthi	19-6-81
Gudliswamy S. Kitturmath	22-6-81	A. Mallikarjunaiah	29-6-81
Gangadhar Gollar	25-6-81	L. S. Maduranath	24-6-81
M. B. Hampiholi	6-4-81	Mallaiah	3-4-81
M. V. Hanumanthappa	15-4-81	M. Muralidhar	13-4-81
V. S. Lakshminarasimha- char	3-4-81 (A N)	M. B. Mathad	22-4-81
M. Lakshminarayana	22-6-81	S. M. Manjunath	30-4-81
		M. Narayana Sheka	15-6-81

Name	Date of report	Name	Date of report
Narasimha	11-6-81	Nagaraje Urs	8-6-81
M. R. Krishna Reddy	3-4-81	Jayasapalya	22-6-81
K. P. Kumar	3-4-81 (A N)	Leelavathi Goni	9-4-81 (A.N.)
S. Naga	13-4-81	B.P. Manohara	29-6-81
T. Nanje Gowda	22-4-81	H. K. Lakshminarayanappa	3-4-81
V. Nagarajappa	8-4-81	K. E. Mariyappa	16-6-81
M. R. Prabhakar	6-4-81 (A N)	K. N. Ramakrishnaiah	3-4-81
Rudramurthy V. Garag	13-4-81	K. Harishchandra Shetty	16-6-81
H. S. Ramesh	3-4-81	G. J. Jaggal	25-6-81
G. Rajasekhar	22-4-81	Churiveerabhadrappa	
M. P. Ravindramurthy	20-4-81	Kallappa	10-6-81
Ramaiah	3-4-81	M. S. Nagarajan	29-6-81
P. Sadashiva	18-6-81	H. Somanna	5-6-81
N. N. Sathyavathi	15-6-81	B. K. Shylajakumari	15-6-81
J. Savithri	5-6-81	B. S. Nagaraj	23-1-81
M. B. Shankar	27-4-81	G. Jayamma	11-6-81
K. V. Sudhakar	15-4-81	N. Venkatachalapathy	5-6-71
H. Nagarajappa	29-4-81	A. B. Banakar	12-6-81
M. Y. Srinivasu	12-3-81	B. N. Nagaraj	15-6-81
H. S. Sundararam	3-4-81	N. M. Krishnappa	5-6-81
P. Swarnalatha	6-4-81 (A.N.)	T. G. Manjunatha	5-6-81
S. Sathyanarayana	6-4-81	H. V. Basavachary	5-6-81
A. N. Sathyanarayana	8-4-81	M. S. Shankarappa	11-6-81
C. S. Sriramachandra	3-4-81	R. Lakshmikantha	15-6-81
T. J. Shashidhar	13-4-81	B. N. Nagesh	15-6-81
H. Thippeshappa	20-4-81	Narayani Shedthy	12-6-81
R. G. Thakur	15-6-81	A. B. Umapathy	15-6-81
P. H. Usha	3-4-81 (A. N)	B. H. Muniyappa	23-9-81
B. V. Usha	3-4-81	M. N. Ushadevi	13-8-81
D. N. Venkatappa	8-6-81 (A.N.)	N. Ramappa	10-9-81
Venkataraaju	15-4-81	V. Mohan	4-9-81
Vijayamala B. Alagawadi	10-4-81	Edwin Wilson	23-9-81
Vijayakumar	6-4-81	Nayak Narayan	
H. Venkatesh	15-4-81	Krishna	10-9-81 (A.N.)
Vasudeva Sharma	15-6-81	Jayanna	5-10-81
G. B. Vijaya	6-4-81	B. C. Manjunatharadhya	15-9-81
B. V. Venkatarayappa	5-6-81	T. Duggappa	24-9-81
B. G. Yamuna	9-4-81	E. V. Alur	10-9-81
Y. G. Ganiger	8-6-81	B. Nagaraja	23-1-82
R. B. Hanji	8-6-81	D. Jayaramaiah	5-2-82

Name	Date of report	Name	Date of report
H. M. Nagaraja	1-2-82	K. Laxminarayana	26-5-81
Channalkar Thukaram	30-1-82	Y. B. Rajanna	17-8-81
Akkennavar		J. Padmini	29-4-81
Laxmana Yellappa	8-2-82	Mary Anjali	7-8-81
V. M. Haragabal	16-12-81	A. C. Mangooli	14-5-81
K. V. Chandrasekhar	18-12-81	M. Shashikala	24-8-81
T. S. Jagadish	5-1-82	S. A. Jagdale	31-8-81
G. C. Prakash	24-12-81	J. Narendra	13-4-81
S. Gangabyraiah	7-1-82	J. Swarnalatha	5-8-81
V. Govindarao	8-2-82	B. R. Krishna Murthy	4-5-81
C. S. Navalgund	18-2-82	Subhash Swamiras Kittur	1-5-81
Siddaramu	8-3-82	B. R. Chandrasekhara	28-5-81
B. B. Patil	10-4-81 (A.N.)	L. V. Srinivasa	12-8-81
S. B. Mohan	15-4-81	C. G. Kusga	22-5-81
A. Mohana	2-4-81	K. Prabhakara Rao	7-9-81
<b>Telephone Operators</b>		S. S. Kerar	10-8-81
C. R. Rangalakshamma	14-9-81 (FN)	V. L. Shanbhag	1-6-81
H. O. Jayamma	14-9-81 (FN)	M. Ramakrishna	5-8-81
Sheela Gangadhar Naik	16-9-81 (FN)	Kulkarni Puspa, U.	5-5-81
Shashikala Krishna Reddy		N. S. Narthi	5-5-81
	16-9-81	Deonara D. Silva	30-4-81
N. Lakshmi	14-9-81 (FN)	G. S. Lalithamma	1-5-81
N. S. Ravishankar, Supervisor		K. V. Badiger	28-5-81
(Field Demonstrator) Vety.		Sudha B. Patange	23-12-81
College, Hebbal	4-12-81	H. K. Shashikumar	23-12-81
<b>Typists</b>		Andalu	8-5-81
C. C. Lilly	28-12-81	G. M. Desai	18-12-81
Raghavendra	1-5-81	N. R. Lakshminarayana	28-12-81
B. K. Viswanath	1-5-81	K. G. Pushpa	30-4-81
H. R. Hemachandrappa	7-5-81	K. T. Sharada	3-8-81
Vastrad Sharanayya	1-5-81	M. L. Umadevi	7-4-81
Thammanna Gowda	6-8-81	Ambujakshi	16-12-81
A. K. Gopal	29-4-81	R. Shanthkumari	28-5-81
Dhanalaxmi	8-5-81	G. V. Seethalakshmana	16-12-81
K. Aswathkumar	30-4-81	N. Geetha	23-12-81
D. T. Bhuvaneshwara	13-8-81	N. Keshavakumar	12-8-81
Mogera Annappa Basava	25-5-81	B. G. Manjunatha	1-5-81
H. S. Sudarshan	9-9-81	G. V. Leelavathy	5-8-81
		G. Ramamani	1-1-82
		S. B. Hanumanthappa	14-5-81

Name	Date of report	Name	Date of report
B. C. Gawi	11-5-81	K. Prabhakara Rao	7-9-81
T. S. Thimmappaiah	26-12-81	M. S. Kulkarni	10-8-81
Philomane Mascarenhas	22-5-81	Veerappa I Shirur	10-8-81
Abdul Subhan Irene D' Almeida	30-4-81	Murahari Rao	28-9-81
<b>Laboratory Assistants</b>		Basanna	10-8-81
Narasappa	18-1-82	S. Mehaboob	10-8-81
Shivaswamy	19-8-81	C. S. Tergal	18-8-81
R. Manjunatha	1-6-81	Durgappa	10-8-81
Siddamma	10-8-81	M. S. Ramaiah	10-8-81
M. Javaregowda	5-8-81	S. T. Mutalik Desai	7-8-81
K. Chikkarangaiah	1-10-81	Vasanth Ullal	7-8-81
K. R. Narayana Prasad	6-8-81	C. K. Ramegowda	17-8-81
S. Madappa	14-8-81	A. Paraveen	7-8-81
V. Thimmaiah	6-8-81	B. M. Mahadeppa	10-8-81
P. Ratnakara Shetty	6-8-81	R. Muralidhara	28-1-82
S. G. Shivanna	6-8-81	M. I. Tappal	11-8-81
V. C. Kitageri	10-8-81	N. Kempa Raju	19-8-81
V. H. Patager	3-9-81	G. Neelakentiah	27-1-82
S. Siddegowda	6-8-81	Thimmaiah	9-9-81
G. H. Hanumaiah	10-8-81	N. Raju	7-8-81
N. Ningaiah	7-8-81	<b>Field Assistants</b>	
M. Maniraju	6-8-81	D. L. Rajagopal	19-8-81
Muniyappa	6-8-81	Raju	19-8-81 (A.N.)
Azeezunnisa	10-12-81	N. G. Narayana	19-8-81
M. Mohan	10-8-81	B. Kempalingaiah	21-8-81
S. Veeranna	10-8-81	S. B. Pattaswamy	24-8-81
N. Uddande Gowda	7-8-81	M. Adivappa	20-8-81
Chikkaveeraiah	6-8-81	Gurushantha	20-8-81
Shivasidraiah	18-9-81	M. Sidde Gowda	19-8-81
Siddappa	6-8-81	H. Basavaraju	20-8-81
K. R. Babu Rao	30-12-81	H. N. Javara Setty	20-8-81
C. M. Shivanna	10-12-81	H. G. Ramaiah	19-8-81
Ratna Ramakrishna	16-10-81	A. Ravishankar	19-8-81
N. Paramashivaiah	6-8-81	A. C. Shivaji	19-8-81
A. H. Rayudu	7-8-81	B. N. Chikkanna	19-8-81 (A.N.)
S. S. Gadannavar	15-10-81	T. Muniyappa	21-8-81 (A.N.)
Y. R. Aswathappa	30-9-81	T. G. Venkateshaiah	19-8-81
G. S. Biradar	10-8-81	G. Veerabhadraiah	19-8-81
H. Y. Mareker	13-8-81	N. Venkatagiriappa	1-9-81



Name	Date of report	Name	Date of report
C. M. Negendraiah	1-9-81	B. K. Bhajantri	22-8-81
V. M. Desai	21-8-81	B. K. Shivashankar	19-8-81
V. R. Surpur	24-8-81	N. Lakshmaiah	22-8-81
S. Shiva Murthy	24-8-81	Aswathamarayana	19-8-81
S. P. Pinjar	26-8-81	D. P. Venkatesh	19-8-81
H. Chandralah	24-8-81	H. S. Kenchiah	19-8-81
S. H. Haveli	24-8-81	B. Kempe Gowda	19-8-81
N. G. Kalahal	21-8-81	S. B. Godagin	24-8-81
S. S. Biradar	21-8-81	M. B. Sankappa	19-1-81
K. Narasa Hanumaiah	21-8-81	B. K. Kumbali	1-9-81
K. Mylarappachar	24-8-81	T. V. Kanakappanavar	27-8-81
B. K. Chandrashekarappa	4-9-81	R. Rangaswamy	21-8-81
K. A. Chickmath	27-8-81	P. A. Mudagal	26-8-81
N. T. Kadammanavar	27-8-81 (AN)	N. Shivaiah	31-8-81 (AN)
H. Malleshappa	1-9-81	K. Shivaswamy	26-8-81
K. N. Gouder	21-8-81	A. M. Sddaiiah	5-9-81
V. B. Modig	24-8-81	Huchiah	28-8-81
D. B. Patgar	26-8-81	D. Ramaiah	24-8-81 (AN)
H. S. Nagavi	24-8-81	H. Danappa	24-8-81 (AN)
M. H. Shiggavi	25-8-81	V. D. Arkasali	24-8-81 (FN)
S. M. Halappa	27-8-81 (AN)	S. S. Malleshappa	24-8-81
Ramachandrachar	25-8-81	R. Basavaraju	24-8-81
M. T. Keshava Murthy	28-8-81	N. Mahadevappa	24-8-1981
Ramakrishnappe	26-8-81	H. R. Kulkarni	1-9-81
E. B. Pavate	22-8-81	H. T. Basavaraj	22-8-81 (AN)
S. Somanath Gowda	1-9-81	K. Nagaraja Jois	26-8-81
S. N. Hanwal	20-8-81	N. N. Hukkundi	31-8-81 (AN)
G. M. Madaiah	21-8-81	D. N. Kama Reddy	26-8-81
B. Y. Walikar	22-8-81 (AN)	Bettegowda	11-9-81
M. H. Murnal	22-8-81	A. D. Prabhakara	10-9-81
Bhimanna Hugar	27-8-81 (AN)	Syed Khosim	1-9-81
T. Y. Hosoly	24-8-81	B. K. Srinivasa Rao	28-8-81
Chandrasekhar	22-8-81	V. K. Badiger	29-8-81
M. B. Shivananjegowda	12-8-81	A. K. Birdar	28-8-81
K. Viswanathachar	21-8-81	Shankargowda Patil	28-8-81
K. Mohinuddin	22-8-81	S. B. Talwar	1-9-81
S. G. Sellibali	22-8-81	C. N. Jalawadigi	27-9-81
H. Shantha Murthy	19-8-81	V. B. Hosamani	10-9-81
V. S. Malawagol	27-8-81 (AN)	A. Kempaiah	21-8-81
B. N. Ninge Gowda	21-8-81	K. Rangaswamy	19-8-81

Name	Date of report	Name	Date of report
H. V. Dambal	31-8-81	K. Krishna	18-1-82
Channegowda	31-8-81	G. Rangaramanjam	15-1-82
H. Nagabhushan	1-9-81	C. B. Javali	19-12-81
Somasekhariah	26-8-81	M. P. Deshpande	21-12-81
Talwarshankarappa	1-9-81	N. S. Sheelavanth	22-12-81
Sangappa	29-8-81	S. V. Shyajoti	22-12-81
S. K. Hattarki	11-8-81	B. G. Pradeep	19-12-81
B. Devegowda	22-8-81	K. Basavaraj	22-12-81
Channabasappa	25-8-81	R. S. Patil	21-12-81
K. M. Rangappa	5-9-81	S. B. Hoolageri	31-12-81
B. Shivarudrappa	22-8-81	K. Jagadeswarmurthy	21-12-81
S. B. Bijapur	21-8-81	S. V. Angadi	29-12-81
G. M. Puttarangiah	27-8-81	K. B. Puradappa	21-12-81
V. Swamy	11-9-81	Nagarajachari	21-12-81
P. P. Ganamate	29-8-81	Chicklingegowda	23-12-81
C. Chandrasekharaiah	11-9-81	S. D. Kalageri	24-12-81
Jayakumara	4-9-81	S. P. Bikkannavar	24-12-81
M. Malieshaiah	5-9-81	Mirzashafullabaig	28-12-81
T. C. Shivaprakash	31-8-81	S. H. Patil	29-12-1981
Siddagangaiah	8-9-81	R. S. Patil	29-12-81
Vaijanatha K. Shedolkar	14-9-81	Saibanna	29-12-81
A. Nissar	21-9-81	G. R. Kallur	28-12-81
K. V. Venugopalaramjurs	25-9-81	M. S. Guddasmatu	30-12-81
H. B. Krishnappa	19-8-81	Rachanna	31-12-81
S. R. Chavadi	27-8-81	D. R. Patil	31-12-81
Shankarappa	19-10-81	B. J. Toranagetti	1-1-82
V. M. Panchal	17-11-81	S. Sasappa	1-1-82
Sabard	22-8-81	P. B. Chelawali	1-1-82
Ambanna	16-9-81	M. P. Patil	15-1-82
N. Javaraiah	9-1-81	K. N. Narasiah	15-2-82
D. Nanjundaiah	18-1-82	M. F. Utalenavar	23-3-82
S. Manchappa	5-1-82		
K. Honnappa	7-1-82	<b>Driver (H.V)</b>	
G. Sunkanna	24-12-81	Basavaraj	7-9-81
K. Parthasarathy	24-12-81	G. Meniswamy	13-4-81
Anjanappa	24-12-81	G. R. Desai Goudar	18-9-81
V. S. Dhanyal	28-12-81	Raju	20-8-81
Ramappa	28-12-81	Srinivasa	20-4-81
B. S. Darukarya	18-1-82	Shekar Aeka	20-8-81
H. C. Srinivasa Naik	15-1-82	<b>Tractor Drivers</b>	
		B. B. Walikar	19-10-81

Name	Date of report	Name	Date of report
S. K. Kulkarni	18-2-82	K. B. Hanumantharaya	5-6-81
Bandagaswamy	22-10-81	M. Venkatesh	17-6-81
B. Marappa	19-10-81	Siddalingaiah	11-6-81
Nagendra	23-10-81	B. Chandrasekharaiah	8-6-81
Mehaboob Shariff	23-10-81	Muninarasegowda	8-6-81
K. Puttaswamy	28-1-82	M. Siddegowda	2-6-81
A. K. Siddappa	13-10-81	H. M. Munikrishnappa	8-6-81
N. Krishnappa	17-10-81	K. Shivalinganagowda	8-6-81
<b>Driver (L.V)</b>		N. Mohan Raju	8-6-81
H. Huligappa	20-4-81	Rajanna	10-6-81
Shaik Budan	4-4-81	S. C. Viswaraiah	8-6-81
P. Kumar	1-4-81	L. V. Srinivasa	8-6-81
M. Shankar	6-4-81	Rangaiah	8-6-81
Shivalingaiah	6-7-81	Subramanya	5-6-81
A. M. Radkod	15-9-81	S. Rachaiah	8-6-81
H. N. Panchakavi	13-4-81	M. V. Mannaji Rao	8-6-81
K. G. Palakshaiah	1-10-81	A. Mariyanna	15-6-81
K. Govindaiah	1-4-81	Veerappa	8-6-81
B. M. Raju	2-4-81	K. Nagesh	18-6-81
V. D. Patroot	15-4-81	H. Tholacha Naik	19-6-81
Muniraju	30-9-81	Ananda Madiwala	15-6-81
Hombalajah	4-11-81	A. Ramdas Kava	11-6-81
M. D. Ghatage	12-10-81	M. Ramakrishna	10-6-81
C. D. Kadamanavar	30-10-81	N. H. Mane	12-6-81
Puttegowda	27-10-81	N. H. Narayanappa	11-6-81
C. Gangadhar	28-9-81	Yellappa Parappa Jojin	15-6-81
Y. Muniyappa	21-9-81	B. T. Nekar	11-6-81
Anjani	29-10-81	Thimmappa	12-6-81
Lakshmana	27-10-81	K. M. Thimma Gowda	11-6-81
Muniswamachar	21-9-81	H. Danappa	11-6-81
Krishnappa	27-10-81	D. Ramaiah	10-6-81
S. Govindappa	27-10-81	D. S. Karkere	17-6-81
Bool Pujari	17-11-81	Anjaneyya	11-6-81
V. S. Dholstad	15-2-82	Munirathnaiah	24-6-81
R. T. Kaparathi	10-4-81	Chandrasekhar	30-6-81
B. Shashikumar	8-5-81	V. K. Dalvi	11-6-81
<b>Messengers</b>		J. M. Goudar	11-6-81
C. Venkatramappa	10-6-81	J. M. Sahmath	11-6-81
J. Boraiiah	5-6-81	N. B. Malagan	11-6-81
		Byre Gowda	22-6-81

Name	Date of report	Name	Date of report
T. Thimmaiah	11-6-81	H. S. Jakkannavar	12-10-81
C. N. Subramanyam	8-6-81	M. B. Thargar	12-10-81
M. C. Shivanna	11-6-81	T. Krishna	1-10-81
Chikkathimmaiah	8-6-81	T. Thopaiah	18-9-81
Nataraj	10-6-81	B. Altanimath	21-10-81
H. S. Shankar	10-6-81	Muniyamma	1-1-82
K. L. Jayaprakash	12-6-81	T. Himmapa	11-6-81
N. Gangappa	8-6-81	K. Mohandas	29-1-82
Gulappa	8-6-81	M. Puijar	24-11-81
H. S. Ramachandra	8-7-81	Mallikarjuna	30-11-81
Y. B. Dalve	2-7-81	Shivalingappa	3-12-81
S. D. Soudatti	11-6-81	N. Thimmarangaiah	
Rehana Bahadur	29-6-81	<b>Bakery Salesman</b>	
M. Muniraju	26-6-81	B. H. Gokul Babu	7-9-81
Balu	8-6-81	<b>Shelf Assistants</b>	
H. N. Narasimha Murthy	8-6-81	S. S. Shivanand Shirwal	5-10-81
T. Govindappa	8-6-81	K. S. Shridhara Murthy	30-11-81
B. K. Kempegowda	12-6-81	J. R. Lalitha	1-10-81
T. Thimmaiah		A. N. Vasundara	1-10-81
K. V. Thimmarayappa	8-5-81	<b>Salesman-Kannada</b>	
Muniyappa	11-6-81	D. C. Jayashankara	16-10-81
N. Mahadevappa	24-6-81	<b>Electrical Sub-Station Operators</b>	
A. B. Patil	12-6-81	V. Rajendran	12-11-81
V. F. Jambothikar	24-6-81	K. Sennamariyachiah	18-9-81
Seebanna		C. B. Siddappa	14-9-81
B. Vijayakumar	3-8-81	B. Redraiah	17-9-81
N. Nagaraju	6-8-81	<b>Electrical Wiremen</b>	
T. Bettajiah	25-5-81	K. S. Siddappa	12-9-81
L. Gangadhara	11-8-81	C. Narayana	11-9-81
S. V. Patil	10-9-81	<b>Record Assistants</b>	
T. Thimmaiah	8-6-81	G. Ramakrishna	15-10-81
F. Y. Murekar	15-7-81	S. S. Satyanarayana	18-9-81
R. Viswanath	17-9-81	<b>Attenders</b>	
Munivenkatramanappa	18-9-81	K. M. Vanamala	11-9-81
Linganna	17-9-81	Mary Vasantha Kumari Paul	11-9-81
Jettogi Rao	19-9-81		
E. L. Sarwad	24-9-81		
B. V. Uppin	19-9-81		
Narasimha Murthy	18-9-81		
G. C. Danadamani	18-9-81		

Name	Date of report	Name	Date of report
<b>Lab. Attenders</b>		Muniyappa	19-6-81
Lalitha Manjunath Raykar	1-1-82	Donappa	19-6-81
K. Vageesha	21-10-81	Muniyandi	24-6-81
<b>Helpers</b>		Vinayaraju Clement	17-6-81
G. Mohan	28-9-81	Nanjamma	23-12-81
B. Andani	27-5-81	Anjannappa	23-7-81
Anitha Reddy	1-6-81	P. R. Shankar	20-6-81
<b>Janitors/Sweepers</b>		Ramanna	13-11-81
Narayanappa	16-11-81	Jayamma	19-6-81
Prahlad Rao Gundu Rao	7-12-81	Lalitha Bai Hanji	10-6-81
Swarappa	12-11-81	Kargamma	22-6-81
D. Ramakrishna	11-21-81	S. Kappaneelappannavar	29-8-81
S. Narayanamma	25-6-81	Huligewwa Harijan	23-6-81
Gurappa	19-6-81	Maddrappa	23-7-81
K. M. Narayana	22-6-81	S. Aruldas	19-6-81
B. Y. Jawoor	31-7-81	Chikkanna	19-6-81
B. Nagaraj	10-11-81	<b>Farmmen</b>	
B. Somalingaiah	20-6-81	Maruthi	12-1-82
Venkatachala	12-11-81	R. Chandrashekar	29-10-81
Aithappa	22-6-81		
Gorala Narayanappa			
Peddanna	30-6-81		

B. J. NANJUNDAPPA  
Administrative Officer

**APPENDIX****Annual Accounts**

RECEIPTS		
Head of Account	Amount	
	(Rupees in lakhs)	
<b>A. General Funds</b>		
<b>I. (a) STATUTORY GRANTS FROM THE STATE GOVERNMENT</b>		
UNDER SECTION 35 OF THE ACT :		
i) Block Grant	450.00	
ii) Dev. Grant	100.70	
iii) Adhoc Schemes	11.92	562.62
(b) Grants from ICAR & GOI		
i) ICAR	173.84	
ii) GOI	4.32	178.16
	<b>TOTAL I</b>	<b>740.78</b>
<b>II. GRANTS FROM OTHER SOURCES UNDER SECTION 30 (iii)</b>		
OF THE ACT :		
1. P. L-480 - U.S.A		3.29
2. Wheat Associates		0.22
3. Dept. of Atomic Energy		0.67
4. Karnataka State Council for Science & Technology		—
5. University Grants Commission		—
6. K.D.D.P.		19.00
7. State Bank of India		2.32
8. Harihar Poly Fibres		—
9. ASPEE Research Department		0.30
10. World Bank Aided Projects (Sericulture)		35.27
11. UNICEF		0.42
12. M/s. M'lore Chemicals and Fertilizers		0.44
13. Indian Council of Social Science Res.		0.04
14. Indian Council of Medical Research		0.55
15. Dept. of Agriculture, Ferro American Embassy. New Delhi		1.67
16. F.A.O.		1.19
	<b>Total II</b>	<b>65.38</b>

## II

for the year 1981-82 (Provisional)

EXPENDITURE	
Head of Account	Amount
	(Rupees in lakhs)
<b>A. General Funds</b>	
I. GENERAL	
1. University General Administration	81.23
2. University General Expenses	27.75
3. University Library	13.19
4. University Museum	—
5. University Press and Publication Division	3.51
6. University Workshop, Hebbal Campus	1.67
7. University Workshop, Dharwad Campus	0.12
8. University Examinations	1.28
9. University Works Expenditure	22.13
10. University Central Stores	2.00
11. Maintenance of Univ. Dispensary at Hebbal	1.55
	Total I 154.43
II. RESIDENT TEACHING	
1. Agricultural College, Hebbal	40.69
2. College of Agriculture, Dharwad	36.59
3. Veterinary College, Hebbal	48.57
4. College of Basic Sciences and Humanities	23.41
5. College for Postgraduate Studies, Hebbal	6.21
6. College of Fisheries, Mangalore	26.16
7. Agril. Engg. Institute, Raichur	11.05
8. P. G. Courses at Dharwad	3.94
9. P. G. Courses at Mangalore	1.52
10. College of Rural Home Science, Dharwad	3.96
	Total II 202.10

**APPENDIX**

RECEIPTS	
Head of Account	Amount
	(Rupees in lakhs)
III. INCOME FROM FEES ETC.	6.77
IV. INCOME FROM UNIVERSITY PROPERTY	130.58
V. OTHER MISCELLANEOUS INCOME	12.10
Total A	955.61
<b>B. Foundation Fund</b>	—
<b>C. Debt and Suspense Accounts</b>	
1. Advances	1.03
2. Loans	39.78
3. Deposits	27.82
4. Suspense	0.81
5. Revolving Fund Account	1.22
Total C	70.66
RECEIPTS TOTAL A + B + C	1026.27
Add: Opening Balance	(—) 28.56
Total	997.71



11 *Contd.*

EXPENDITURE	
Head of Account	Amount
	(Rupees in lakhs)
<b>III. RESEARCH</b>	
1. Direction	3.32
2. Regional Research Station	91.52
3. Agril. Research Station	72.68
Total III	167.52
<b>IV. (a) EXTENSION</b>	23.94
(b) MISCELLANEOUS	—
Total IV	23.94
<b>V. SCHEMES SPONSORED BY OTHER AGENCIES</b>	38.48
<b>VI. FIVE YEAR PLAN SCHEMES OF THE UNIVERSITY</b>	274.58
Total A	861.05
<b>B. Foundation Fund</b>	
<b>C. Debt and Suspense Accounts</b>	—
1. Advances	4.15
2. Loans	25.03
3. Deposits	136.84
4. Suspense	(—) 1.53
5. Revolving Fund Account	0.86
6. Purchase of Steel, Cement and Other Building Materials	2.36
Total C	167.71
<b>TOTAL EXPENDITURE A + B + C</b>	1028.76
<b>Add: CLOSING BALANCE</b>	(—) 31.05
<b>Total</b>	<b>997.71</b>

**APPENDIX****(b) Budget Estimates****Abstract Estimates of**

RECEIPTS	
Head of Account	Amount
(Rupees in lakhs)	
<b>A. General Funds</b>	
I. (a) STATUTORY GRANTS FROM THE STATE GOVT. UNDER SECTION 35(2) OF THE ACT :	
— Block Grant, Development Grant and Grants for Adhoc Schemes	735.10
(b) Grants from ICAR & G.O.I.	328.65
Total I	1063.75
II. GRANTS FROM OTHER SOURCES	
a) PL-480	2.69
b) Wheat Associates, USA	—
c) Dept. of Atomic Energy	1.43
d) ASPEE Research Dept., Foundation Fund. Bombay	0.73
e) University Grants Commission	—
f) Karnataka Dairy Development Corporation	20.61
g) Harihar Poly Fibres	—
h) World Bank Aided Projects (Sericulture)	6.97
i) United Nations Children's Fund	—
j) Mangalore Chemicals and Fertilizers	—
k) Indian Council of Medical Research	0.94
l) Food and Agricultural Organisation	0.24
Total II	33.61

## III

for 1982-83

## Receipts and Expenditure

EXPENDITURE	
Head of Account	Amount
(Rupees in lakhs)	
<b>A. General Funds</b>	
I. UNIVERSITY GENERAL ADMINISTRATION	200.33
II. RESIDENT TEACHING	273.25
III. RESEARCH	207.18
IV. (a) EXTENSION	38.75
(b) MISCELLANEOUS ITEMS	14.13
V. SCHEMES SPONSORED BY OTHER AGENCIES	40.61
VI. FIVE YEAR PLAN SCHEMES OF THE UNIVERSITY	525.14
Anticipated savings under LTC, Vacant Posts and Other items	(—) 20.00
<b>Total A</b>	<b>1279.39</b>

**APPENDIX**

RECEIPTS	
Head of Account	Amount
	(Rupees in lakhs)
III. INCOME FROM FEES ETC.	7.00
IV. INCOME FROM UNIVERSITY PROPERTY	140.53
V. OTHER MISCELLANEOUS INCOME	20.05
Total III, IV & V	167.58
Total A	1264.94
B. Foundation Fund	0.50
C. Debt and Suspense Account	124.92
Total Receipts A + B + C	1390.36
Add: Opening Balance	--
Grand Total	1390.36

**III Contd.**

EXPENDITURE	
Head of Account	Amount
	(Rupees in lakhs)
<b>B. Foundation Fund</b>	0.50
<b>C. Debt and Suspense Accounts</b>	—
1. Advances	4.00
2. Loans	63.92
3. Deposits	39.60
4. Revolving Fund Account	2.00
5. Purchase of Steel, Cement and Other Building Materials	5.00
<b>Total C</b>	<b>114.52</b>
<b>Total Expenditure A + B + C</b>	<b>1394.41</b>
<b>Add: Closing Balance</b>	<b>(—) 4.05</b>
<b>Grand Total</b>	<b>1390.36</b>

**H. M. NAGABHUSHANA**  
*Comptroller*

## APPENDIX IV

*(Excerpts from the Addresses on the occasion of the Sixteenth Convocation of the UAS, on February 5, 1982).*

### **Welcome Address by Dr. N. G. Perur, Vice-Chancellor, UAS**

This University is singularly fortunate in receiving a sustained support from the State Government, and particularly the successive Chief Ministers and Pro-Chancellors who have always shown active interest in its growth and helped to meet its needs. Our present Chief Minister, who also happens to be our Pro-Chancellor, maintained this abiding interest in the wellbeing of this University and rendered all the help required therefor. It is a great honour that in spite of his busy schedule, the honourable Chief Minister has found time to participate in this convocation. I extend a warm welcome to him.

As most of you are aware, our Chief Guest, Dr. G. S. Sidhu, has been a Scientist of International repute whose contributions in the field of Chemistry have been outstanding. Today, as Director General of the Council of Scientific and Industrial Research, he has been entrusted with the onerous responsibility of shaping and setting the trends in scientific and industrial research for the country. The future of Scientific and Industrial Technology will largely depend upon the leadership and guidance that he provides. We are confident that with him at the helm of affairs, the future of Scientific and Industrial Research in the country is in safe hands. It is a matter of great pleasure for us in the University that we have been able to persuade Dr. Sidhu to accept our invitation to be the Chief Guest of this convocation and give the benefit of his valuable advice to the outgoing graduates so that they could serve the community better. I extend a cordial welcome to him.

To the members of the Board of Regents, Academic Council, the faculty and other staff, but for whose contribution this University would not have been what it is today, I extend a warm welcome.

It is equally my pleasure to extend a cordial welcome to the distinguished guests who have so kindly responded to our invitation, the outgoing graduates who have left behind their mark of achievement for the posterity to emulate, the current student friends who have always extended their willing cooperation in maintaining the reputation of this University.

For us in the University, this is an occasion on which we could present before you a brief account of some of the important activities of the University during the past year. I seek your kind indulgence for the same.

Integration of research, teaching and extension education is a cardinal principal on which the concept of Agricultural Universities was founded in India. Eversince this University came into being, we have evolved such structural and policy frameworks that would strictly adhere to the needs of the above concept.

From the beginning, we have realised that a strong research base is a prerequisite not only for an effective teaching process but also for a continuous flow of appropriate technology to the farming community. All our efforts are being made not only to create such a research base and sustain it, but also keep moving in new directions to help tackle problems of relevance as they emerge in different areas of Agricultural Sciences. In our efforts to strengthen the research base, the World Bank as well as the ICAR have come to our help in a big way through the NARP, the objective of which is to strengthen the research structure of the University so that location specific technology is developed, particularly to suit the vast tracts of rainfed areas of the State, leading to higher productivity of crops.

In the field of plant breeding, quite a few new crop varieties have been evolved in the University during 1980-81 which will have a great impact on the agricultural economy of the State. In the case of rice, several cultures having tolerance to low temperatures have been developed. The variety 'Madhu' has been further improved for non-shattering, and 'Vani' against cracking.

In the case of ragi, the variety Indaf-7 has been released as 'Hastha'. This variety has been proposed for the *rabi* season in Karnataka. It takes 115 to 120 days for maturity and has an yield potential of 45 to 50 q/ha under irrigated condition. It has good cooking quality also.

In the case of *kharif* sorghum, it was found that SPV varieties have out-yielded the hybrids like CSH-1 and CSH-5. In the case of *rabi* sorghum, the Dharwad Hybrid, SPH-212 has recorded the highest grain yield of 4247 kg/ha, compared to the high yielding check SPV-86 with 2681 kg/ha.

In the case of wheat, KDW-16 was released as 'Keerthi' for late sowing conditions. It is resistant to all races of black and brown rust disease. It gives 15-20 per cent more yield than UP-301, and is suitable for all irrigated areas of Karnataka, though more suitable for the transitional belt of Karnataka. It has an yield potential of 30 q/ha.

Another wheat variety, KDW-137 was released as 'Kiran' for the rainfed areas of Karnataka. It is highly resistant to lodging and drought, with an yield potential of 10 q/ha, under rainfed conditions.

The University has achieved significant break-through in evolving hybrid cotton varieties. After the famous 'Varalaxmi' hybrid cotton, we have evolved another cotton hybrid, DCH-32 which has been released as 'Jayalaxmi'. It has an yield potential of 28 q/ha under irrigated conditions. It gives over 15 per cent higher seed cotton and 27 per cent higher lint yield, compared to 'Varalaxmi'. It has a higher ginning outturn of 36.5 per cent, besides being tolerant to blackarm and red leaf blight. It matures earlier to Varalaxmi by 10 days.

Another variety in cotton, DS-59 was released as 'Sowbhagya'. It matures in about 165 days with an yield potential of 25 q/ha under irrigated conditions. It gives an increased yield of seed cotton by 13 per cent and lint by 24 per cent over Hampi and Mysore Vijaya. It is also tolerant to bacterial blight and red leaf blight.

In the case of groundnut, KRG-I was released for summer cropping in Raichur, Bellary and Gulburga districts. It has an yield potential of 26 q/ha with 47 per cent of oil in the seed and 73 per cent of shelling. It is an improvement over S-206 variety. Studies conducted on groundnut cultivation in paddy fallows with residual moisture (without irrigation) in the sandy soils of the coastal belt of North and South Kanara districts indicated that the Spanish Improved, DH-3-30 and TMV-2 were found to be suitable for the area with an yield potential of 26 q/ha as compared to 18 q/ha of the local variety.

Niger variety No. 71 was released as a whole crop for Raichur, Gulburga and Bidar districts. It matures in 95 days and has an yield potential of 3 q/ha which is 50 per cent more than the local variety.

In the studies on the methods of harvesting of sorghum seed, it was found that seeds obtained from 'earheads harvested along with stock' method produced vigorous seedlings than from the method where only earheads were harvested. As for sorghum seed threshing, the use of raspbar thresher was found most efficient in terms of lowest seed damage compared to threshing by hand, stone roller or spike tooth thresher.

The rice variety Intan has been improved for earliness and plant height through induced mutagenesis. The mutagenesis No. 1, 2 and 3 matures in 120, 135 and 150 days respectively as against 165 days in respect of the original Intan. The mutant No. 4 is reduced in height. The first two mutants are in the final stages of release. The most important characteristics of these mutants are: (1) ability to perform better under low input conditions, and (2) produce more straw and grain than other varieties, even under poor management. The local scented variety Jirige Sanna has been dwarfened.



The coastal saline tolerant rice variety, viz., Karikagga has been improved both for yield and grain characteristics, eliminating awn and black colour of the husk as well as its high grain shattering quality. The variety 'Masuri' (Gowrisanna) has been improved for blast resistance and optimal threshability without affecting its excellent grain and cooking qualities. Another noteworthy contribution in rice is that a dwarf male sterile line has been developed from the Karnataka Male Sterile-1 (KMS-1), and on cross pollination, high seed setting (up to 40 per cent) was observed. This has opened up the possibilities of developing hybrid rices very soon.

A new hybrid brinjal has been developed which has high yield potential and is resistant to bacterial wilt. The fruits are bright purple in colour and have higher acceptable taste and flavour.

In grapes, it was found that application of ethrel at 375 ppm, twice a week to the new shoots at 45 days after foundation pruning in Thompson Seedless resulted in the induction of fruitfulness in the basal buds which otherwise would remain unproductive, thus giving higher yields. In the Gulabi variety of grapes, application of GA at 25 ppm at the blooming stage improved the bunch and berry character. Similarly, in Thompson Seedless, application of GA at 30 ppm along with EDTA at 300 ppm improved the bunch and berry characters.

Studies on vegetative propagation in Jack through air layering indicated that girdling and etiolation followed by application of IBA and NAA at 10,000 ppm concentration resulted in 50 per cent survival among the transplanted air layers.

Application of 80 kg N/ha has been found to be optimum dose for potato under Bangalore conditions. Further, split application of 40 per cent N at planting, 40 per cent N at earthing up and 20 per cent N to the foliage twice, at 50 and 60 days, was found to be better than the application of the entire dose at planting or two split doses. Planting studies in the case of potato have shown that planting of potato as early as November gives the highest yield of 299 q/ha while December and January plantings recorded an yield of 266 q/ha and 171 q/ha respectively.

Application of N and P in the form of mud balls about 4" deep in the soil resulted in about 50 per cent increase in the yield of paddy. In the case of production of VFC tobacco in acid soils, application of 500 kg of calcium carbonate per hectate found to have better effect on green leaves, cured leaves, bright leaves and TBLE.

Micronutrient studies on groundnut indicated that the application of molybdenum gave the highest yield of 1295 kg/ha when compared with 1165 kg/ha of controlled plot.

Addition of agricultural wastes in black soils was found to alleviate adverse physical properties, such as infiltration rate, dispersion and swelling behaviour. The increase in yield was found to be due to release of native and applied P, resulting in efficient utilization and considerable saving in the use of phosphatic fertilizers. These wastes were also found effective in solubilising iron, manganese, calcium and magnesium that are tied up in the soil matrix...

A study on clinical pathology of bovine mastitis revealed that most of the organisms responsible for bovine mastitis which are normally sensitive to penicillin and streptomycin were found to be resistant.

Letrospiral infection is one of the serious conditions found in man and animals and is of Zoonotic importance. An epidemiological study indicated the existence of this infection in a wide variety of animals such as cattle, buffaloes, sheep, goats, dogs, pigs, horses, monkeys, elephants and man. The highest incidence of infection (37 per cent) was in dogs. Two vaccines, one for use in buffaloes and another for dogs, have been developed and both have given satisfactory results.

A modified sheep-pox vaccine has been developed. More than 2000 sheep have been vaccinated in the field with this vaccine and the results are encouraging.

Two anti-viral drugs viz., 2-Thiouracil and NULIP were tried for their anti-viral action against Rinderpest virus. The drug successfully inhibited the virus *in vitro* in low concentrations. *In vivo* trials are under study.

For the first time in Karnataka, a faunistic study on pigeon feather mites was undertaken and six species of mites were recorded.

The occurrence of a mange producing mite of pigeons (*Horpyrhynchus nidulaus*) was recorded for the first time in India.

An improved strain of sheep having fast growth rate of better wool quality has been evolved at Dharwad campus and is in final stages of testing.

Crossbred chicks have been evolved from 4 selected pure lines which compared very well with some of the leading strains in the country. They have a fast rate of growth (1,500 g), high feed efficiency (2.4 kg/kg body weight), viability (98 per cent) and provide nearly 75 per cent ready to cook meat at 8 weeks of age. They have tender and non-fatty meat suited for tandoori dishes at 5 to 6 weeks of age.

In the field of Fishery Science, the University have been able to achieve some outstanding results of great applied value. The common carp, an exotic

fish which is widely cultured in the country, breeds freely in confined waters unlike its Indian counterparts. This free breeding upsets the population balance in the pond, resulting in stunted growth of all the stocked fish. This can be overcome by culturing individuals of only one sex. This objective has been successfully achieved by hormonal manipulation of sex of the newly hatched offsprings, whereby the entire brood is made to consist only of males and sterile individuals, completely eliminating the female sex. Similar work carried out on tilapia, another commercially important exotic fish, has resulted in obtaining more than 90 per cent males.

...A new smoked product called "tuna shavings", which keeps well for over 6 months at room temperature, was successfully prepared.

...A new device for hauling gillnets was designed and fabricated and successfully tested in the field. This would help in quicker operation of the gear. Another manually operated device for opening the shells of clams and mussels has also been fabricated and is being tested.

The University always endeavours to see that the new technology that is evolved in its research laboratories and research stations reaches the farmers fields as early as practicable through its own Extension Education Units located in the Regional Research Stations and the extension agencies of the State Development Departments.

The University started one more Extension Education Unit during 1981 with its headquarters at Agricultural Research Station, Mangalore for the benefit of coastal areas of the State.

Besides continuing to provide the extension education services which the University had started in the past in several aspects of rural development, its extension education units have laid emphasis on some new areas of development during the last year.

The University intensified its efforts in promoting the new "Bhagyalakshmi" Gobar Gas Plant developed by the University. As a result about 110 farmers have taken up construction of this new gobar gas plant. The State Khadi and Village Industries Board, Bangalore has also recognised this new "Bhagyalakshmi" gobar gas plant for the purpose of providing subsidies. The Government of Karnataka have also recognised the importance of this new model of gobar gas plant and have come forward to issue special permit for cement required by the farmers for constructing this type of plant.

The promotional work on Kubabul plantation in rural areas was intensified during the year. More than two lakhs seedlings of Kubabul were raised by the farmers themselves and planted in villages.

Pulse promotion programme was further accelerating during the year. More than 300 small farmers under the purview of Bangalore Extension Education Unit have grown redgram as an entire crop. This has doubled their per acre income as compared to growing only ragi.

The Extension Education Units at Dharwad and Raichur have organised 14 block demonstrations on the newly released 'Jayalakshmi' hybrid cotton...

The University which started only with two undergraduate degree programmes in 1965-66 today has seven undergraduate degree programmes and one Diploma in Agricultural Engineering. In view of the importance of sericulture in this State, there is a proposal to start an undergraduate degree programme in sericulture for which clearance from the State Government is awaited. Continuous efforts are being made not only to update the course contents of its various degree programmes but also to improve the practical content of these courses with increased physical facilities. Besides providing increased land facilities for the students of B.Sc. in Agriculture, Horticulture, Agricultural Marketing and Cooperation, Home Science, provision has been made for placement of the final B.Sc. (Agricultural Marketing and Cooperation) students in important Agricultural Marketing and Cooperation organisations for a period of one trimester so that they get actual work experience in their organisations. Similarly, a scheme of Internship for a period of six months is introduced for final year B.V.Sc. students.

As a result of an overall qualitative improvement in the teaching process of various undergraduate programmes in the University, it is heartening to mention that the graduates of this University, as in the previous years, have maintained their place of primacy over all other Agricultural Universities by securing the largest number of ICAR Junior Fellowships, constituting about 30 per cent of the total number of fellowships offered by the ICAR through competitive examinations at All India level.

#### **Address by the Chief Guest—Dr. G. S. Sidhu**

...Agricultural Sciences are by nature strongly inter-disciplinary and cover such a wide gamut of knowledge that people like me belonging to other disciplines also feel at home with agricultural scientists. There is always something common to discuss and exchange ideas on.

One of the areas in which notable achievements have been made by this University is "plant breeding." New varieties of ragi, jowar, cotton, sunflower and Pulses have been developed. When developing new cultivars, the geneticists aim at (a) better yield; (b) disease/pest control; (c) lesser require-

ment of water during cultivation and ; (d) possible higher content of specific constituents, e.g. sugar in sugar cane, oil in oilseeds and proteins in cereals. The methods used so far have been traditional for improving and evolving of cultivars viz., selective breeding and hybridization. Cross Breeding can only be between closely related species and the plant geneticist has to depend on chance induced mutations.

I would like to focus your attention on some of the exciting areas of new knowledge in which our agricultural scientists should enter in a big way. Advances in tissue culture were the first major departure from the traditional methods of evolving new cultivars. Tissue culture can be applied to rapid multiplication of 'elite' plants, isolation of disease-free plants and embryo culture of hybrids, haploid plants and somatic hybridization in plant breeding. In India several research institutes have set up good tissue culture laboratories and have made rapid advances in this field. One of the best successes in CSIR laboratories with which I am more familiar is of the National Chemical Laboratory, Pune which has developed Turmeric, Snapdragon, Cabbage, Eucalyptus and Teak plants through tissue culture. Whereas tissue culture will become a major contributor to the science of plant breeding, it will be the new Recombinant DNA technology, popularly known as genetic engineering which, coupled with tissue culture techniques, will bring about revolutionary changes and open up totally new dimensions of far-reaching consequences in plant breeding. The developments in the field of hybridization between cells of both closely and distantly related species have opened up exciting possibilities in several fields of application in agricultural sciences. Advances in Recombinant DNA technology can lead to improvement in existing crops and open up the possibility of development of entirely new crop plants. Agricultural microbiology is in for a revolutionary change.

...The plants get their nitrogen from the soil. Nitrogenous fertilizers supply this nitrogen either in the form of nitrate or in the form of urea or ammonia. These fertilizers are all derived from coal, petroleum or natural gas and are highly energy intensive in their production. The age-old method was to rotate crops in which crops which enrich the nitrogen content of the soil are alternatively planted with other crops. Legumes have been well known from the earlier times to enhance the fertility of the soils. The roots of some of the legumes are infected by the bacteria of the genus *Rhizobium*. It is these microorganisms living in the roots of these plants that carry out the process of biological nitrogen fixation. These bacteria actually enter the roots of the legume. The host plants and the invading bacteria bear a symbiotic relationship.

One method of enhancing the nitrogen fixing action of *Rhizobium* in legume roots is to screen the bacteria and by selective breeding develop strains

more efficient in nitrogen fixing. Mutations can also be introduced in such bacteria by the usual methods of exposure to mutagens or ionizing radiation. This approach has been followed and plants in the laboratory have been inoculated with mutant bacteria to find out the amounts of nitrogen fixed by different mutant strains. However, when the new *Rhizobium* strains were transferred from the laboratory growth chamber into the field, they were unable to compete with the bacteria in the soil.

One can take this approach a step further and identify the most competitive strains of bacteria which also have better nitrogen fixing properties. But then the whole process of inducing mutations and then screening for useful mutants is inefficient and one must look elsewhere for answers. The biochemistry of infection by *Rhizobium* is, therefore, being intensively studied in several laboratories. If the genes that control nitrogen fixation in *Rhizobium* can be identified and extracted, it should be possible to modify other bacteria directly by genetic engineering and it should be possible to develop new microorganisms that can live in the soil, compete with the other microorganisms in the soil and will not be dependent on symbiotic relationship with any particular crop plant, such as a legume. If such new micro-organisms can be created through genetic engineering, the need for applying fertilizers for agriculture can be minimized or eliminated.

I have mentioned that a new microorganism even if it has superior nitrogen fixing ability must be hardy enough to compete with other microorganisms in the soil. But even this is not enough. It is well known that the process of nitrogen fixation is an energy consuming process. This energy is supplied through mediation of ATP and therefore cells which fix nitrogen should also be able to synthesise larger amounts of ATP. Genetic engineering of such cells must, therefore, also aim at incorporating in the host cell information for producing ATP in the required amounts, along with genes that control nitrogen fixation. There will be other limitations, constraints and complications, but I am sure that researchers will be able to overcome these.

I would like to mention that the gene pool is being destroyed at an alarming rate. In India especially the clearing of land, the denudation of forests for agriculture, manufacture of pulp and paper, of plywood and for siting industrial plants is a matter of very grave concern. Some genetic wealth is disappearing for all times to come and it is time that Institutes like this University devote a great deal of research effort and extension, reversing this trend and maintaining genetic reserves.

Most of the existing germ plasm is stored in seed collections. With the advances in tissue culture and genetic engineering, more attention will also have

to be paid to the preservation of new genetic stock, cultures and cell lines. The artificially induced genetic variations by the methods of tissue culture or genetic engineering may not be easy to maintain in cultures for a long period of time because of the tendency to undergo genetic changes on repeated sub-culturing leading to the genetic uniformity of the clone being lost. Cryogenic storing of such cultures by freezing them at super-low temperatures can provide an answer to this problem.

The Government of India are very conscious of the importance of research in these newer areas. It may be recollected that it was only a month ago that the formation of the Biotechnology Board was announced by the Prime Minister of India, when addressing the Indian Science Congress Session at Mysore. The major research organisations are also extremely conscious of the need of an integrated research policy in this area, and CSIR, the Department of Atomic Energy, the Indian Council of Agricultural Research, the Indian Council of Medical Research, the Department of Science and Technology have among themselves pledged, from their existing allocation, Rs. 25 crore for promoting R&D within and outside their institutes in various areas of modern biotechnology. We are all conscious that for such research work we need extremely well-trained researchers and the universities, therefore, have a very great part to play in providing modern up-to-date courses in subjects such as microbiology and exposing our students to the most recent advances in other countries made in this exciting field.

## APPENDIX V

### LIST OF PUBLICATIONS BY THE STAFF OF THE UNIVERSITY

<i>Name of author (s)</i>	<i>Title of the paper with the details of publication</i>
<b>AGRICULTURAL SCIENCES</b>	
<b>Agricultural Botany</b>	
Hanchinal, R. R. and Goud, J. V. (1981)	"Development of D-genome monosomic addition lines in durum wheat—Bijaga yellow". <i>Wheat Information Service</i> . 53.
Ramachandram, M. and Goud, J. V. (1981)	"Gene action for seed yield and its components in safflower." <i>Indian J. Genet.</i> 41 (3).
Ramachandram, M. and Goud, J. V. (1981)	"Inheritance of different leaf margins in safflower." <i>Indian J. Genet.</i> 41 (3).
Manjunath, A. and Goud, J. V. (1981)	"Epistatic gene action in sunflower-caution to sunflower geneticists and breeders." <i>Proc. 10th Inter. Sunflower conference sufens para disc Australia</i> , 249-251.
Bijapur, U. K. Gowda, B. T. S. and Goud, J. V. (1981)	"Grain yield stability of experimental rabi sorghum ( <i>Sorghum bicolor</i> ) hybrids." <i>Mysore J. agric. Sci.</i> 15 : 12-15.
Bijapur, U. K., Gowda, B. T. S. and Goud, J. V. (1981)	"Evaluation of newly developed male steriles and pollinators in a line tester analysis in grain sorghum." <i>Myore J. agric. Sci.</i> 15 : 56-60.
Indi, S. K., and Goud, J. V. (1981)	"Genetic analysis of quantitative characters in an intervarietal cross of sorghum." <i>Mysore J. agric. Sci</i> 15 : 6-11.
Kullaiswamy, B. Y. and Goud, J. V. (1982)	"Linkage relationships of factors governing nature of pedicelled <i>spikelets</i> , glume covering and ear smoothness in sorghum" <i>SABRAO</i> 13 (2).
Giriraj, K. and Goud, J. V. (1982)	"Heterosis for grain yield in winter sorghum" <i>SABRAO</i> 13 (2).
Mahadevappa, M., Ikeshahi, H. and Preguitro Aurin, (1981)	"Screening rice genotypes for tolerance to alkalinity and zinc deficiency." <i>Euphytica</i> . 30 ; 253-258.
Mahadevappa, M., Ikeshahi, H. and Mooshyanus, and Toffman, W. R. (1981)	"Improvement of native rice through induced mutation." <i>International Rice Research paper Series No.</i> 56.



<i>Name of Author(s)</i>	<i>Title of the Paper with the Details of Publication</i>
Mahadevappa, M. (1981)	"Breeding rice tolerant to deficiencies of zinc, phosphorus and iron and excess after on." International Rice Research Conference, April 17. May 1, held at Los Bonos, Laguna, Philippines.
Naidu, B. S., Mahadevappa, M. Inamadar, S.S., Maharudrappa, K. and Jayaram (1981)	"Performance of IR-36 in Karnataka, India", <i>IRRN</i> . 6 : 4.

#### **Agricultural Economics**

Gururaj Hunsigi and Srivastava, S. C. (1980)	"Quantity potential (Q/T) and quantity intensity (Q/I) isotherms of soil potassium in some sugarcane soils". <i>Deccan sugar technol. Assoc</i> 30 : 63-72.
Gururaj Hunsigi (1981)	"Ratoon cane management." Status paper read at National Seminar on Ratoon Cane Management held at IISR, Lucknow, March 14-15, 1 : 7-14.
Gururaj Hunsigi and Krishna Murthy, K. (1981)	"Role of research in augmenting the sugarcane and sugar production" Paper read at the Biennial Conference held at RDTC, Dharwad, Feb. 14-18.
Gururaj Hunsigi and Srivastava, S. C. (1981)	"Some measures of potassium availability to sugarcane". <i>Fert. News</i> . 26 (6) : 35-38.
Halemani, H. L., Hegde, D. M. and Kudasomannavar, B. T. (1981)	"Hybrid and local maize production with different plant densities and row spacings under transitional tract of Dharwad". <i>Mysore J. agric. Sci.</i> , 15 : (2).
Halemani, H. L. (1981)	"Studies on the effect of spirillum, NAA and seed fortification on the yield of irrigated wheat" First National Seminar on Wheat Agronomy 6th-8th July, 1981 held at IARI, New-Delhi.
Hegde, B. R. (1981)	"Harsh red soils can give lush green crops". <i>Intensive Agric.</i> April-May, 1981, 39-44.
Hegde, B. R., Munikrishna Reddy, N. Havanagi, G. V. (1980)	"Intercropping with ragi in Karnataka". <i>Indian. J. Genetics and Pl. breeding</i> 41 A (special issue).
Kulkarni, K. R. and Panwar, K. S. (1982)	"Response of pigeonpea to fertilizer in India—A critical review" Proceedings of the International Work on Pigeonpeas, ICRISAT Centre, Patancheru, India. 1 : p 212-220.
Nadagoudar, B. S., Dwarakanath, N. and Janardhana Gowda, N. A. I. (1981)	"Control of cyperus and grass weeds in sugarcane". <i>Indian Soc. Weed Conf.</i>
Nadagoudar, B. S., Shankariah, C., Dwarakanath, N. and Khot, A. A. (1981)	"Blend of varieties for extended crush and high recovery". <i>Indian Sugar J.</i> 30 : 10.

<i>Name of Author(s)</i>	<i>Title of the Paper with the Details of Publication</i>
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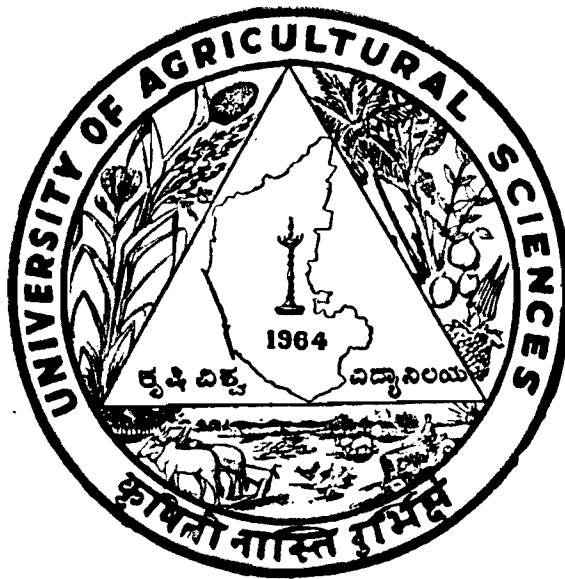


THE UNIVERSITY

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1982-83



# **THE UNIVERSITY OF AGRICULTURAL SCIENCES**

**HEBBAL, BANGALORE-560 024**

## **NINETEENTH ANNUAL REPORT**

**(FOR THE PERIOD FROM 1st APRIL 1982 TO 31st MARCH 1983)**



**1982-83**



## **FOREWORD**

The University of Agricultural Sciences, Bangalore, is charged with teaching, research and extension education functions in the field of agricultural sciences in the State of Karnataka. The 1982-83 Annual Report is an yearly account of the activities of the University in this regard.

The reporting year 1982-83 was full of crowded events and activities. Several workshops, seminars and scientists' meets were held in the University campuses. Experts and scientists from F.A.O., International Research Institutes, Ambassadors and a Noble Laureate Dr. Norman E. Borlaug honoured our University by their visits and discussions with our scientists and officers. All these events helped the University in exchange of scientific knowledge and shaping our future plans and activities.

Some of the important decisions of the Board of Regents during the year 1982-83 were :

1. Provision of appointment of teachers through promotion.
2. Decentralisation of financial powers.
3. Shifting of B.F.Sc., I year class from GKVK to Mangalore campus.

It is hoped that the above progressive decisions of the Board will help furtherance of the University progress.

The Academic Council agreed to have one section in B.Sc. (Agri) with Kannada medium of instruction. This may help the students who study PUC with Kannada medium specially those who come from the rural areas. The Academic Council also approved a proposal to offer postgraduate diploma course in sericulture, considering the increasing importance of sericulture in the State of Karnataka. During the year under report, the University started a new degree programme in sericulture. Internship programme for B.V.Sc. students was introduced as part of the curricular requirement.

Research Council and Extension Education Council meetings were held in which the research and extension activities of the University during the year were reviewed and programmes for the coming year were finalised. The University spends quite a sizeable amount every year for the research activities. The I.C.A.R. with its large number of coordinated research projects

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and ad hoc research projects is helping the University substantially in the augmentation of research activities in the University at its various research stations. Under the National Agricultural Research Programme a new research station at Nagamangala was started during the year 1982-83 at a cost of Rs. 40.70 lakhs. As an outcome of the research findings, several new varieties, new practices, new engineering tools and machineries were developed. Some of these new findings which have stood the test under farmers' field conditions will be released, for adoption by farmers in the State.

In Animal Science research a new vaccine has been developed which is being tested for its large scale adoption. It has been successfully demonstrated that leaf protein concentrate prepared from lucerne leaf can effectively replace groundnut cake as a protein source in poultry feed. The residual product after preparing the leaf protein concentrate from the lucerne leaf could profitably be fed to dairy animals without any adverse effect on their health and milk yield.

The Directorate of Extension has conducted large number of training programmes for the farm men and women as well as to the inservice officials of the various development departments of the State. A correspondence course for farmers on paddy was organised during the year in which about 148 farmers participated. Field Days and Krishi Melas were conducted in which about 20,000 farmers participated.

Another important activity of the Directorate of Extension during the year was 21-day mason training programme in the construction of Bhagya-lakshmi biogas plant conducted at all the districts of the State. The publication — "Package of Practices for High Yields" both in English and Kannada was printed in addition to 12 new leaflets for the benefit of State Development Departments and farmers.

The Communication Centre published six original writings in addition to the periodical publications, of the Mysore Journal of Agricultural Sciences, U.A.S. Diary, Current Research and Krishi Vignana. The Department of Kannada Studies published seven original books and four translations in Kannada.

During 1982-83, there has been a good progress in the development activities of the University. Several construction works which were taken earlier were completed and new works were also taken during the year. A total sum of Rs. 110.6 lakhs was spent during the year for the development works.



(v)

While Grants from the State Government are not enhanced in proportion to the desired development of the University, the expenditure on salary, labour, cost of farm inputs, laboratory chemicals and vehicle propelling charges are increasing; it has become increasingly difficult to balance the budget without affecting the main functions of the University – teaching, research and extension education. The University is constantly striving hard to get more grants from the Government and also to increase its internal resources. It is our endeavour to forge ahead with new programmes for the around scientific development of agriculture in the State of Karnataka with the sole aim of improving the lot of the farmers. The Annual Report of the University for the year 1982-83 given in the following pages gives an account of the efforts made by the University towards this goal.

N. G. PERUR  
*Vice-Chancellor*



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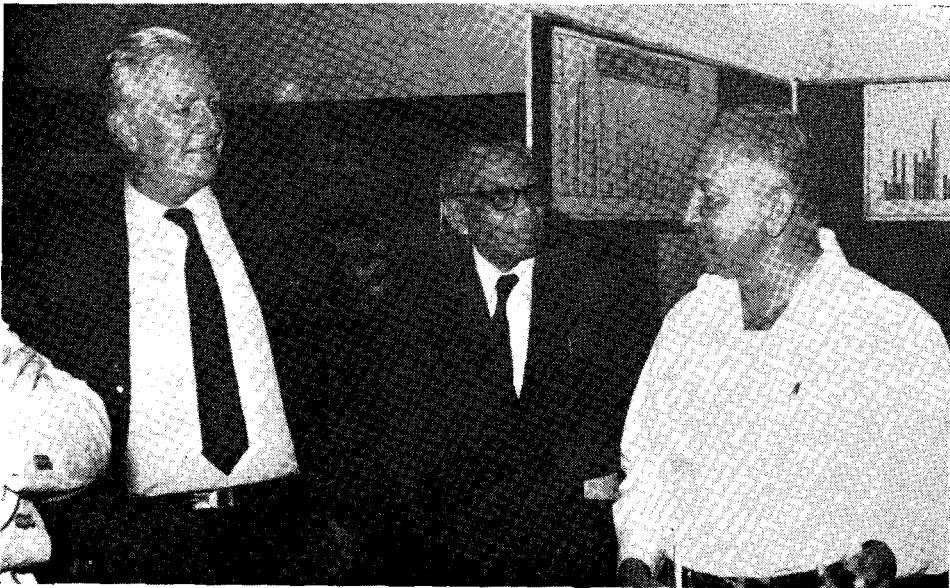
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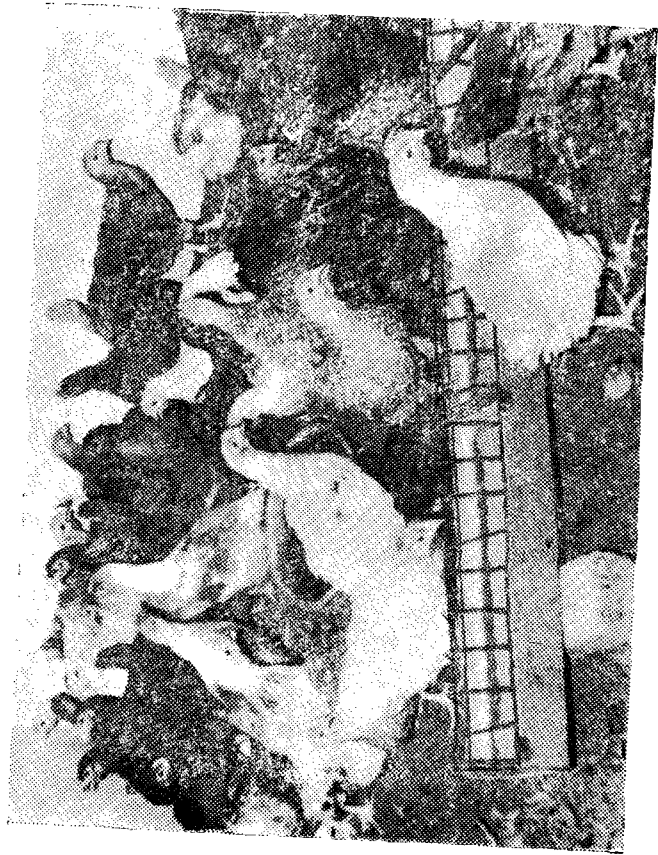
Dr. Norman E. Borlaug, Nobel Laureate, viewing wheat products  
prepared by UAS Bakery



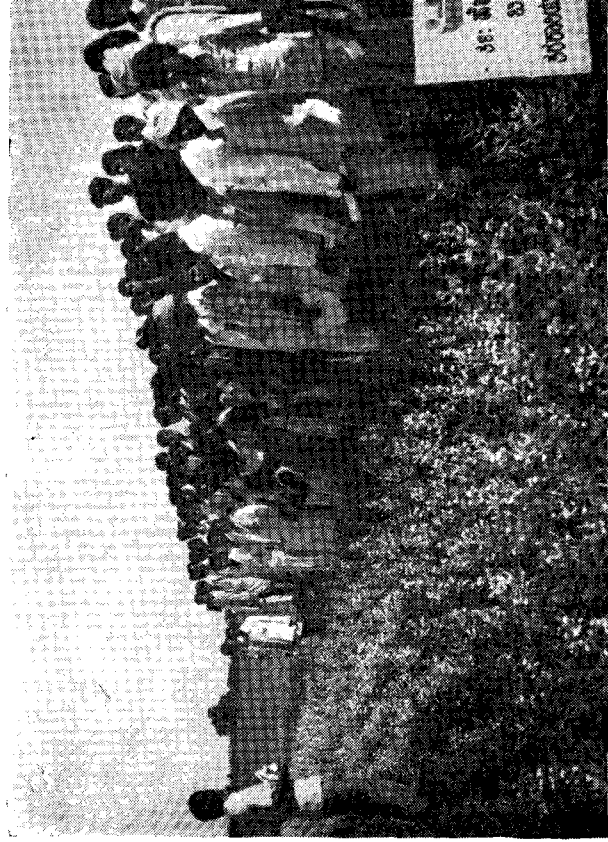
Mr. Rolf Ramisch, His Excellency the Ambassador of the Federal Republic of  
Germany visiting the Poultry Unit



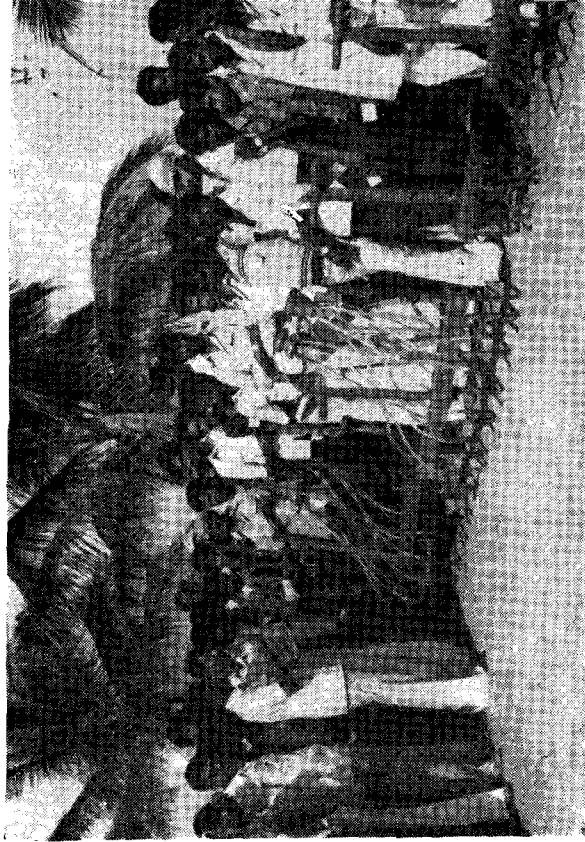
'Chethana' Ragi variety



A new strain of Hybrid Chicks (IBB-83)



Farmers visiting the demonstration plots during Krishi Mela



Farmers viewing the implements during Krishi Mela



UAS Sheep



Inauguration of the Seminar on Animal Health Care



Inauguration of oilseeds workshop



Dr. Norman E. Borlaug, delivering the key-note address at  
Wheat Research Workers Workshop





Shri B. L. Gowda, Minister for Agriculture and Pro-Chancellor of the UAS  
Inaugurating the BS & H College Students Association

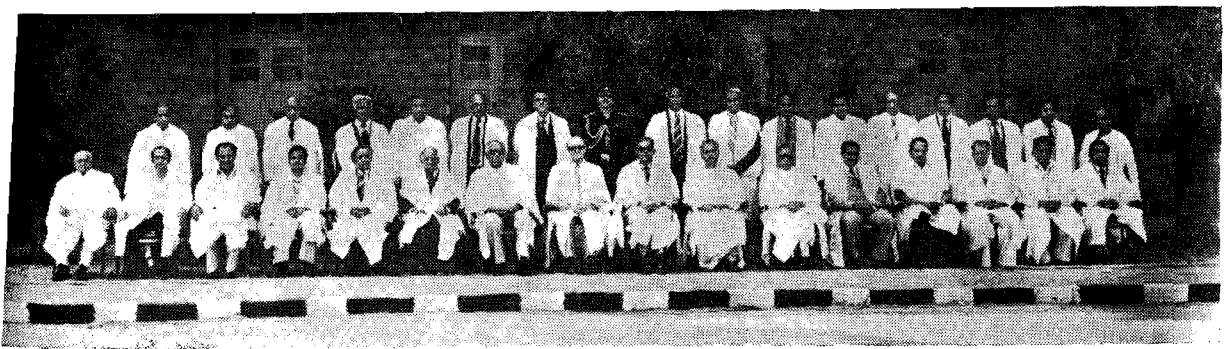


Raga-Sanje (BS & H College)



GKVK Trophy Winners

## SEVENTEENTH CONVOCATION



Members of the Board of Regents and the Academic Council with the  
Chancellor, Pro-chancellor and the Chief Guest



**The Chancellor, Shri Govinda Narain, distributing the Gold Medals**



Academic procession



A view of the graduates and audience



**Dr. N. G. Perur, Vice-Chancellor, delivering welcome address**



**Dr. L. D. Swindale, Director General, ICRISAT,  
delivering Convocation address**

**PART I**  
**UNIVERSITY ADMINISTRATION**

**A. General**

**(i) BOARD OF REGENTS**

**Chairman**

Dr. N. G. Perur, Vice-Chancellor

**Members**

1. Mr. Maruthi D. Male
2. Mr. N. K. Ganapaiah
3. Mr. J. A. Karumbaiah
4. Mr. M. M. Nadaf
5. Mr. Manmohan Attawar
6. Mr. R. V. Halappaavar (From 14-5-1982)
7. Mr. H. Viswanath (From 14-5-1982)
8. Mr. Mune Gowda (From 4-8-1982)
9. Mr. R. K. Solapurkar (From 20-9-1982)
10. Dr. K. C. Naik (From 20-9-1982)
11. Secretary to Government, Agriculture and Animal Husbandry Department
12. Secretary to Government, Education and Youth Services
13. Commissioner and Secretary to Government, Finance Department
14. Director of Agriculture in Karnataka
15. Director of Horticulture in Karnataka
16. Director of Animal Husbandry and Veterinary Services in Karnataka
17. Director of Fisheries in Karnataka

**(ii) OFFICERS OF THE UNIVERSITY**

**Chancellor**

Mr. Govinda Narain, His Excellency, the Governor of Karnataka

**Pro-Chancellor**

- 1) Mr. R. Gundu Rao, Honourable Chief Minister, Government of Karnataka (upto 16-2-1983)
- 2) Mr. B. L. Gowda, Honourable Minister for Agriculture, Government of Karnataka (From 16-2-1983)

**Vice-Chancellor**

Dr. N. G. Perur

**Dean**

Dr. S. V. Patil (From 6-9-1982)

**Other Officers**

Director of Instruction (PGS), Dharwad	.... Dr. S. V. Patil (upto 22-9-1982)
	... Dr. R. B. Patil (from 22-9-1982)
Director of Instruction (Agri), Hebbal	... Dr. K. S. Krishna Sastry
Director of Instruction (Agri), Dharwad	... Dr. R. B. Patil (upto 26-9-1982)
	.... Dr. R. K. Hegde I/c. (from 27-9-1982)
Director of Instruction (Vety), Hebbal	... Dr. K. Trivikrama Rao
Director of Instruction (Fisheries), Mangalore	... Prof. H. P. C. Shetty
Director of Instruction (Home Science), Dharwad	... Dr. (Mrs.) Leela Phadnis
Director of Instruction (BS&H)	... Dr. R. Narayana
Director of Research	... Dr. K. Krishnamurthy
Director of Extension	... Dr. K. A. Jaliha
Comptroller	... Mr. H. M. Nagabhushana
Registrar	... Mr. R. Krishnappa
Administrative Officer	... Mr. B. J. Nanjundappa (upto 17-1-83)
	.... Mr. B. M. Venkatachala Raju I/c. (from 17-1-83)
Estate Officer	... Mr. B. Venkata Swamy
Librarian	... Mr. H. R. Ramachandra
Director of Student Welfare	... Mr. K. Subbaiah

## (iii) HEADS OF DEPARTMENTS

**Basic Sciences and Humanities**

- |                 |     |  |
|-----------------|-----|--|
| 1. Biochemistry | ... | Dr. T. K. Virupaksha<br>Professor (GKVK) |
| 2. Statistics   | ... | Dr. N. Sundararaj<br>Professor (GKVK)    |

**Agriculture**

- |                              |     |  |
|------------------------------|-----|--|
| 1. Agricultural Botany       | .   | Dr. J. V. Goud<br>Professor (Dharwad)              |
| 2. Agricultural Chemistry    | ... | Dr. P. B. Deshpande<br>Professor (Hebbal)          |
| 3. Agricultural Economics    | ... | Dr. R. Ramanna<br>Professor (GKVK)                 |
| 4. Agricultural Engineering  | ... | Dr. N. L. Maurya<br>Principal (Raichur)            |
| 5. Agricultural Entomology   | ... | Dr. T. S. Thontadarya<br>Professor (Hebbal)        |
| 6. Agricultural Extension    | ... | Dr. M. K. Sethu Rao<br>Professor (Hebbal)          |
| 7. Agricultural Microbiology | ... | Dr. T. K. Ramachandra Reddy<br>Professor (Dharwad) |
| 8. Agronomy                  | ... | Dr. G. V. Havanagi<br>Professor (Hebbal)           |
| 9. Crop Physiology           | ... | Dr. Y. C. Panchal<br>Professor (Dharwad)           |
| 10. Horticulture             | ... | Dr. U. V. Sulladmath<br>Professor (GKVK)           |
| 11. Plant Pathology          | ... | Dr. R. K. Hegde<br>Professor (Dharwad)             |
| 12. Seed Technology          | ... | Dr. G. N. Kulkarni<br>Professor (Dharwad)          |
| 13. Farm Forestry            | ... | —  |
| 14. Agricultural Marketing   | ... | Dr. P. G. Chengappa<br>Professor I/c. (Hebbal)     |

**Veterinary**

- |                                 |     |                                       |
|---------------------------------|-----|---------------------------------------|
| 1. Animal Genetics and Breeding | ... | Dr. A. V. Rai<br>Professor (Hebbal)   |
| 2. Gynaecology and Obstetrics   | ... | Dr. R. V. Patil<br>Professor (Hebbal) |



3. Poultry Science	... Dr. B. S. Ramappa Professor & Geneticist (Poultry) Hebbal
4. Surgery	... Dr. P. H. Thippaiah Reddy Professor (Hebbal)
5. Veterinary Anatomy	... Dr. Abdus Salam Professor I/c. (Hebbal)
6. Veterinary Pathology	... Dr. S. J. Seshadri Director & Professor I/c. (Hebbal)
7. Veterinary Pharmacology	... —
8. Veterinary Physiology	... Dr. K. Thimmaiah Professor (Hebbal)
9. Veterinary Parasitology	... Dr. S. Abdul Rahman Professor (Hebbal)
10. Veterinary Microbiology	... Dr. R. Raghavan Professor I/c. (Hebbal)

#### ***Fisheries***

1. Aquaculture	... Dr. T. J. Verghese Professor (Mangalore)
2. Fish Processing Technology	... Dr. T. M. Rudra Setty Professor (Mangalore)
3. Fishery Engineering	... Prof. P. K. Salaian Professor (Mangalore)
4. Fishery Biology	... Dr. S. L. Shanbhogue Professor (Mangalore)

#### ***Home Science***

1. Foods and Nutrition	... Dr. (Miss.) Meera Rao Associate Professor (Dharwad)
2. Home Economics	.... Dr. (Mrs.) M. P. Vaidehi Associate Professor (Hebbal)

## **B. General Administration**

### **(i) Activities of the Vice-Chancellor**

During the year under report, Dr. N. G. Perur who was earlier appointed to act as Vice-Chancellor *w.e.f.* 5-9-1981 during the absence of Dr. R. Dwarakinath, was appointed on regular basis as Vice-Chancellor of the University for a period of three years from 11-6-1982.

The major and important activities of the Vice-Chancellor during the year are as follows :

Presided over a meeting to review the progress of work of the Yellow Leaf Diseases Project of Arecanut in Karnataka, held at the UAS, GKVK Campus on 2-4-1982.

Meeting of the High Power Committee to go into the study of Drought Conditions and Long Term Measures to resolve the problem, organised by the Government of Karnataka, in Bangalore on 1-5-1982.

Workshop on Water Hyacinth, organised at the National Aeronautical Laboratory, Bangalore on 3-5-1982.

Meeting of the Vice-Chancellors in connection with the Development of Western Ghats held at New Delhi on 7-12-1982.

ICAR Regional Committee No. 8 meeting held at the Indian Institute of Horticultural Research, Bangalore on 28-1-1983 and 29-1-1983.

Vice-Chancellors' Conference held at Delhi on 19-2-1983.

Meeting of the Association of Agricultural Universities at Delhi held on 20-2-1983.

Annual General Body Meeting of the ICAR Society, held at Delhi on 26-2-1983 and participated in the inaugural function of the New Buildings of the Potash Research Institute, and the Research Council Meeting of the Potash Research Institute at New Delhi on 19-3-1983.

*Press Conference* : The Vice-Chancellor held Press Conference at Bangalore on 11-11-1982 and 1-3-1983 and explained the programmes and progress of the University.

**Articles and Speeches:** Chaired the Inaugural Session of the ICAR Annual Workshop on *kharif* Oilseeds at Hebbal on 7-5-1982.

Inaugurated the Seminar on "Strategy for Fisheries Research in Karnataka" at Fisheries College, Mangalore on 17-5-1982.

Delivered Key-note Address at the Symposium on "Animal Health-Challenges for 80s" at West End Hotel, Bangalore on 22-5-1982.

Presided over the one-day State Level Workshop-Orientation Programme on Oilseeds, Pulses and Dryland Agriculture at Bangalore on 25-5-1982.

Delivered the Valedictory Address at the Second Seminar on "Role of Financial Institutions in Rural Entrepreneurship and Development" organised by the Management Development Institute, New Delhi, at Hotel Cauvery Continental, Bangalore, on 2-7-1982.

Presided over the Zonal Workshop on Lab-to-Land Programme organised by the National Dairy Research Institute, Bangalore on 31-7-1982.

Chaired the Inaugural Session of the Working Group Meeting of Soil Conservationists at Ooty on 6-9-1982.

Inaugurated the FAO Training Programme organised by the Commonwealth Institute of Biological Control, Bangalore on 11-10-1982.

Chaired the Sixth Session of the UNESCO-sponsored Regional Workshop on "Curriculum Development in Higher Agricultural Education" held at Govind Ballab Pant University of Agriculture and Technology, Pantnagar, Uttar Pradesh on 28-10-1982.

Presided over the Inaugural function of the Training Workshop on Rural Development for Executives of Industries organised by the Centre for Rural Development Studies, UAS in cooperation with the Federation of Indian Chambers of Commerce and Industry, New Delhi and Federation of Karnataka Chambers of Commerce and Industry, Bangalore, held at Hebbal on 3-12-1982.

Chaired the Plenary Session at the Silver Jubilee celebrations of Arecanut Research and Development in India, at the Central Plantation Crops Research Institute, Vittal, Dakshina Kannada, on 14-12-1982.

Inaugurated the All India Workshop on Biological Control at Hebbal, on 22-2-1983.

Delivered the welcome address at the Seventeenth Convocation of the UAS held at Bangalore on 2-3-1983.

*Visit of Important Teams/Committees:* A five-member delegation from LOSOTHO on 8-4-1982.

FAO Experts and CIBC Director on 3-5-1982.

Scientists from the International Rice Research Institute, Manila, Philippines on 28-5-1982.

Two Professors from the Department of Agronomy, Beijing Agricultural University, People's Republic of China on 11-9-1982.

Members of the Maharashtra Legislature, Bombay on 2-11-1982.

A team of Officers from Indonesia, Jakarta on 16-12-1982.

Senior Professors from Bangkok, Thailand on 25-2-1983.

*Visitors:* Mr. A. J. Ghugnov, Agricultural Attache, USSR Embassy, New Delhi on 7-4-1982.

Dr. Lint, World Bank, Washington on 4-6-1982.

Mr. J. G. Rumeau, FAO Representative in India, New Delhi on 19-6-1982.

Dr. John A. Lowe, Regional Programme Leader, FAO, Bangkok, Thailand on 9-7-1982.

Dr. B. D. Turner, Professor, King's College, London, United Kingdom on 24-7-1982.

Dr. G. M. Bahran, Scientist, Afghanistan on 26-8-1982.

Mr. Rolf Ramisch, H. E. the Ambassador of the Federal Republic of Germany on 27-8-1982.

Dr. Norman E. Borlaug, Director-General, International Maize and Wheat Improvement Centre, Mexico, on 28-8-1982.

Dr. C. P. Mamaril, Coordinator, International Rice Research Institute, Manila, Philippines on 8-9-1982.

Lady John Nott, w/o Rt. Hon. John Nott, Secretary of State for Defence, United Kingdom on 23-9-1982.

Mr. Rao Birendra Singh, Hon'ble Minister for Agriculture, Government of India, New Delhi on 29-1-1983 in connection with the laying of Foundation Stone for the Dairy Technology Block, Hebbal Campus.

Dr. L. D. Swindale, Director General, International Crops Research Institute for Semi-Arid Tropics (AP), on 2-3-1983 to deliver the Convocation Address at the Seventeenth Convocation of the University.

Mr. Govind Narain, His Excellency the Governor of Karnataka and Chancellor of the UAS on 2-3-1983 to preside over the Seventeenth Convocation of the UAS and to lay the Foundation Stone for the Agricultural College New Building, GKVK Campus.

Mr. B. L. Gowda, Hon'ble Minister for Agriculture and Pro-Chancellor of the UAS on 2-3-1983, to lay the Foundation Stone for the Indoor Games Complex at the GKVK Campus.

B. M. VENKATACHALA RAJU  
*Administrative Officer i/c*

## **(ii) Meetings of the Authorities of the University**

### **(a) Board of Regents**

The Board of Regents held nine meetings during 1982-83. The following are some of the important decisions :

#### **Amendment to Statutes of the University**

1. The Board while deciding to revise the pay scales of Instructors/Research Assistants/Extension Guides to Rs. 920-30-950-50-1200-60-1500-75-1725 recommended the same to the Chancellor for approval to amend the Statute 30(6).

The Board further decided that as and when the State Government revises the pay scales of its employees of equal cadre, the same be adopted in the case of Instructors/Research Assistants/Extension Guides in the University.

2. The Board while approving the addition of the following Statute as Statute 52(1) (o) recommended the same to the Chancellor for approval :

**“(o) Master of Science (Food and Nutrition)”**

3. Based on the recommendations of the Academic Council the Board approved the addition of the following new Statute as 30(40-C) and recommended the same to the Chancellor for approval :

**“30 (4-C): Notwithstanding the above provisions, teachers shall also be appointed through promotion as indicated below :**

- (1) The present system of open recruitment may continue in respect of all cadres of teachers. However, provision is made for promotion of Instructors as Assistant Professors, Assistant Professors as Associate Professors and Associate Professors as Professors subject to the following conditions :
  - (a) Instructors who have put in 10 years of active service in the University of Agricultural Sciences including the period of higher studies of 2 years for M.Sc. and 3 years for Ph.D., but for a maximum of 3 years for both M.Sc. and Ph.D. together, and who possess the qualifications prescribed for the posts of Assistant Professors may be promoted as Assistant Professors provided their work is satisfactory as evaluated by a Screening Committee constituted by the Vice-Chancellor, consisting of five experts in the concerned subject drawn from outside the University.
  - (b) Assistant Professors who have rendered 10 years of active service in the University of Agricultural Sciences as Assistant Professors including the period spent on higher studies up to a maximum of 3 years for Ph.D. and who possess the qualifications for the posts of Associate Professors provided their work is satisfactory as evaluated by a Screening Committee constituted by the Vice-Chancellor, consisting of five experts in the concerned subject drawn from outside the University.
  - (c) Associate Professors who have rendered 15 years of active service if they are only M.Sc., or 10 years of active service if they are Ph.Ds., as Associate Professors in the University and who possess the qualifications prescribed for the posts of Professors may be promoted as Professors provided their work is satisfactory as evaluated by a Screening Committee constituted by the Vice-Chancellor, consisting of five experts in the concerned subject drawn from outside the University.
- (2) The promotion of Instructors to Assistant Professors, Assistant Professors to Associate Professors as indicated above will be against supernumerary posts which may be created to provide for such a promotion and the post shall be purely personal.
- (3) The Screening Committee constituted for this purpose shall meet not more than once a year.

- (4) A person whose case for promotion is rejected by a Screening Committee once, may request for consideration of his case for promotion again after two years.

*Note :* The approval of the Chancellor is still awaited as on 15-4-19 3.

4. The Board while approving the substitution of the following Statutes to the existing Statutes 9(1) (b) of the Statutes of the UAS, recommended the same to the Chancellor for approval :

“9(1) (b) : Travelling allowance to other non-official members.

- |  |                              |
|--|------------------------------|
| (i) Daily Allowance to members outside Bangalore | Sitting fee Rs. 50 per diem  |
| (ii) Sitting fees                                | Sitting fee Rs. 50 per diem” |

5. The Board while approving the following amendment to the existing para 2 of Statute 32(1) decided to recommend the same to the Chancellor for approval :

Substitute the existing para 2 of Statute 32(1) with the following :

“provided that service personnel to such of the category of posts carrying a maximum basic pay of not more than Rs. 950 or corresponding maximum basic pay up to Rs. 950 as revised from time to time, shall be appointed by the Vice-Chancellor based on the recommendations of the Committee constituted by the Vice-Chancellor. A report of such appointments shall be placed before the Board.”

6. The Board approved the following amendment to Statutes 24(2), 25(3), 26(2) and 18(2) (b) in respect of revision of pay scales of the Director of Research, the Director of Extension, the Director of Instruction and the Dean respectively :

24(2) The salary of the Director of Research shall be in the scale of Rs. 2450-100-2950 and this scale shall be applicable from 1-1-1982, but the monetary benefit shall be admissible only with effect from 1-4-1982.

25(3) The salary of the Director of Extension shall be in the scale of Rs. 2450-100-2950 and this scale shall be applicable from 1-1-1982, but the monetary benefit shall be admissible only with effect from 1-4-1982.

26(2) The salary of the Director of Instruction shall be in the scale of Rs. 250-100-2950 and this scale shall be applicable from 1-1-1982, but the monetary benefit shall be admissible only with effect from 1-4-1982.

18(2) (b) The salary of the Dean shall be in the scale of Rs. 2950-125/2-3200 besides the admissible allowances if the appointee happens to be a person from outside the University.

7. The Board while approving the following amendments to Statute 19(1) of the First Statutes of UAS, recommended the same to the Chancellor for approval :

19(1) Read the powers and duties laid down in Sections 13, 15, 26 and 46 of the Act -

(a) The Comptroller shall be responsible for the management of all funds of the University including the General fund, the Foundation fund and other funds in accordance with the Statutes, Regulations and provisions of the Act, subject to the overall direction of the Board and the Vice-Chancellor provided -

(i) All expenditure up to Rs. 20,000 on a single item shall have received the sanction or approval of the Comptroller or any other officer or teacher concerned duly authorised by the Board.

D. I/Principal, AEI, Raichur	All expenditure up to
D.R/D.E/E.O/D.S.W/Librarian	Rs. 20,000 on a single item.
C.S.O/Regional Associate Directors (NARP)	All expenditure up to
Sr. Farm Supdt./Farm Supdt./	Rs. 15,000 on a single item.
Officer incharge of schemes	All expenditure up to
Research Assts. incharge	Rs. 10,000 on a single item.
of Farms and Research Stations	All expenditure up to
	Rs. 5,000 on a single item.

(ii) All expenditure exceeding Rs. 20,000 but not exceeding Rs. 2.00 lakhs on a single item shall have received the approval of the Vice-Chancellor.

(iii) All Expenditure exceeding Rs. 2.00 lakhs on a single item shall have received the approval of the Board.



- (iv) All purchases exceeding Rs. 1000 shall be made only on the basis of quotations or tenders.
- (v) That no expenditure shall be incurred except in accordance with the financial estimates as approved by the Board, under Section 37 of the Act and as delegated under Section 46 of the Act.

**Other important decisions of the Board of Regents**

1. The Board ratified the action taken by the University in permitting Mr. S. V. Hegde, Scientist (Microbiology) to attend the course on 'Biological Nitrogen Fixation and its Ecological Bases' at Carcas, Venezuela from 13-1-1982 to 4-2-1982 (including journey period) without any financial commitment on the part of the University by treating his absense as on duty.

2. The Board ratified the action taken by the University in permitting Dr. H. S. Hanumanthappa, Training Coordinator, to attend the Workshop on "The Problems of Mobilizing Rural Youth to meet the Requirements of Developments of Asia Today" at Colombo, Sri Lanka from 24-1-1982 to 2-2-1982 without any financial commitment on the part of the University but by treating his period of absence, including actual journey period, as on duty.

3. The Board ratified the action taken by the University in sparing the services of Dr. R. V. Krishna Moorthy, Associate Professor of Zoology, to the Karnataka State Sericulture Department, Bangalore, for a period of one year from 22-1-1982 for being appointed as Divisional Chief in Sericulture.

4. The Board approved the proposal to appoint Mr. N. T. Lillaram, Assistant Professor of Chemistry on contract basis under Statute 30 (4-B) for a maximum period of one year as Assistant Professor of Chemistry, College of Basic Sciences and Humanities, G.K.V.K. from the date of his actual retirement from the U.A.S. service namely, 1-5-1982 on a monthly remuneration of Rs. 1,000 p.m.

5. The Board approved the proposal to spare the services of Dr. B. S. Keshava Murthy for another one year from 7-1-1982 to the Government of Karnataka.

6. The Board decided to give a higher start of Rs. 820 in the scale of Rs. 700-1,600 to all Assistant Professors appointed on or after 1-1-1977 so long as they satisfy all the qualifications prescribed by the University for the post.

7. The Board decided to extend the period of deputation of Dr. P. N. Kamalapur for a period of one year from 21-12-1981 without any financial commitment to the University.

8. The Board ratified the action taken by the University in permitting Dr. A. S. Parashiva Murthy to attend the Fifth International Soil Classification Workshop held in Sudan from 31-10-1982 to 11-11-1982 without any financial commitment on the part of the University except treating his absence including actual journey period, as on duty.

9. The Board approved the proposal to pay a special pay of Rs. 30 p.m. to Typists working in the University in the scale of Rs. 400-900 with effect from 17-12-1981 in accordance with Government Order No. FD 66 SRP 81 dated 17-12-1981.

10. The Board approved the proposal to appoint Mr. B. G. Patil Kulkarni as Visiting Scientist in Plant Pathology for a period of one year under Statute 30 (4-B) (b).

11. The Board approved the proposal to appoint Mr. S. K. Suryanarayan as Visiting Scientist in the Department of Sericulture at Hebbal on a contract basis for a period of one year under Statute 30 (4-B) (b).

12. The Board approved the proposal of selecting candidates without interview but according to the criteria prescribed by the Vice-Chancellor up to the grade of Senior Assistants, with a view to complete the recruitment work expeditiously. However, in the case of Stenographers, Drivers, Typists, Mechanics and other categories of technical nature, Trade Test should be conducted for which the score card should be prescribed by the Vice-Chancellor to suit the evaluation of candidates without interview.

13. The Board appointed Dr. D. K. Veeranarayana Gowda on a contract basis for a period of one year in the first instance against the post of Professor of Pharmacology.

14. The Board approved the proposal to implement the revised scales of pay to the non-teaching staff of the University of Agricultural Sciences with effect from 1-1-1982. However, the monetary benefit of revised scales of pay shall be admissible from 1-4-1982 only.

15. The Board agreed to spare the services of Dr. Gururaj Hunsigi to the Mysore Paper Mills Ltd., for a period of 2 years on deputation.

16. The Board ratified the action taken by the University in deputing Dr. R. Narayana, Director of Instruction (BS & H) under the cultural exchange

programme to visit Syria for a period of six weeks from 25-4-1982 to 5-6-1982 by treating his deputation as on duty in addition to the journey period.

17. The Board while ratifying the action taken by the University in permitting Dr. T. K. Siddarama Gowda to accept the Post Doctoral Fellowship from the International Rice Research Institute, Manila, and relieving him of his duties with effect from the afternoon of 28-3-1982, decided to sanction the admissible study leave to Dr. T. K. Siddarama Gowda for a period of one year with effect from 13-3-1982.

18. The Board ratified the action taken by the University in permitting Dr. S. Narasimha Murthy to attend the 6/7th Annual Bangladesh Science Conference at Bangladesh Agricultural Research Institute, Dacca from 7-2-1982 to 11-2-1982 without any financial commitment on the part of the University by treating his absence including journey period as on duty.

19. The Board while ratifying the action taken by the University in permitting Dr. A. Manjunath to attend the 10th International Sunflower Conference held at Brisbane, Australia from 14-3-1982 to 18-3-1982 without any financial commitment on the part of the University.

20. The Board while ratifying the action taken by the University in permitting Mrs. K. Sheela to undergo the Regional Training Programme in Foods and Nutrition Planning to be held at the University of Philippines, Los Banos, from June 1982 to October 1983 for a period of 17 months, decided to approve her deputation for this 17 months training at Philippines.

21. The Board approved the proposal for payment of special pay to the Typists and others in the Research Stations who are entrusted with the cash work as per the terms of Government Order No. FD 80 SRP 79 dated 20-5-1980 with effect from 1-4-1980. The Board further decided that this payment may be made even if the period of work attended to is less than one month.

22. The Board approved the proposal for continuing to pay HRA and CCA to University employees working at ARS, Chintamani with effect from 13-7-1975 at the Government rates admissible to Government employees in Chintamani.

23. The Board approved the proposal to grant HRA and CCA at the same rates as are applicable to Government employees in Shimoga City with effect from 1-11-1979 and 3-12-1979 respectively to the staff working at ARS, Navile and ARS, Honnaville, considering the facts of non-availability of quarters and transport facilities.

24. The Board decided to permit Mr. K. Krishnappa, Assistant Professor of Plant Pathology to attend the Advanced and Intensive Training Course on Root-knot Nematodes from 11-4-1983 to 29-4-1983 at North Carolina State University, Raleigh, USA, by treating his absence as an duty including actual journey period, without any financial commitment on the part of the University.

25. The Board ratified the action taken by the University in permitting Dr. K. V. Devaraj, Chief Scientific Officer (IF), to proceed to USA and UK as a Visiting Scientist, treating his absence as study leave for 120 days from 2-8-1982 to 29-11-1982 without any additional financial commitment on the part of the University.

26. In the light of the recommendations of the Academic Council, the Board approved the proposal to enhance the value of Graduate Assistantship to Postgraduate students as follows :

- |                       |              |
|-----------------------|--------------|
| 1. For M.Sc. students | Rs. 350 p.m. |
| 2. For Ph.D. students | Rs. 500 p.m. |

The revised rates are given effect from November 1, 1982.

27. In the light of the recommendations of the Academic Council, the Board approved the revised rates of remuneration to be paid to the External Examiners with effect from November 1, 1982.

- |  |         |
|--|---------|
| 1. For examining M.Sc. thesis                                  | Rs. 100 |
| 2. For examining Ph.D. thesis                                  | Rs. 150 |
| 3. For conducting qualifying examination for Ph.D. students    | Rs. 100 |
| 4. For conducting final viva-voce examination of Ph.D students | Rs. 100 |

28. The Board approved the proposal for offering M.Sc. (Agri) degree programme in Sericulture at Dharwad Campus.

29. In the light of the recommendations of the Academic Council, the Board approved the proposal to rename the Department of ANMPT, as the Department of Animal Nutrition.

30. The Board approved the proposal for bifurcating the existing Department of 'Sociology and Economics' into two separate departments, namely, 'the Department of Sociology' and 'the Department of Economics' and to redesignate the post of Associate Professor of Sociology and Economics to that of Associate Professor of Sociology.

31. The Board approved the proposal for deputation of Dr. G. K. Veeresh to attend the 8th International Colloquium on Soil Zoology held in Belgium from 29-8-1982 to 3-9-1982 with admissible journey period and also to meet the cost of Registration fee and 50 per cent of the travel cost (the total expenditure not exceeding Rs. 12,000, the other 50 per cent of the cost being met by the ICAR) and his absence from 4-9-82 to 8-10-82 in connection with his visit to UK with the assistance of the British Council Fellowship and the museums at Holland, Germany and France, by availing the tourist concession air ticket being treated as leave at his credit.

32. The Board approved the proposal to permit Dr. P. M. Rahamathulla, Assistant Professor of Pathology to accept Post-Doctoral position at the University of Cincinnati, Ohio, USA for another period from 1-7-1982 to 21-12-1983 on the same terms and conditions as already agreed to by the University.

33. The Board approved the proposal for deputation of Dr. A.S. Parashiva Murthy to attend the International Conference on "Chemistry and World Food Supplies - the New Frontiers" to be held at Manila, Philippines from 6th to 10th December 1982, meeting the cost of Registration fee and 50 per cent of the International travel cost (the total expenditure not exceeding Rs. 12,000) the other 50 per cent being met by the Indian Council of Agricultural Research.

34. The Board ratified the action taken by the University in permitting Mr. K. S. Arun Kumar to attend the International Congress of Agricultural Economists held at Jakarta - Indonesia from 24-8-1982 to 2-9-1982 by treating his absence, including actual journey period, as on duty and also agreed to meet the cost towards the Registration fee of Rs. 525 and internal travel cost from Bangalore to Madras and back.

35. The Board ratified the action taken by the University in permitting Dr. C. A. Viraktamath to attend International Workshop on "Bio-taxonomy, Classification and Biology of Leaf Hoppers and Plant Hoppers of Economic Importance" from 4-10-1982 to 7-10-1982 at London.

36. The Board while permitting Dr. K. G. Hanumantharaya Setty to attend the Advance Intensive Training Course on Root-knot nematodes at Raleigh, USA from 11-4-1983 to 29-4-1983 by treating his absence as on duty including actual journey period without any financial commitment on the part of the University, desired that during this period he may also collect information on Tobacco nematodes.

37. The Board ratified the action taken by the University in permitting Dr. M. A. Devaiah to accept the Post Doctoral Fellowship offered by the

University of Hawaii, USA to work on insect pest management for one year with effect from 6-10-1982.

38. The Board approved the proposal to shift I year B.F.Sc. class from GKVK to Mangalore Campus with effect from the academic year 1982-83.

39. The Board ratified the action taken by the University in relieving Dr. I. Karunasagar of his duties on the afternoon of 4-8-1982 to enable him to proceed on study tour to USA and UK under PL 480 Project from 5-8-1982 to 16-11-1982 treating his absence as on duty.

40. The Board approved the proposal to spare the services of Dr. K. A. Jaliha, Director of Extension, to the FAO for an assignment in Sierra Leone for a period of two months from the date his relief.

#### **(b) Academic Council**

The Academic Council met three times during 1982-83. Following are the important decisions :

1. The Academic Council while approving the proposal to make eligible B.Sc. (Agri), B.V.Sc., B.F.Sc., B.Sc. (Hort), B.Sc. (Dairy Technology), besides B.H.Sc. graduates with 50 per cent of marks or equivalent Grade Point Average in the aggregate of the degree programme for the Master's degree in Food and Nutrition, recommended to the Board to amend the relevant Statutes providing for a degree with the nomenclature M.Sc. (Foods and Nutrition).

2. The Academic Council while approving the proposal to rename the Department of ANMPT as the Department of Animal Nutrition and to redesignate the post of Professor of Dairy Science to Professor of Animal Nutrition, recommended the same to the Board for a approval.

3. In view of the operational difficulties faced by the office of the Registrar, the Academic Council agreed that invariably 30th November of every year should be the last date for receiving application from the Graduating candidates who have completed the degree programme by that year for the ensuing Convocation of the year.

4. The Academic Council agreed to reserve 10 per cent of the admission capacity in all programmes, Undergraduate/Postgraduate including Ph.D. programmes for ICAR nominees in favour of the following categories :

##### **(i) Bachelor's degree programme**

- a) State/Union territories which do not have facilities in the particular field of education.

- b) Foreign students holding Government of India scholarships.
- c) Foreign students sponsored by their Governments with scholarships.
- d) Special category *i.e.*, students from backward areas where there are no Agricultural Universities or the degree programmes in certain areas.

**(ii) Master's degree programme**

- (a) Foreign students holding Government of India scholarships.
- (b) Foreign students sponsored by their Governments with scholarships.
- (c) Special category students as mentioned above at 1(d).

**(iii) Ph.D. degree programmes**

- (a) Inservice candidates from Agricultural Universities from States/Territories where there are no such disciplines.
- (b) Inservice candidates from ICAR institutes from States/Territories where there are no such disciplines.
- (c) Foreign students holding Government of India scholarships.
- (d) Foreign students sponsored by their Governments with scholarships.

In respect of admission of Government of India nominees for Post-graduate programmes sponsored by the Indian Council of Agricultural Research from within the country must go through the admission processes of taking the written tests and viva voce and get a minimum of 50 per cent of marks in the admission processes as already stipulated in the Regulations.

5. The Academic Council decided to recommend to the Board for bifurcating the existing Department of Sociology and Economics into two separate departments *viz.*, Department of Sociology and Department of Economics.

6. The Academic Council while agreeing in principle to have one section in B.Sc. (Agri) with Kannada as the medium of instruction decided that this may be done provided a minimum of 50 students join the section.

7. The Academic Council decided to include as members of the Boards of Studies of the concerned Faculties the staff members of the cadre of Professors, Associate Professors and two elected members from the cadre of Assistant Professors and two from the cadre of Instructors from teaching, research and extension wing of the University.

8. The Academic Council while approving the following Regulations relating to University Merit Teaching Fellowships :

- (a) Graduates who have obtained more than 3.50 out of 4.00 Overall Grade Point Average at Bachelor's level and more than 3.80 out of 4.00 at Master's level are eligible for appointment as Junior Teaching Fellow. For the Senior Teaching Fellowship, in addition to what is prescribed for Junior Fellowship the persons should have obtained OGPA of more than 3.80 out of 4.00 at Ph.D. level.
- (b) At each College the selection for appointment as Teaching Fellow shall be made on the basis of OGPA of students graduates from the College from among those who applied for Fellowship. Not more than one in each subject will be awarded every year at each College. If there are more than one merited candidate in a subject at a College, only one with higher merit shall be awarded.
- (c) The University Merit Teaching Fellowship shall normally be for a period of two years subject to satisfactory performance. The period may be extended for one more year.
- (d) Fresh awards shall be made soon after the completion of the regular last Trimester of the previous degree programme. The vacancies of Fellowships shall be filled for the remaining period by inviting applications once in about four months i.e., in January, April, September of the Academic year.
- (e) The number of maximum teaching/research/extension fellowships including Junior and Senior Fellowships that shall be awarded each year (excluding the ones that need to be continued) shall be decided at the beginning of each year institution-wise.
- (f) Persons holding Master's degree shall be awarded Junior Fellowship and those holding Ph.D. degree, Senior Fellowships. The basis for award of Fellowship however will be OGPA at Bachelor's, Master's and Ph.D. level, the ratio of weightage being 70:20:10 respectively in the case of Senior Fellowships and the ratio of weightage as between Bachelor's and Master's degree being 80:20 respectively in the case of Junior Fellowships.
- (g) The Fellow shall carry out Lecture, Research and Extension Education work as may be decided by the Head of the Department.
- (h) Persons who are awarded the Fellowships shall be whole time Fellows in the University and shall not be permitted to do Postgraduate programme nor accept any other fellowships or assignments. The value of the Fellowships shall be as follows :



*Consolidated amount  
per month*

(i) Junior Fellowship	Rs. 1500
(ii) Senior Fellowship	Rs. 1800

- (i) The number of fellowships will be based on vacancies available in the University in the cadres of Instructors and Assistant Professors.
- (j) The suitability of a person for award of Merit Fellowships as judged by the Vice-Chancellor in his discretion shall be the sole criteria for the award and the continuance of fellowships.

9. The Academic Council while approving the proposal to award Gold Medals to the first two ranks from among the Diploma holders in Agricultural Engineering every year under the following conditions, recommended the same to the Board for approval :

- (1) They should have an Overall Grade Point Average of not less than 3.75 at the end of the Diploma programme.
- (2) They should not have obtained 'F' or 'EE' symbol in any of the courses registered by them as a part of the Diploma programme.
- (3) They should have completed the Diploma programme within the prescribed period.

10. The Academic Council approved the proposal to extend the Merit Scholarship to Postgraduate students in M.Sc. (D.Sc.) during their seventh trimester also as they will be undergoing inplant training during that period.

11. The Academic Council approved the proposal to offer a Postgraduate Diploma course in Sericulture starting from 1st June 1983.

**Other important decisions**

1. The Academic Council approved the proposal to change the credit pattern in respect of Ag. Ent. 201 and Ag. Ent. 301 for B.Sc. (Agri) and Ag. Ent. 302 for B.Sc. (Hort) degree programme from 1+2 to 2+1 credits.

2. The Academic Council approved the two Postgraduate courses namely Ag. Ent. 521 and Ag. Ent. 540 with 2+1 and 2+1 credits respectively.

3. The Academic Council approved the new Postgraduate course in Agricultural Microbiology, namely Biology of Cultivation of Mushrooms—Ag. Mic. 528 with 2+1 credits.

4. The Academic Council approved the proposal to make Econ. 101 and Ag. Econ. 101 as pre-requisites to Ag. Econ. 302, Farm Management Economics, courses.

5. The Academic Council approved the revised course outline for HM 353—Household Industries with 1 + 2 credits.

6. The Academic Council approved the new courses in Sericulture viz., Ag. Ent. 541, Ag. Ent. 542, Ag. Ent. 543 and Ag. Ent. 544.

7. The Academic Council approved the course Stat. 539—Statistical Techniques in Microbiology with 2 + 1 credits for Postgraduate students in Fisheries.

### **(c) Board of Studies**

The Boards of Studies of the Faculty of Agriculture, Faculty of Animal Science and Faculty of Basic Sciences and Humanities held 3, 2 and 2 meetings respectively.

#### ***Faculty of Agriculture***

1. The Board of Studies decided that time limit of three years over and above the minimum period required for completion of B.Sc. (Agri), B.H.Sc., B.Sc. (Hort) and B.Sc. (Agril. Mark. & Coop) degree programme should be fixed.

2. The Board of Studies approved the revised course outlines for HM 353—Home Management course.

3. The Board of Studies approved the syllabus for Master's degree programme in Home Management.

4. The Board decided that the Cumulative Grade Point Average for awarding Gold Medals to Undergraduate students should be maintained at 3.75 only.

5. The Board of Studies approved the course curriculum for B.Sc. (Sericulture) degree programme.

#### ***Faculty of Animal Science***

1. The Board of Studies recommended to the Academic Council the following amendments to Regulations relating to Internship programme for B.V.Sc. students.

- (a) Students who have successfully completed 222 credit hours *plus* remedial courses prescribed for the degree programme shall be eligible for the internship programme.

- (b) The programme shall be offered immediately the next month, after successful completion of the courses, as stated at (a) above and spread over for 2 trimesters or 6 months.
- (c) Evaluation and grading will be done in 6 disciplines in which training has been given during internship programme. Each discipline is allotted 3 credits.
- (d) Registration for both the trimesters will be done before the commencement of the internship programme at the rate of 9 credit hours per trimester.
- (e) The leave provision made in the guidelines of the scheme shall be followed, during the period of internship.

2. The Board of Studies agreed for the proposal for extending the award of Merit Scholarship to Postgraduate students of M.Sc. (D.Sc.) for the 7th trimester and recommended the same for approval of the Academic Council.

3. The Board of Studies approved new courses in Fish Processing Technology.

4. The Board of Studies agreed for fixing a time limit of 4 years, over and above the minimum duration for completing the Undergraduate programmes in respect of B.V.Sc., B.F.Sc. and B.Sc. (D.T.).

5. The Board of Studies agreed to discontinue to conduct the unannounced examination. However, there shall be 4 announced examinations or quizzes instead of three at present.

***Faculty of Basic Sciences & Humanities***

1. The Board of Studies agreed for the discontinuance of the requirement of Stat. 301 course for B.V.Sc. students from the Academic year 1982-83, as sufficient time has been given to the students to complete this course for the curriculum requirement and in its place the existing course Stat. 102 (2+1) can be substituted for the curriculum requirement of any student.

2. The Board decided to renumber F. Stat. 302 — Statistical methods in Fisheries (1 + 1) as Stat. 304 keeping the course content as it is.

R. KRISHNAPPA.  
*Registrar*

## PART II

### TEACHING

#### A. General

The outturn of graduates, number of students admitted during the year and scholarships awarded for various courses are presented below :

##### (i) Outturn of Graduates

College	Course	No. completed
Agricultural College, Hebbal	Ph.D.	12
	M.Sc. (Agri)	60
	M.Sc. (Hort)	17
	M.H.Sc.	1
	B.Sc. (Agri)	141
	B.Sc. (Hort)	24
	B.Sc. (Agril. Mark. & Coop)	21
Veterinary College, Hebbal	Ph.D.	7
	M.V.Sc.	30
	M.Sc. (Dairy Science)	11
	B.V.Sc.	71
Agricultural College, Dharwad	Ph.D.	11
	M.Sc. (Agri)	53
	B.Sc. (Agri)	84
	B.Sc. (Agril. Mark. & Coop)	26
Fisheries College, Mangalore	M.F.Sc.	16
	B.F.Sc.	23
Rural Home Science College, Dharwad	B.H.Sc.	24
	M.H.Sc.	8
Agricultural Engineering Institute, Raichur	D.A.E.	21
Total		661

##### (ii) The number of students admitted

1. B.Sc. (Agri)	330
2. B.Sc. (Hort)	41
3. B.Sc. (Agril. Mark. & Coop)	39

4.	B.Sc. (Sericulture)	19
5.	B.H.Sc.	27
6.	B.V.Sc.	119
7.	B.Sc. (D.T.)	21
8.	B.F.Sc.	34
9.	D.A.E.	23
10.	M.Sc. (Agri)	241
11.	M.Sc. (Hort)	19
12.	M.H.Sc.	15
13.	M.V.Sc.	23
14.	M.F.Sc.	29
15.	M.Sc. (D.Sc.)	8
16.	Ph.D.	61
Total		1049

**(iii) Students Strength at Various Colleges and Institutions**

College	Course	No. on Roll
Agricultural College, Hebbal	Ph.D	91
	M.Sc. (Agri)	326
	M.Sc. (Hort)	39
	M.H.Sc.	8
	B.Sc. (Agri)	827
	B.Sc. (Hort)	151
	B.Sc. (Agril. Mark. & Coop)	91
	B.Sc. (Sericulture)	19
Veterinary College, Hebbal	Ph.D	6
	M.V.Sc.	47
	M.Sc. (D.Sc.)	28
	B.V.Sc.	545
	B.Sc. (D.T.)	57
Agricultural College, Dharwad	Ph.D	50
	M.Sc. (Agri)	235
	B.Sc. (Agri)	458
	B.Sc. (Agril. Mark. & Coop)	75
Fisheries College, Mangalore	M.F.Sc.	54
	B.F.Sc.	132
Rural Home Science College, Dharwad	M.H.Sc.	21
	B.H.Sc.	74
Agricultural Engineering Institute, Raichur	DAE	66
Total		3400

## (iv) Scholarships awarded during 1982-83

Name of the College	University of Agricultural Sciences				GOI & ICAR	
	Merit	General	Fee concessions	Loan		
1. <i>Agricultural College, Hebbal</i>						
i. Undergraduate						
(a) B.Sc. (Agri)	8	75	132	9	87	
(b) B.Sc. (Hort)	8	40	16	1	13	
(c) B.Sc. (Agril. Mark. & Coop.)	8	4	14	2	12	
(d) B.Sc. (Sericulture)	2	2	4	1	—	
ii. Postgraduate	43	—	46	—	50	
2. <i>Agricultural College, Dharwad</i>						
i. Undergraduate						
(a) B.Sc. (Agri)	8	36	24	6	37	
(b) B.Sc. (Agril. Mark. & Coop.)	8	6	11	1	8	25
ii. Postgraduate	23	—	1	—	32	
3. <i>Veterinary College, Hebbal</i>						
i. Undergraduate	16	54	89	5	51	
ii. Postgraduate	11	—	8	4	—	
4. <i>Fisheries College, Mangalore</i>						
i. Undergraduate	8	10	6	2	10	
ii. Postgraduate	6	—	—	1	—	
5. <i>Home Science College, Dharwad</i>						
i. Undergraduate	6	2	—	1	7	
ii. Postgraduate	4	—	—	1	1	
6. <i>Agril. Engineering Institute, Raichur</i>						
i. Diploma	6	5	2	—	—	

## (v). Convocation

The Seventeenth Convocation of the University was held at the Veterinary College, Hebbal on 2-3-1983. A total of 780 candidates took various degrees as follows :

Sl. No.	Degree	In person	In absentia	Total
1.	Ph.D.	31	6	37
2.	M.Sc. (Agri)	74	62	136
3.	M.Sc. (Hort)	16	4	20
4.	M.H.Sc.	4	3	7
5.	M.V.Sc.	11	8	19
6.	M.Sc. (Dairy Science)	12	6	18
7.	M.F.Sc.	7	3	10
8.	B.Sc. (Agri)	171	162	333
9.	B.Sc. (Hort)	20	14	34
10.	B.H.Sc.	3	24	27
11.	B.V.Sc.	48	21	69
12.	B.F.Sc.	3	13	16
13.	B.Sc. (Agril. Mark. & Coop.)	28	26	54
Total		428	352	780

Gold medals and prizes were awarded to 65 candidates for outstanding performance in their studies.

The Convocation was presided over by His Excellency Shri Govind Narain, the Governor of Karnataka and Chancellor of the University. Dr. L. D. Swindale, Director General, ICRISAT, Hyderabad delivered the Convocation address.

R. KRISHNAPPA  
Registrar

**B. Reports of the Teaching Institutions****1. College of Postgraduate Studies, Dharwad**

The programme of Postgraduate Instruction in the University consists of Master's degree in Agriculture, Veterinary, Fisheries, Horticulture, Home Science, Dairy Science, Poultry Science, Statistics, Bio-chemistry and Sericulture, and Doctor of Philosophy (Ph.D.) in Agriculture and Animal Sciences. Postgraduate programmes in Agriculture are offered at GKVK, Hebbal, as well as Dharwad Campuses. The courses in Animal Science faculty are offered at Hebbal (Animal Sciences) and Mangalore (Fisheries Sciences) campuses.

*Special Lectures:* The following special lectures were arranged for the benefit of postgraduate students :

<i>Name of the speaker</i>	<i>Date</i>	<i>Topic</i>
1	2	3
Mr. V. R. Rajagopalan, Director, Mangala Fertilizers Bangalore	12-4-82	Fertilizers and their Market- ing
Dr. H. G. Singh Director of Research Udaipur University, Jaipur	9-6-82	Planning Research for Agri- culture
Mr. M. S. Sondhe Sarvodaya Worker, Damasak Mandir, Mortiwa, Sri Lanka	24-6-82	Sarvodaya — a Community Organisation in Sri Lanka
Prof. Han Chen-Ru & Prof. Liu Xun-Hao Agronomy Dept. Beijing Agri. Univ., China	25-9-82	Some Aspects of Multiple Cropping in China
Dr. N. K. Umrani Chief Scientist Dry Land, Solapur	21-1-83	Efficient use of Fertilizer under Dryland Conditions
A. B. Joshi Rtd. V.C. Mahatma Phule Krishi Vidyapeeth, Rahuri	13-9-82	Further Strategy for Indian Agriculture
Sri G. V. Kadakol, Ph D. student Methorne University, Australia	10-11-82	Shattering Resistance in Mus- tard
Dr. M. J. Vasudeva Rao ICRISAT, Hyderabad	10-11-82	Striga Resistance in Mustard
Dr. R. S. Pardoa, Prof. & Head Plant Breeding, Haryana Agril. Univ., Hissar	27-11-82	Breeding for Stress Tolerance in Crop Plants
Dr. N. Seetaram ICRISAT, Hyderabad	18-2-83	Sorghum Physiology
Dr. K. B. Desai Sr. Scientist, Agril. University Navasari	23-2-83	Sorghum Improvement in Gujarat



1	2	3
Dr. C. H. Shah Prof. Emeritus Bombay University, Bombay	10-12-82	Modernisation of Indian Agriculture - Some Economic Issues
Dr. G. S. Kori, USA	28-12-82	Pesticides and Environment
Dr. Thomas S. Walker Economist, ICRISAT Hyderabad	18-1-83 19-1-83	1. Portfolio Analysis 2. Application of Linear Programming Models to Agriculture
	20-1-83	3. Sophisticated Techniques of Agril. Price Analysis
	21-1-83	4. Socio-Economic Constraints for Adoption of Modern Agricultural Production Technology
Mr. Desai, Dy. Director of Seed Certification Dharwad	17-2-83	Seed Certification
Dr. M. Udayakumar I/c Prof. of Crop Physiology Bangalore	15-9-82	Partitioning Factors in Post- flowering Growth in Crop Plants with Special Reference to Ragi
Mr. M. N. Doddamani Project Director, DRDS Dharwad	2-11-82	Concepts of IRDP
Dr. P. Basavaiah Mr. M. B. Hasalkar Dr. A. N. Kabbur Mr. Policegowdar India Devt. Service Dharwad	29-12-82	India Devt. Service, Organisation, Objectives, Operation and Accomplishment
Dr. B. S. Giriappagowda Assoc. Prof., Dept. of Criminology, K. U., Dharwad	26-3-83	Science against Crime
Dr. S. N. Singh Senior Scientist, Divn. of Ag. Extn. IARI, New Delhi	30-3-83	Challenges of Extension in Coming Years

1	2	3
Dr. S. Chandrasekharan Prof. of Soil Science and Chemistry, Annamalai Nagar	25-9-83	Organic Acids in Rice Soils
Dr. R. Nath, P. G. Instt. of Medical Edn., Chandigarh	Feb, 83	Cadmium Toxicity
Dr. K. G. Shanmugavelu Prof. of Horticulture & Head Dn. of Horticulture, TNAU Madurai	13-5-82	Recent Horticultural Research Activities in TNAU
Prof. R. S. Amin Professor Emiritus, Gujarat Agril. University	29-5-82	Soft Wood Grafting on Hard Wood Plants
Dr. P. Perrino, Head Mediterranean Germplasm Bank Bari, Italy and UNDP Consultant	19-6-82	1. Gene Banks - Conservation and Utilization of Plant Genetic Resources
	26-6-82	2. Sampling Strategy for Plant Exploration and Collection
Mr. R. Jairus David M.Sc. (Fruit-Tech.) Univ. of California, Davis	19-6-82	<i>Clostridium sporogenes</i> Taxo- nomy, Spore Biology, Mechanisms of Heat, Resistance and Recovery Pattern
Prof. Henry M. Junger Prof. of Plant Breeding, Dept. of Pl. Breeding & Bio-chemistry Cornell University, Ithaca, New York, U.S.A.	19-2-82	1. Strategies in Breeding for Disease Resistance in Vege- table crops
	5-3-83	2. The Potential of Vegetables in Meeting World Food Needs.
Dr. Noel G. Mamiepic Project Director, International Programme on Seed Technology	28-5-82	Nature of Training Programme
Dr. R. C. Mabesa Asst. Prof. (Vegetable crops) College, Laguna, Philippines	28-5-82	Vegetable Seed Production

1	2	3
Dr. S. S. Virmani Pl. Breeder, IRRI, Manila, Philippines	29-5-82	Hybrid Rice Breeding - Potential and Problems
Dr. Siddiqui Coordinator, NSP, IARI, New Delhi	24-12-82	Scope of National Seed Programme
Mr. S. R. Viswanath Soybean Breeder, Hebbal	21-12-82	Soybean Seed Production
Mr. Sreekantaradhya Breeder, Dry Farming	28-12-82	Seed Problem under Dry Farming Conditions
Mr. B. S. Nadagoudar Agronomist (Cotton), ARS Dharwad	7-3-82	Hybrid Cotton Seed Production
Dr. B. T. Shankaregowda Geneticist (Millets), GKVK	14-3-83	Sorghum Seed Production
Mr. Mark Moffet Howard Univ. USA	12-4-82	Behaviour and Related Aspects of the Ant Genus Pheidologeton
Dr. D. S. Ajri Prof. & Head, Dept. of Ent. Rahuri	10-5-82	Our Experience with Pyrethroids
Dr. Ramadas Menon Emeritus Scientist, Mannuthi	26-8-82	Some Concepts on Biological Specialisation
Prof. Lellan Rai, B. H.U. Varanasi	1-10-82	1. Salient Features of Insecticide Act in Relation to their Toxicity and Hazards
	13-14 & 15-10-82	2. Film Show on Life on Earth
Dr. G. Buckingham Res. Leader, Biol. Control USDA, Florida	25-11-82	Biological Control Research in Florida
Dr. B. D. Tusher King's College, London	20-12-82	1. Psocoptera - Biology and Natural History
	21-12-82	2. Psocoptera - Ecological Niche
	22-12-82	3. Psocoptera - Population Dynamics and Energetics

1	2	3
<b>Dr. Bennet</b> Director, CIBC, West Indies	31-1-83	Biological Control of Aquatic Weeds
<b>Dr. P. Bhaskaran</b> Reader and Head, Dept. of Entomology, Annamalai University	2-2-83	Host Plant Nutrition in Respect to Inorganic Potash in Soil and Crop Resistance to Insect Pests
<b>Dr. P. E. Howse</b> Univ. Southampton, UK	7-2-83	1. Chemical Ecology of Ants and Termites
	9-2-83	2. Behavioural Techniques in the Evaluation of Pheromones
<b>Dr. T. N. Ananthakrishnan</b> Director, Entomology Unit Loyola College, Madras	22-3-83	Perspectives in Mycophagous Thrips
<b>Dr. T. S. Walkar</b> Economist, ICRISAT, Hyderabad	7-7-82	Economic Research on SAT Agriculture
<b>Dr. M. Shivamurthy</b> Reader in Statistics K.U., Dharwad	24-7-82	Sampling Techniques for Research in Agricultural Economics
<b>Dr. H. S. Gopalrao</b> Director, Inst. for Devt. of Studies, Univ. of Mysore Mysore.	9-8-82	Structure, Conduct and Performance Approach to Research in Agricultural Marketing
<b>Dr. S. S. Rathi</b> Res. Associate, UAS, Dharwad	25-10-82	Financial Ratios and their Use in Farm Business Analysis
<b>Dr. C. S. Shah</b> Prof. Emeritus, Bombay Univ. Bombay	12-12-82	Agril. Supply Functions
<b>Dr. M. Mohanasundaram</b> Assoc. Prof. of Entomology, RRS Vridhalhalane, T. N.	25-1-83	Role of Mites in Agriculture
<b>Dr. M. C. Sircar</b> Prof. of Agril. Chemistry and Soils, IARI, New Delhi		Ongoing Research Programmes on Nitrogen and Phosphorus at the Division of Soil Science, IARI, Delhi

1	2	3
Dr. K. R. Krishna	14-6-82	Mycorrhizal Application in Agriculture
Dr. V. Ranga Rao	28-8-82	Nitrogen Fixation, Research Attital, Ibadan, Nigeria
Dr. T. A. Lumpkin	3-11-82	<i>Azolla</i> in Rice Production
Dr. D. H. Hubbell	18-11-82	Recognition Process in Legume <i>Rhizobium</i> Symbiosis and Infection of Legume Root
Dr. N. P. Singh, Prof. & Head, Dept. of Pathology College of Vety. Science Pantnagar	15-4-82	Pneumoenteritis in Calves
Dr. B. Dickson Institute of Fishery Technology Research, Bergen Norway	29-11-82	Demersal Pair Traling and its Operational Parameters
Dr. Kim Jauncy, Lecturer University of Stirling	16-11-82	1. Fish Nutrition - I
	17-11-82	2. Fish Nutrition - II
Dr. Donald J. Macintosh Research Associate University of Stirling	18-11-82	Cockle Culture
Mr. A. A. H. Moss Consultant, I.C.I. United Kingdom	29-3-83	Problems of Aquatic Pollution in U.K.
Dr. M. Subramanyam Prof. & Head Dept. of Agronomy, TNAU, Coimbatore	1-3-82	Nitrogen Management in Rice
Dr. Kishan Singh Director, Sugarcane Research Institute Lucknow	28-6-82	Problems of Nematode Diseases on Sugarcane
Dr. Morris R. Bonde Research Plant Pathologist Plant Disease Research Lab. U.S.D.A., Maryland, USA	6-10-82	Research Programme in Maize and Sorghum Downy Mildew at USDA Plant Disease Laboratory

1	2	3
Dr. D. S. Bhatti Professor & Head Dept. of Nematology Agricultural University Hissar, Haryana	9-3-82	Nematode Problems in Haryana
Dr. Jillian Galbraith Dept. of Microbiology Queensland, Brisban Australia	4-2-83	Fungi in the Biological Con- trol of Water Hyacinth
Prof. G. Pontecarvo, FRS Imperial Research Fund London	9-2-83	General Discussion
Dr. W. J. Rennie Seed Pathologist Dept. of Agriculture and Fisheries, Edinburgh, UK	26-2-83	Seed Pathology Research and Development in the United Kingdom
Dr. Manikraju Head & Professor of Pediatrics KMC, Hubli	13-1-83	Prevalence of Nutritional Dis- orders
Dr. Kamat, Assistant Professor of Biochemistry KMC, Hubli	13-1-83	Biochemical Method of Asses- sment of Nutritional Status

*Names of the students who have secured ICAR fellowships*

Agronomy (Hebbal)

1. P. P. Jay, Jr. Fellowship, ICAR (M.Sc)
2. B. Basavaraj                   ,,
3. T. Balachandra,               ,,
4. G. C. Basavaraj, Aspee

Agronomy (Dharwad)

1. D. P. Biradar, Jr. Fellowship, ICAR (M.Sc.)
2. M. M. Chiniwar               ,,
3. S. A. Dhawalgi               ,,
4. J. V. Patil                   ,,

5. K. Ramappa Jr. Fellowship, ICAR (M.Sc.)
6. S. D. Sayagavi „
7. V. S. Korikantimath, Sr. Fellowship, ICAR (Ph.D)
8. C. A. Agasimani „

**Agricultural Botany : ICAR Junior Fellowships**

- |                      |                      |
|----------------------|----------------------|
| 1. J. S. Hiremath    | 8. N. B. Gaddagimath |
| 2. R. M. Malewaniki  | 9. S. B. Ramatcerth  |
| 3. J. C. Karkannavar | 10. R. V. Kashappa   |
| 4. M. T. Merehradder | 11. Madhava Rao      |
| 5. A. N. Magadum     | 12. V. A. Vajanthree |
| 6. S. H. Patil       | 13. Pujari           |
| 7. D. H. Narahatti   |                      |

**Crop Physiology :**

- |                   |                    |
|-------------------|--------------------|
| 1. S. N. Yeligar. | 2. K. N. Kattimani |
|-------------------|--------------------|

**Agril. Economics : Senior Fellowship**

1. S. R. S. Murthy

**Junior Fellowship**

- |                   |                        |
|-------------------|------------------------|
| 1. M. G. Bhat     | 3. G. P. Reddy         |
| 2. Y. C. Kademani | 4. B. G. Gangadharappa |

**KSAMB Fellowship**

- |                      |                    |
|----------------------|--------------------|
| 1. S. S. Patil       | 4. B. K. Alagawadi |
| 2. T. R. Uglawat     | 5. M. M. Kollolli  |
| 3. N. R. Mamle-Desai |                    |

**Entomology (Dharwad) : ICAR Fellowship**

- |                        |                          |
|------------------------|--------------------------|
| 1. Pulakeshi Karamaddi | 4. V. E. Narasimhamurthy |
| 2. V. S. Hollolli      | 5. V. C. Hegde           |
| 3. Shivamurthappa      | 6. S. N. Pujary          |

**Hebbal :**

- |              |                        |                |
|--------------|------------------------|----------------|
| M.Sc. (Agri) | 1. H. V. Ananthamurthy | 4. N. Srinivas |
|              | 2. P. Shivaram Bhat    | 5. P. Sreedhar |
|              | 3. Shivamurthy Naik    |                |
| Ph.D.        | 6. C. T. Ashok Kumar   |                |

**CSIR Fellowship**

1. S. Subramanya

**UNDP Fellowship**

1. P. Kalidas

**Agricultural Extension (Hebbal)**

- |       |                    |                      |
|-------|--------------------|----------------------|
| Ph.D. | 1. R. M. Prasad    | 2. Prakash Khardeler |
| M.Sc. | 3. Manimegalan     | 6. Sudhakar          |
|       | 4. B. Nijalingappa | 7. Somashekhar       |
|       | 5. Kotresh Naik    |                      |

**Dharwad :**

- |                       |                |
|-----------------------|----------------|
| 1. M. T. Ashoka Reddy | 2. M. S. Saraf |
|-----------------------|----------------|

**Horticulture : Hebbal**

- |       |                         |                       |
|-------|-------------------------|-----------------------|
| M.Sc. | 1. K. N. Manjunath      | 4. Mr. T. P. Murali   |
|       | 2. D. D. Yogananda      | 5. Mr. S. Ganesh Naik |
|       | 3. B. P. N. Jayanthamma |                       |

**H. R. D. P. Fellowship**

- |                     |                  |
|---------------------|------------------|
| 1. Pawan Srivastava | 3. B. K. Nandish |
| 2. K. S. Jayakumar  |                  |

**Dharwad Campus : ICAR**

- |                |                     |                   |
|----------------|---------------------|-------------------|
| Sr. Fellowship | 1. G. S. Hegde      |                   |
| Jr. Fellowship | 2. H. B. Patil      | 5. H. Malleshappa |
|                | 3. Subramanya Gudge | 6. G. D. Murgod   |
|                | 4. K. D. Udupudi    |                   |

**Plant Pathology :**

- |                    |                        |
|--------------------|------------------------|
| 1. S. H. Rakkasagi | 3. J. N. Mutalik Desai |
| 2. M. S. Kulkarni  | 4. Mr. Ganesh Bhat     |

**Seed Technology : Dharwad**

- |                  |                      |
|------------------|----------------------|
| 1. S. E. Nataraj | 2. M. M. Nyamagouder |
|------------------|----------------------|

**Chemistry & Soils : Hebbal**

- |                        |                  |
|------------------------|------------------|
| 1. H. M. Chidanandappa | 3. H. Puttaswamy |
| 2. K. G. Anand Naik    |                  |

**Animal Genetics & Breeding**

- |                 |                  |
|-----------------|------------------|
| 1. Pratap Kumar | 3. Krishna Reddy |
| 2. R. Raghavan  |                  |

**Veterinary Pathology :**

- |                    |
|--------------------|
| 1. M. V. Jagannath |
|--------------------|



## Veterinary Pharmacology :

- |                        |                   |
|------------------------|-------------------|
| 1. A. M. Chandrashekar | 4. Balakrishnarao |
| 2. Nair                | 5. R. N. Kamath   |
| 3. Ashok Kumar         |                   |
| 3. R. Medha Murthy     |                   |

## Dairy Technology :

- |                   |                    |
|-------------------|--------------------|
| 1. S. Ravikrishna | 3. Narasimh Murthy |
| 2. Krishna Prasad |                    |

## Fishery Biology :

- |                         |                   |
|-------------------------|-------------------|
| 1. S. M. Shivaprakasha  | 5. P. Sukumar     |
| 2. D. K. Narayana Reddy | 6. Honne Gowda    |
| 3. S. Dam Roy           | 7. M. Modiletappa |
| 4. Gangadhara Gowda     |                   |

## Fishery Oceanography :

- |                        |
|------------------------|
| 1. H. Venkatesh Prabhu |
|------------------------|

## Fish Processing Technology :

- |             |                         |                         |
|-------------|-------------------------|-------------------------|
| Sr. M.F.Sc. | 1. M. S. Satish         | 5. A. N. Devaraju       |
|             | 2. A. Ganapathy Bhat    | 6. U. Sankappa Shetty   |
|             | 3. T. N. Pratapachandra | 7. T. Seetharama Shetty |
| Jr. M.F.Sc. | 4. H. S. Veerappa Gowda |                         |

## Aquaculture :

- |                         |                        |
|-------------------------|------------------------|
| 1. B. S. Narayana Gowda | 7. James David         |
| 2. Iqbal Ahmed          | 8. K. Purandara Shetty |
| 3. N. Basavaraja        | 9. S. A. Viswa Menon   |
| 4. K. M. Renukaradhya   | 10. T. K. Beerappa     |
| 5. Sushantha Borthakur  | 11. M. M. Vijayan      |
| 6. A. N. Ravishankar    |                        |

## Aquatic Biology :

- |                         |                  |
|-------------------------|------------------|
| 1. Prabhudev            | 3. J. Shanmugha- |
| 2. S. Solomon Ravikumar | sundaram         |

**Completion of Degree Programme :**

The following students have completed their P.G. degree programme. The topics of theses are below :

<i>Name of the student</i>	<i>Topic of the thesis</i>
1	2

**Ph.D.****Agronomy**

1. Subhas K. Gumaste      Studies on intercropping of lucerne with hybrid cotton (Varalaxmi) and hybrid sorghum (CSH-5)
2. S. Panchaksharaiah      Investigations on the effect of nitrogen, iron, gypsum, sulphur and CCC on growth and yield of groundnut (*Arachis hypogaea* L.) and iron efficiency of genotypes on black soils under irrigation.
3. B. Sreenivas      Agronomic investigations on *Cajaharanthus roseus* (L.) G. Don - A crop prospect.
4. B. S. Goudareddy      Agronomic investigations on irrigated rabi sorghum (*Sorghum bicolor* (L) Moench).
5. B. Shivaraj      Effect of calcium and sulphur application on growth, yield quality of groundnut (*Arachis hypogaea* L.)

**Chemistry and Soils**

6. V. S. Doddamani      A study of forms of phosphorus, phosphate potential, Q/I relationship and sorption in relation to phosphorus availability in selected soils of Karnataka.

**Agricultural Entomology**

7. Osman Ahmed Zaghloul      Bioecology of *Earias vittella* (Fabricius) and assessment of losses in cotton due to boll worms.

1	2
8. C. A. Viraktamath	A generic revision of old world agallini
<b>Agricultural Extension</b>	
9. G. R. Desai	A critical analysis of the contribution of education and extension guidance to economic performance of cotton farmers of Karnataka State.
10. Nandineravanda Appanna Prakash	Studies on root parasitism and nutrition of sandalwood.
11. Umesh G. Nalawadi	Nutritional studies in some varieties of Marigold.
12. K. Gopi Kumar	Nature, causes and remedies for bronzing in guava.
13. Devinder Singh Cheema	Studies on improvement of chilles for resistance to anthracnose and cercospora leaf spot diseases.
14. Kasaram Parushotham	Studies on propagation of coffee bud cuttings.
15. H. N. Channabasappa	Studies on citrus rootstocks in relation to soil salinity.
16. K. V. Puranik Math	Yield and quality improvements of cowpea - A pulse crop as influenced by fertiliser and micronutrients.
<b>Plant Pathology</b>	
17. M. N. Lakshmikantha Sastry	Studies on species of Phytophthora affecting plantation crops in Karnataka with special reference to Koleroga of arecanut and wilt of black pepper.
18. K. Krishnappa	Studies on races of root-knot nematode in India with particular reference to Karnataka.
19. V. B. Bidari	Distribution and epidemiology of chilli viruses in Karnataka.
20. D. Nanje Gowda	Investigations on the efficacy of Antihelminth antibiotic in the control of root-knot nematodes.
<b>Agricultural Microbiology</b>	
21. H. N. Chanakya	Investigations upon changes in effluent and soil properties upon effluent infiltration.

1	2
<b>Crop Physiology</b>	
22. S. D. Choudhari	Variability in growth and yield attributes, photosynthetic rate and translocation in bunch genotypes of groundnut and their relation to productivity.
<b>Agricultural Botany</b>	
23. K. Virupakshappa	Evaluation of single seed descent, bulk and pedigree breeding methods in cowpea.
24. Riaz Ahmed Sheriff	Genetic divergence studies in foxtail millet.
<b>Veterinary Microbiology</b>	
25. J. Srinivasappa	<i>In vitro</i> effects of antiviral agents on rinderpest virus.
26. B. Janaki Rama Sarma	Immunological studies on allergens of house dust mites and their role in human and animal allergies.
<b>M.Sc. (Agri.)</b>	
<b>Agronomy</b>	
1. Nagaraju	Comparative study of the performance of different crops during summer in Visvesvaraya canal tract.
2. B. Doddahanumanthappa	Productivity of avare as influenced by varieties and fertility levels.
3. M. B. Guled	Effect of manuring and 2, 4-D on striga control in sorghum.
4. Y. N. Jayaram	Evaluation of different methods of surface irrigation and moisture regimes in finger millet.
5. S. G. Yellappa	Agronomic investigations on varietal spacing and manurial aspects of horsegram Verdc.
6. N. Nagaraja Rao	Studies on the effect of inoculation and nitrogen levels on the growth and yield of horsegram.
7. Shivayougi G. Mogali	Studies on some aspects of seed biology, auto-toxicity, allelopathy and chemical control of <i>Eupatorium adorum</i> L.

1	2
8. H. C. Puttaswamy	Effect of seed hardening of germination, initial vigour and seedling emergence of finger millet varieties.
9. Somashekara	Influence of soil fertility and harvesting time of intercrops on the growth and yield of dryland ragi.
10. M. G. Prasad	Intercropping in finger millet with soybean and lucerne.
11. G.C. Devendrappa	Studies on the effect of water regimes and urea on growth, yield and nitrogen uptake of rice in V. C. Command Area, Mandya.
12. A. B. Magadam	Effect of scheduling irrigation on growth and yield of pigeon pea genotypes in <i>rabi</i> season.
13. B. M. Chittanur	Effect of gypsum, sand and farmyard manure application and cultivation practices on the growth and yield of bunch type groundnut in black soil under irrigation.
14. B. N. Shamanur	Scheduling of irrigation to <i>rabi</i> hybrid maize ( <i>Zea mays</i> L.) in black soils of Malaprabha project.
15. K. Raja Rao	Growth, yield and quality of hybrid napier grass in association with forage legumes at varied levels of nitrogen and <i>Rhizobium</i> inoculation.
16. M. H. Hosamani	Crop canopy in relation to weed growth in legumes and screening of herbicides in cowpea.
17. Patil Mohan Hanamant	Comparative performance of redgram and castor as intercrops in groundnut with different row proportions.
18. V. V. Angadi	Effect of NPK and time of nitrogen application on the growth and yield of bunch type groundnut in black soil under irrigation.
19. K. H. Nagaraj	Effect of defoliation and nitrogen nutrition on growth, yield and grain leaf ratio in two genotypes of maize.
20. S. R. Katageri	Response of gram to different irrigation schedules and Na spray.

1	2
21. Shankaragowda B. Biradar	Performance of groundnut genotypes in relation to inter and intra row spacing on irrigated black soil.
22. S. B. Koni	A study on crop residues management in chilli production.
<b>Seed Technology</b>	
23. A. R. Nagaraja	Sorption and storage studies on redgram seeds.
24. M. Babu	Studies on solar heated air drying of hybrid sorghum (CSH-1) seed and the effect of drying parameters on seed viability.
25. V. P. Kalappa	Seed production studies in sweet pepper.
26. E. Khaleel Basha	Histological and histochemical studies in the viable and nonviable seeds of sunflower subjected to germination.
27. Syed Sadaqart Ahmed	Studies on seed-borne aspects of anthracnose of chillies caused by <i>Colletotrichum capsici</i> Butler and Bisby.
28. H. Narasimha Murthy	Comparative study on CS-3541-R-6 pollinator lines for seed yield and quality of sorghum hybrid CSH-5.
29. B. C. Channakeshava	Influence of seed sizes and seed treatments on growth and yield of CSH-5 sorghum hybrid.
<b>Agricultural Economics</b>	
30. R. P. Pratap Reddy	Economics of egg production around Bangalore.
31. G. S. Basavarajappa	Marketing of onion in selected markets of Karnataka.
32. E. Krishnaraja	An evaluation of investment in arecanut gardens in Dakshina Kannada district, Karnataka.
33. S. T. Satyanarayana	Economic analysis of Gobar Gas Plants in Chikmagalore District, Karnataka.
34. Honnaiah	Institutional investment finance for Agriculture : A study in Koratagere taluk of Tumkur district Karnataka.
35. Parameshwar K. Dixit	Supply response of groundnut in Karnataka : An econometric evidence.

1	2
36. H. Basavaraja	Supply response of cotton in Karnataka State : An econometric analysis.
37. M. M. Mailar	An economic analysis of soil conservation-A case study in Gadag taluk in Karnataka State.
38. K. Umar	An analysis of marketing of fish in South Kanara District.
39. B. S. Indu Sekharan	An economic analysis of ICDP in Dharwad district: Study of development programme impact.
40. H. R. Sudhakara	Impact of the Regional Rural Bank (Cauvery Grameena Bank) Finance on net farm returns and employment among marginal and small farmers in Mysore district, Karnataka.
41. Govinaray Narayan Nayak	Impact of credit on farm economy in Malaprabha Command Area, Karnataka State.

#### Chemistry and Soils

42. S. Narayana Reddy	Influence of graded levels of fertilizers on moisture use efficiency of ragi and maize under rainfed conditions.
43. R. S. Dodda Byregowda	Studies on efficacy of herbicides, their residues and their effect on soil nitrification under rice culture.
44. Shirni Nagaraja Kedlaya	Characterisation of soil zinc and response of paddy and maize to applied zinc in lateritic soils of Karnataka.
45. S. Narayana Reddy	Influence of graded levels of fertilizers on moisture use efficiency of ragi and maize under rainfed conditions.
46. V. Reddeppa Reddy	Effect of calcium, sulphur and boron on the yield and composition of sunflower.
47. Badrinath	Evaluation of modified Olsen's extractant for the determination of available phosphorus and potassium in base unsaturated soils of Karnataka.

1	2
48. K. Sudhir	Calcium-magnesium-potassium interrelationship in soils and crop.
49. N. K. Muruli	Genesis and classification of some red soils of Tumkur district, Karnataka State.
<b>Agricultural Entomology</b>	
50. Yeshetty Subhas	Efficacy of some insecticides on important insect pests of mulberry with special reference to the effect of insecticide residues on silkworm <i>Bombyx mori</i> Linnaeus.
51. H. N. Sattigi	Studies on the biology, chemical control of <i>Sitophilus oryzae</i> Linnaeus and <i>Rhizopertha dominica</i> Fabricius and residue analysis of insecticides.
52. K. N. Dayashankar	Performance of erisilks worm <i>Samia cynthia ricini</i> Boisval on different host plants and economics of rearing on castor under Dharwad conditions.
53. H. S. Krishna Murthy	Biology and morphology of <i>Diocalandra frumenti</i> and <i>in vitro</i> evaluation of four insecticides on adults.
54. B. N. Nagendra	Studies on soil microarthropod population in different habitats of Hebbal Campus.
55. Y. K. Kotikal	Studies on the pests of mulberry with special reference to the black headed hairy caterpillar.
56. M. Manjunatha	Dioecology and control of the spider mite <i>Tetranychus neocaledonicus</i> Andre on vegetables.
57. R. S. Giraddi	Studies on the biology and control of army worm <i>Mythimna separata</i> with special reference to the loss estimation in sorghum.
58. G. S. Indudhara Murthy	Evaluation of acaricides for toxicity to vegetable mite <i>Tetranychus ludeni</i> and its predator <i>Typhlodromips tetranychivarus</i> .
59. B. Mali	Interaction studies of <i>Tetranychus ludeni</i> Zacher with two predacious phytoseiids and development of a model.



1	2
60. H. N. Munisamaiah	Assessment of relative efficacy of four insecticides as grain protectants of redgram against <i>Callosobruchus chinensis</i> (Linnaeus) (Coleoptera : Bruchidae).
61. V. N. Patel	The role of Trichogramma egg parasitoid as a component in the integrated control of cotton bollworms, <i>Heliothis armigera</i> (Hubner) and <i>Earias</i> Spp.
62. K. P. Chinnaswamy	Studies on Aspergillosis of silkworm, <i>Bombyx mori</i> Linnaeus caused by <i>Aspergillus tamariix</i> Kita.
<b>Agricultural Extension</b>	
63. N. B. Patil	A study of factors associated with the knowledge and adoption behaviour of farmers in relation to recommended practices of Bidi tobacco cultivation in Nipani area of Karnataka State.
64. C. Kusumakara	Communication and management abilities of extension staff under A. E. P. in Karnataka.
65. M. Jothi	A study of the impact of the pre-service training of Agricultural Assistants in relation to T & V system and the training methods adopted.
66. V. Narasimha Reddy	Evaluation of the drought prone areas programme in Ponnai (West) watershed of Chittoor district, Andhra Pradesh.
67. K. S. Krishna	Development of a scale to measure the effectiveness of rural youth clubs and its application.
68. Dayanand N. Bidari	A study of some socio-economic and psychological characteristics of farmers as related to differential levels of fertilizer use in Dharwad taluk.
69. M. S. Nataraju	Relative influence of extension methods on knowledge, attitude and adoption of improved dairy management practices by small farmers, marginal farmers and agricultural labourers in Bangalore district.

1	2
70. K. T. Ramachandra	A study on use of visual aids by teachers of University of Agricultural Sciences, Bangalore
71. D. Nanjappa	Content analysis of agricultural information in selected Kannada dailies and farmers reading habits, preferences and suggestions.
72. B. Rajanna	Relative effectiveness of various combinations of radio, slide show and film show in dissemination of information on control of Uzi fly – an experimental study.
73. S. Sainath	A study on adoption behaviour and motivation pattern of grape cultivators in Bangalore district of Karnataka State.
74. B. Vittal	A study of job responsibilities and job satisfaction of Agricultural Assistants in Agricultural Extension Project of Karnataka.
75. G. Venkateshprasad	Job performance and job satisfaction of seed farm managers in Karnataka.
76. P. S. Geethakutty	An analysis of adoption of recommended rice cultivation practices, in relation to the understanding of principles and knowledge of procedures by the farmers and the extension workers.
77. K. C. Rama Shiva Reddy	A study on job perception, job performance and job satisfaction of Agricultural Assistants in Agricultural Extension Project in Karnataka.

#### Horticulture

78. Sreepathi Aravind Reddy	Effect of high density planting on growth, yield and biomass production in robusta banana.
79. B. Jayanthi	Effects of gibberellic acid on growth and flowering of China Aster.
80. Veerendra R. Patil	Studies on induction of vegetative growth and flowering in mango Alphonso and Pairi.
81. G. M. Mahadevaiah	Studies on flowering, fruit set and fruit development in 'Kalipatti' sapota.
82. T. R. Guru Prasad	Studies on systematic selection of jack-fruit types.

1	2
83. B. N. Sathyanarayana	Effect of growth regulators on veneer and wedge grafting of mango.
84. D.T. Shivanandappa	Studies on improvement of bottle gourd.
85. M. Vasundara	Some studies on uneven ripening and translocation of metabolites in 'Gulabi' grape.
86. P. N. Nagaraja Swamy	Studies on production of california wonder bell pepper in relation to fertilizer levels and spacings.
87. K. Umesha	Studies on the effects of nitrogen, phosphorus and potassium on growth yield and sennoside content in Indian Senna.
88. H. B. Lingaiah	Effect of precooling, waxing and prepackaging of field bean, bell pepper, carrot and tomat <sup>o</sup> on their shelf life and quality.
89. N. Basavaraja	Studies on hybrid seed production in brinjal.
90. M. R. Dinesh	Effects of certain growth regulating chemicals and time of pruning on bud burst in grapevine cv. Anab-e-shahi.
91. G. K. Mukunda	Studies on floral biology, fruit set and developmental changes in cacao.
92. K. M. Indiresha	Studies on the performance of open pollinated seedlings of jasmine.
93. K. E. Shekharappa	Effects of types of cuttings and IBA on the rooting of hardwood cuttings of pomegranate.
94. T. Manjunatha Rao	Studies on genetic variability and correlations in China Aster.
95. V. Chikkasubbanna	Effect of variety, maturity and season on composition and quality of musts and wines.
96. R. Narayana Murthy	Studies on systematic evaluation of productive pummelo of seedling types.
97. Shivayogi P. Jagali	Studies on regulation of vegetative flushes and flowering in mango.
98. C. T. Yeshoda	Cytotaxonomical studies in Indian dendrobiums (Orchidaceae).
99. A. C. Chandrashekara	Studies on growth and fruiting in sweet organ-ges ( <i>Citrus sinensis</i> ) and mandarins.

1	2
100. M. S. Angadi	Influence of different levels of nitrogen, phosphorus, potassium and farmyard manure on growth, yield and quality attributes on Betelvine cv. Ambadi.
101. C. M. Kala	Storage studies on mango.
102. Mahabaleshwar Hegde	Studies on effect of nitrogen, phosphorus and potassium on growth and yield of ambrette.
103. H. M. Venkatesh Murthy	Role of bio-regulants on development and chemical composition of gulabi grape.
<b>Plant Pathology</b>	
104. K. S. Panduranga Rao	Influence of host nutrition on the incidence of bacterial blight of cowpea.
105. H. Nagesh Prabhu	Studies on two isolates of <i>Xanthomonas bataticola</i> Patel, Kulkarni and Dhande causing bacterial leaf spot of betelvine and pepper.
106. I. S. Patil	Studies on leaf blight of barley caused by <i>Drechslera sorokiniana</i> Subram and Jain.
107. R. Rama Murthy	Studies on root rot of cotton caused by <i>Rhizoctonia bataticola</i> Butler.
108. Desai Suseelendra	Studies on stalk rots of maize in Karnataka.
109. Aspari N. Sudarsanarao	Estimation of crop loss in finger millet due to blast disease.
110. Chandrakant T. Hebbar	Studies on the leaf spot of tomato caused by Yamamoto.
111. P. H. Neelakanta	Studies on the seed borne aspects of brown spot of paddy caused by <i>Drechslera oryzae</i> Subram. and Jain, and blast of paddy caused by <i>Pyricularia oryzae</i> Cav.
112. Dayanand M. Mahalinga	Studies on grain mouldiness and stalk rot of sorghum caused by species of Fusarium.
113. E. Krishna Murthy	Studies on biochemical, histopathological and histochemical changes in cowpea plants due to infection by <i>Xanthomonas campestris</i> cv <i>vignicola</i> .
114. A. L. Uma	Studies on root-knot nematode, <i>Meloidogyne incognita</i> on winged bean, <i>Psodhocarpus tetragonolobus</i> (L) DC.

1	2
115. N. C. Nagaraj	Studies on horsegram yellow mosaic disease.
<b>Agricultural Microbiology</b>	
116. Sybil Ezra	Studies on <i>Serratia marcescens</i> isolated from food sources.
117. M. K. Shivaprakasha	Studies on the isolation and screening of N <sub>2</sub> fixing blue green algae from the paddy fields of Shimoga district.
118. K. S. Poonacha	Effect of growth regulators on oyster mushroom.
119. Varanasi Krishnamurthy	Microbial and chemical studies on the cultivation of oyster mushroom in paddy straw.
120. B. N. Muruleedhara	Microbial decomposition of <i>Azolla</i> in paddy soil under flooded condition.
121. Prabhu Desai A. Vishwanath	Bioefficiency, chemical and microbial changes in different substrates used for cultivation of oyster mushroom.
122. Jatinder Singh	Effect of glyphosphate on soil microflora.
123. Mridul Phadnis	Effect of using selected starter cultures on some of the B-Complex vitamins in Dahi and Shrikhand.
124. G. Krishna Kumari	Microbiological and chemical studies of substrates during the cultivation of oyster mushroom and their influence on the nutritional value of mushrooms.
125. M. I. Nanaiah	Influence of temperature and moisture on <i>Aspergillus flavus</i> to produce aflatoxin in wheat flour and its effect on the protein and carbohydrate.
126. S. K. Usha	Microbiology of pickles and their constituents.
127. Chaya Y. Kulkarni	Seed microflora on wheat and sorghum and its products in relation to the occurrence of facultative pathogenic bacteria.
128. M. G. Manjunatha	Intrinsic antibiotic resistance in <i>Rhizobium</i> species and inoculation response to a kanamycin resistant strain in groundnut.

1	2
<b>Crop Physiology</b>	
129. B. C. Patil	Physiological studies in Bidi tobacco as influenced by potash application.
130. A. G. Shankar	Chlorosis of rice seedlings in dry nursery the cause, its effect on growth and productivity and ameliorative measures.
131. S. P. Nataraju	Effect of low light intensity and nitrate availability on nitrate reductase activity in finger millet genotypes.
132. B.B. Channappagoudar	Physiology of crop-weed competition in irrigated <i>rabi</i> sorghum and wheat.
133. B. N. Ananda	Osmoregulation in genotypes of finger millet, groundnut and rice.
134. K. T. Prasanna	Effect of cytozyme on the growth and yield attributes of groundnut.
135. B. R. Gurumurthy	Desirable growth characteristics in relation to productivity in finger millet: 'A physiological analysis.'
136. T. C. Chame Gowda	Leaf area distribution at different canopy levels and its relationship with growth and productivity in finger millet genotypes.
137. Rajashekharappa V. Koti	Physiological studies on boll development and seed dormancy in some cotton genotypes.
138. Virupaxi P. Chimmad	Investigations on the physiological causes for seed deterioration and methods for improvement in greengram varieties.
139. Mechanda Muthappa Subbaiah	Leaf elongation and changes in bio-chemical constituents in genotypes of sorghum under stress.
<b>Agricultural Botany</b>	
140. Udayakumara Holla	Line $\times$ tester analysis of combining ability and heterosis in <i>Gossypium herbaceum</i> L $\times$ <i>G. arboreum</i> L. cotton.
141. M. S. Halalli	Studies on inheritance of resistance to shootfly in sorghum.

1	2
142. G. Nijaguna	Genetic analysis of harvest index and other yield attributes in three crosses of rice.
143. K.H.M. Nagabasavaiah	Genetic analysis of ten quantitative characters in $F_3$ generation of a seven-parent diallel set in sorghum.
144. K. M. Venkateshappa	Stability of yield, yield components and seed protein content in some elite cultivars of fox-tail millet.
145. B. Shivaprakash	Genetic analysis of yield and yield components in sesame.
146. P. Gopala Reddy	Studies on induced mutagenesis in sesame through gamma irradiation.
147. K. S. Jagadeesha	Effect of DDT on soil microorganisms, with special reference to nitrification.
148. M. N. Gennur	Cytogenetic studies in interspecific and intra-specific hybrids of <i>Gossypium herbaceum</i> and <i>Gossypium arboreum</i> .
149. T. D. Shankar	Genetics of yield and yield components in finger millet following generation mean analysis.
150. H. Dayakara Reddy	Genetic variability and association of morphological characters to the seed yield in little millet.
151. H. L. Nadaf	Genetic variability, diversity and correlation studies in groundnut.
152. M. K. Javali	A study of genetic variability, correlation coefficient, heritability, genetic advance, path coefficient analysis and selection indices of sixteen characters in cotton, <i>Gossypium hirsutum</i> L.
153. L. C. Veeresh	Studies on mutagenic response of winged bean to gamma rays.
154. S. T. Kajjidoni	Heterosis, combining ability and gene action for earliness, yield and yield components in $2 \times 10$ crosses of <i>Gossypium arboreum</i> L $\times$ <i>G. herbaceum</i> L. cottons.
155. M. H. Kamatara	Heterosis and combining ability in chickpea.

1	2
<b>Bio-chemistry</b>	
156. D. Hara Gopal	<i>In vitro</i> enzymatic hydrolysis of the storage proteins of Italian millet.
157. Abhay Kumar	Characterisation and digestibility of sunflower seed proteins and their interaction with phenolics.
158. T. Rajashekhar	Evaluation of check basin method of irrigation in red soils of Dharwad.
159. T.C. Channakrishnaiah	A statistical study on growth curves and growth models for broiler chicks of ML, RL and HL breeds.
<b>Home Science</b>	
<b>Foods and Nutrition</b>	
160. A. Padmakshi Nayak	Effect of germination on nutrient composition of cowpeas and mothbeans.
161. Bharati R. Byakod	Nutrient adequacy of diets served in hospitals of Hubli-Dharwad Corporation
162. B. Kasturi Ba	Effect of fermentation on thiamine and riboflavin
163. Rohini M. Jirlimath	Analysis of hostel diets as consumed by post-adolescent female boarders.
<b>Child Development and Family Relations</b>	
164. Sulochana S. Polisgoudar	A comparative study on the social and intellectual development of scheduled and non-scheduled caste school going children.
165. Ratna B. Gai	A study on the relationship between socio-economic factors and anthropometric measurements of new-born babies.
166. Uma B. Malipatil	A study on the knowledge and participation of rural women in child rearing practices.
167. Varalakshmi Rao	Development and nutritional evaluation of extrusion cooked ready-to-eat foods from jowar, wheat, horsegram and defatted sunflower seed meal combinations.



1	2
<b>Veterinary</b>	
<b>Animal Nutrition, Management and Products Technology</b>	
168. K. R. Mohanan	Associative growth and performance of starter organisms in fermented milk (DAHI)
169. V. G. Prasanna	Utilisation of soybeans in dairy cattle rations
<b>Gynaecology and Obstetrics</b>	
170. A. B. Arun Kumar	Studies on porcine ovaries.
171. V. Lakshmana Reddy	Studies on blood glucose, cholesterol, total proteins, ascorbic acid and inorganic phosphorus in cycling oestrus cows, anoestrus cows and anoestrus heifers.
172. S. R. Heranjal	Studies on certain biochemical composition and fractionation of seminal plasma and certain ingredients used in semen extenders.
173. M. A. Jawaz Ahmed Sheriff	Prenatal sex determination in buffaloes and cows.
174. S. K. Shashikumar	Studies on certain biochemical constituents in uterine secretions of buffaloes during pre-oestrus, oestrus, dioestrus and early pregnancy.
175. S. V. Chimulgund	Certain factors influencing fertility in mares.
<b>Medicine</b>	
176. K. Hanumanthajiah	Experimental rumen acidosis in buffalo calves.
177. M. Krishna Murthy	Studies on certain aspects of immune status and immunotherapy in bovine mastitis.
<b>Microbiology and Public Health</b>	
178. K. G. Ravikumar	Serological and bacteriological studies on ovine infectious infertility.
179. M. S. Ranganathan	Bacterial aetiology of piglet mortality in respiratory and intestinal tract infections.

1	2
<b>Veterinary Pathology</b>	
180. R. N. Sreenivas Gowda	Pathoepidemiology of <i>Lymphoid leucosis</i> in poultry and some aspects of pathogenesis on experimental <i>Myeloid leucosis</i> .
<b>Pharmacology</b>	
181. B. S. Narakesari	Influence of phenylbutazone on the pharmacokinetics of chlorthalidone in buffalo ( <i>Bubalus bubalis</i> ) calves.
182. R. V. Mirji	The effect of pregnant mare serum gonadotrophin (PMSG) on the pituitary gonadotrophin secretion and ovulation in the dairy cow.
<b>Animal Genetics and Breeding</b>	
183. Dinakar S. Desai	Cytogenetic studies on normal and malformed cattle.
<b>Surgery</b>	
184. B. Sridhar	Studies on diagnosis and treatment of experimentally induced metacarpophalangeal joint lameness in equines.
<b>Dairy Science</b>	
<b>Dairy Microbiology</b>	
185. R. A. Patil	Studies on the nutritional requirement and other characteristics of <i>Streptococcus thermophilus</i> .
186. R. Krishna	Studies on high somatic cell count milk in relation to its bacterial flora and its effect on the growth of starter cultures.
<b>Dairy Chemistry</b>	
187. C. Kempanna	Studies on the effect and inter-relationship of carotene and copper on oxidative stability of ghee.
188. S. Shekhar	Studies on the effect of dissolved oxygen in milk and milk products.

1	2
<b>Dairy Technology</b>	
189. R. Channura	Studies on the preparation of vegetable protein-based milk substitutes.
190. L. Mahalingaiah	Quality of cream and its influence on yield, shelf-life and quality of ghee.
191. Gopal Gowda	Studies on utilisation of sour milk for the manufacture of edible casing in commercial dairies.
192. B. V. Balasubramanyam	Preparation of recombined milk and its use in the manufacture of some dairy products.
193. A. R. Dhananjaya Murthy	Studies on the effect of stabilizer and emulsifier on mix properties and quality of soft-serve ice cream.
194. R. Bache Gowda	Studies on preparation and packaging of "Ready-to-use" cottage cheese based salads, dessert and dips to suit Indian conditions.
195. S. K. Mahadev	Studies on utilisation of market milk for manufacture of shrikhand.
<b>Poultry Science</b>	
196. C. Antony Chakko	Studies on the processing and preservation of duck meat.
197. K. A. R. Saldanha	Nutritive value of Kubabul in broilers.
198. B. V. Shivamurthy	True metabolizable energy values of selected feed stuffs in chicken.
<b>Fisheries</b>	
<b>Fishery Hydrography</b>	
199. C. K. Murthy	Combined toxicity of silver and copper on a few marine invertebrates and ecological monitoring of the inshore waters of the Arabian sea off Mangalore.
200. Hemanta Kumar Sahu	Studies on the circulation and hydrographic features of the estuarine and nearshore waters of Mangalore.

1	2
201. K. Gopala Reddy	Studies on the plankton of Mulki estuary in relation to hydrography.
202. E. G. Jayaraj	Studies on currents and some oceanographic factors in relation to fisheries of Mangalore.
203. Y.V. Raghunatha Reddy	Studies on the phosphorus cycle and its influence on the standing crop of plankton in the estuarine and nearshore waters of Mangalore.
<b>Fish Processing Technology</b>	
204. Krishna Chandra Dora	Effect of C. S. W. storage of sardine fish on the quality changes during frozen storage.
205. Lakshminatha Reddy	Development of a frozen product from minced fish meat.
206. K. R. Lokesh	Preparation of fish savings by hot smoking method.
<b>Aquaculture</b>	
207. N. V. Halinge	Evaluation of three terrestrial fodder grasses as feed for the grass carp.
208. M. C. Nandeesh	Effect of three different organic manures on the growth of cultivable carps.
209. K. R. Dinesh	Effects of fertilising fish ponds with poultry manure and varying doses of urea.
<b>Fishery Biology</b>	
210. N. Ramaiah	Observations on the bacterial diseases of farmed carps and the sensitivity of pathogens to a few drugs.
211. G. N. Kulkarni	Some biological aspects of <i>Scoliodon latieudus</i> Mull and Henle and <i>Carcharhinus limbatus</i> (Mull and Henle) with notes on the elasmobranch fishery of the Dakshina Kannada coast.

## 2. Agricultural College, Hebbal, Bangalore

Dr. K. S. Krishna Sastry continued to be the Director of Instruction (Agri) during the period under report.

*Teaching:* The academic year 1981-82 ended on 7-8-1982. The I trimester 1982-83 for III and IV year classes commenced on 20-9-1982 and ended on 22-1-1983. For II year and Postgraduate classes the first trimester commenced on 11-10-1982 and continued up to 29-1-1983. The second trimester for all the classes commenced on 14-2-1983 and is scheduled to close on 21-5-1983.

### Students strength

	Undergraduates		
	II Yr.	III Yr.	IV Yr.
B.Sc. (Agri)	162	238	160
B.Sc. (Hort)	25	43	34
B.Sc. (Agri Marketing and Coop)	30	25	19
	Postgraduates		
	Junior	Senior	
M.Sc. (Agri)	124	149	
M.Sc. (Hort)	13	15	
M.H.Sc.	5	2	
Ph.D.	35	60	

### Student Performances

One hundred and thirty six students who had completed the B.Sc. (Agri) degree from this College have been awarded the degree during the Annual Convocation held on 2-3-1983. Twentyfour students have been awarded B.Sc. (Hort) degree and 21 have been awarded B.Sc. (Agri. Marketing and Co-operation) degree, during the year. The performance of the Undergraduate students in their degree programme are as under.

A. G. P.	B.Sc. (Agri)	B.Sc. (Hort)	B.Sc. (Agri. Mark. and Coop)
3.50 to 4.00	28	5	7
3.00 to 3.49	52	7	7
2.50 to 2.99	29	7	2
Below 2.50	27	5	5
	136	24	21

Twentyone students have completed their Ph.D. degree while 83 students have completed the M.Sc. (Agri) degree from the various departments of this college during 1982.

The following students of the Agricultural College, Hebbal, were awarded Gold medal at the Seventeenth Convocation held on 2-3-1983 for their outstanding academic performance.

1. Dr. K. Pandu Sastry, Ph.D. in Agronomy
2. Dr. M. G. Chandrakanth, Ph.D. in Agril. Economics
3. Dr. M. Subhashchandra Bose, Ph.D. in Soil Science
4. Dr. K. Krishnappa, Ph.D. in Plant Pathology
5. Dr. M. Jayaramaiah, Ph.D. in Agril. Entomology
6. Dr. B. Mallik, Ph.D. in Agril. Entomology
7. Dr. K. R. Krishna, Ph.D. in Agril. Microbiology
8. Dr. Dutta Omprakash, Ph.D. in Horticulture
9. Mr. A. C. Shankara, M.Sc. (Agri) in Plant Breeding and Genetics
10. Mr. G. A. Aswathanarayana Setty, M.Sc. (Agri) in Plant Pathology
11. Mr. M. A. Narasaraj, M.Sc. (Agri) in Agril. Extension
12. Mr. G. S. Srinivasan, M.Sc. (Agri) in Agril. Extension
13. Mr. C. Kusumakara, M.Sc. (Agri) in Agril. Extension
14. Mr. C. K. Parthasarathy Prasad, M.Sc. (Agri) in Plant Pathology
15. Mr. M. K. Shivaprakash, M.Sc. (Agri) in Agril. Microbiology
16. Mr. V. P. Kalappa, M.Sc. (Agri) in Seed Technology
17. Mr. K. S. Sathyesha, I Rank in B.Sc. (Agri)
18. Mr. A. P. Anantha Kumar, II Rank in B.Sc. (Agri)
19. Mr. Ravikantha Mallaya, II Rank in B.Sc. (Agri)
20. Mr. B. N. Srinivasa Murthy, I Rank in B.Sc. (Hort)
21. Miss Lakshmi Jagannathan, II Rank in B.Sc. (Hort)
22. Mr. George Mathew, I Rank in B.Sc. (Agril. Mark. and Coop.)
23. Miss V. Meenakshi, II Rank in B.Sc. (Agril. Mark. and Coop.)
24. Mr. S. P. Ramamohan, B.Sc. (Agri)

*Earn while you learn scheme :* As part the of Agronomy practical, the students of III B.Sc. (Agri) have raised paddy, fodder maize and cowpea crops and have earned net profit ranging from Rs. 91 to 322. Graduate Assistantship were provided to Senior Postgraduate students in most of the Departments.

#### **Visitors**

1. Dr. A. John Knight, Director of Extension, TNAU, Coimbatore
2. Dr. Sumati Mulay, Scientist, IARI, New Delhi
3. Dr. H. N. Byra Reddy, Director of Extension, APAU, Hyderabad
4. Prof. A. G. G. Menon, Coordinator, NARP, Kerala
5. Dr. G. S. Sekhon, Director of Potash Institute, Govt. of India, New Delhi
6. Dr. M. C. Sarkar, Scientist, IARI

7. Dr. J. C. Katyal, Coordinator, Micronutrients Scheme, PAU, Ludhiana
8. Dr. Kishan Singh, Director, Sugarcane Research Institute, Lucknow
9. Dr. Morris R. Bonde, Research Plant Pathologist, U.S.D.A., Maryland, USA
10. Dr. Harrison, B. Scottish, Hort. Res. Institute, U.K.
11. Dr. D. S. Bhatti, Professor and Head, Dept. of Nematology, Hissar, Haryana
12. Dr. Jillian Galbriath, Dept. of Microbiology, Queensland, Brisbane, Australia
13. Prof. G. Pontecarvo, FRS, Imperial Research Fund, London
14. Dr. W. J. Rennie, Seed Pathologist, Dept. of Agri. and Fisheries, U.K.
15. Dr. Scarlett Epstein, Prof. of Sociology and Rural Dev., University of Sussex, U.K.
16. Mr. V. Sarafis, Senior Lecturer in Biology, Hawkebury Agricultural College, Richmond, N.S.W., Australia
17. Dr. P. Perrino, Head, Mediterranean Germplasm Bank, Bari, Italy and UNDP Consultant
18. Dr. Canaray L. Powell, UNDP/FAO Consultant, New Zealand
19. Dr. J. V. Smithson, Chickpea Breeder, ICRIAT, Hyderabad
20. Dr. P. N. Bahl, National Fellow (Chickpea), Division of Genetics, IARI, New Delhi
21. Dr. Henry M. Munger, UNDP Consultant and Professor of Plant Breeding and Veg. Crops, Cornell University, Ithaca, New York
22. Dr. Pierre Mayleon, Dr. Tacquer Hevt, Dr. Pierre Dupug and Jean Delort Laval, French Delegation from French National Institute of Agronomic Research
23. Dr. M. V. Rao, Deputy Director General (Crops), ICAR, New Delhi
24. Mr. T. G. Chandrasekharaiah, Chairman and Managing Director, Karnataka Cashew Development Corporation, Mangalore
25. Dr. C. R. Muthukrishnan, Dean, Faculty of Horticulture, TNAU, Coimbatore
26. Dr. P. K. Gopalakrishnan, Associate Dean, College of Horticulture, Kerala Agricultural University, Trichur, Kerala
27. Dr. Noel G. Mamicpic, Projector Director, International Training Programme on Seed Technology, Laguna, Philippines
28. Dr. R. C. Mobesa, Asst. Professor (Vegetable Crops) College, Laguna, Philippines
29. Dr. S. S. Virmani, Plant Breeder, IRRI, Manila, Philippines
30. Dr. Siddiqui, Coordinator, NSP, IARI, New Delhi
31. Dr. D. V. Seshu and Dr. Garrity, IRRI, Philippines
32. Dr. William John Rellie, Seed Pathologist, Department of Agriculture and Fisheries, East C' Scotland, Edinburg, E-H-128 NJ

33. Members of the Ford Foundation.
34. Dr. Peter J. Wood, Member of the World Bank team.

### ***Seminars and Symposia***

The Department of Agricultural Botany, Hebbal, under the auspices of the Agricultural Botany Association, organised a symposium entitled 'Sir Charles Darwin Memorial Lectures' on 16-4-82.

The Department of Agricultural Extension organized the following seminars during the year.

- i) Seminar on use of Urea Supergranules
- ii) Seminar on Rural Development
- iii) Seminar-cum-workshop on T & V System
- iv) Seminar on Objective Type Questions Setting

### ***Participation in International Seminars/Workshop***

1. Dr. D. Rajagopal, Assistant Professor of Entomology, attended the workshop on Photoreception and Vision in Invertebrates at Bishop's University, Lennoxville, Canada from 11-7-82 to 26-7-82. He also attended the 9th International Congress on Social Insects at the University of Colorado, UAS from 8-8-82 to 14-8-82.

2. Dr. G. K. Veeresh, Senior Professor of Entomology, attended the 8th International Symposium on Soil Zoology from 29-8-82 to 4-9-1982 at Louvain-La Neuve, Belgium.

3. Dr. C. A. Virakthamath, Associate Professor of Entomology attended the International Conference on Bio-Taxonomy at London.

4. Dr. K. R. Thimmaraju, Associate Professor of Horticulture has been deputed to undergo training in Horticulture at Washington, USA, under UNDP/FAO programme from 15-3-1983 to 13-6-1983.

5. Dr. K.G. H. Shetty, Professor of Plant Pathology and Dr. K. Krishnappa, Asst. Professor of Plant Pathology attended an advanced and intensive training course on root knot nematodes at Raleigh, USA.

K. S. KRISHNA SASTRY  
Director of Instruction (Agri)  
Hebbal



### 3. College of Agriculture, Dharwad

#### Students strength

	B. Sc. (Agri.)	B. Sc. (Agri. Mark & Coop).
I Year	135	19
II Year	110	19
III Year	106	21
IV Year	108	16
Repeaters	21	1

#### Students performances

- i) No. of students completed their degree programmes.

B. Sc. (Agri.)	84
B. Sc. (Ag. Mark & Coop.)	26

- ii) The following students secured first five places in B. Sc. (Agri.) :

	CGPA
1. Mr. Digambarappa P. Biradar	3.98
2. Mr. B. L. Dinakar	3.96
3. Mr. Siddappa D. Biradar	3.95
4. Mr. Shankar G. Hegde	3.93
5. Mr. Siddaraya D. Sayagavi	3.92

- iii) The following students secured first three places in the B.Sc. (Ag. Mark & Coop) :

1. Mr. S. B. Mahajanashetty	3.98
2. Mr. S. M. Gorbai	3.88
3. Mr. B. K. Alagwadi	3.72

*Earn while you learn Scheme:* Most of the PG students of Agricultural Economics Department are being engaged on daily wages in the economic surveys and analysis of the data of the research projects undertaken by the department.

Three students of Crop Physiology Department earned in the CADA-TBP scheme on chemical weed control and other Adhoc schemes while they were pursuing P. G. courses.

#### Visitors

1. Dr. Thomas S. Walker, Scientist, ICRISAT, Hyderabad visited on 7-7-1982 and 18-1-1983.
2. Dr. H. S. Gopala Rao, Director, Institute of Development, University of Mysore, Mysore visited on 9-8-1982.

3. Dr. C. H. Shah, Professor, Emeritus, University of Bombay, Bombay visited on 10-12-1982.
4. Dr. G. S. Kori, Economist, USDA visited on 28-12-1982.
5. Late Dr. H. R. Arakeri, Chairman, ASRB, New Delhi visited the Department of Crop Physiology and inguarated the Crop Physiology Club on 9-7-1982.
6. Two Chinese Scientists visited the department on 21-9-1982.
7. Dr. A. B. Joshi, Vice-Chancellor, Mahatma Phule Krishi Vidyapeetha, Rahuri also visited.
8. Professor Santisappa, Vice-Chancellor, Madras University visited the campus on 24-12-1982 and 25-12-1982.

#### **Seminers/Symposia**

- 1) Soil Science Department organised a seminar on Concept of NARP.
- 2) Crop Physiology Department organised special lectures by the staff members for the benefit of the students appearing for the All India Competitive Examinations such as IAS, IFS and ICAR fellowships.

The Crop Physiology Club, Dharwad was inaugurated by late Dr. H. R. Arakeri, Chairman, ASRB, New Delhi on 9-7-1982.

An educational tour to ICRISAT, APAU, CPPARTI, AICRIP and IARI centre at Hyderabad was conducted for the benifit of postgraduate students.

R. B. PATIL  
*Director of Instruction (Agri)*  
*Dharwad*

#### **4. Veterinary College, Hebbal**

The year 1983 forms the Silver Jubilee year of the Veterinary College having completed its 25 years of its existence.

#### **Students strength**

Undergraduate					Postgraduate	
I yr.	II yr.	III yr.	IV yr.	V yr.	I yr.	II yr.
106	78	85	94	85	65	58

### ***Students performances***

The academic performance of the students during the year is quite satisfactory.

### ***Visitors***

1. Lady Nott, Wife of Rt. Hon'ble John Nott, Secretary of Defence, U.K.
2. Dr. B. B. Mallick, Professor of Eminence, IVRI, Izatnagar.
3. Dr. G. Harish, Veterinary Practitioner from USA.
4. Dr. Rolf Carlsson, University of Lund, Lund, Sweeden.

### ***Seminars, Symposium and Training Programmes***

1. The staff of the Veterinary College participated in the Scientific session of the Animal Feed Challenge for the 1980s organised with the cooperation of the Combined Livestock Food Manufacturer's Association. The session was inaugurated by the Hon'ble Minister for Animal Husbandry.

2. A training programme in "Zoonosis" was conducted in the College for Medical and Veterinary Scientists of four southern states, namely Karnataka, Kerala, Tamil Nadu and Pondichery. Several scientists from UAS, Institute of Animal Health and Veterinary Biologicals, IVRI, Nimhans, St. John Medical College, Bangalore and Medical College, Bangalore, participated. The training programme was inaugurated by Dr. Narayana Reddy, Director, NIMHANS.

3. An orientation programme in Animal Nutrition for final year B.V.Sc., students was arranged with the help of Combined Livestock Food Manufacturer's Association.

4. A short term course of 10 days duration in Physiopathology of Reproduction was organised for the benefit of the field officers of the State Department of Animal Husbandry and Veterinary Services. Six officers participated in the training programme.

5. A training programme in Poultry was conducted for the officers of Commercial Banks for a period of 10 days. 24 Extension Officers participated in the training programme.

K. TRIVIKRAMA RAO  
Director of Instruction (Vety)  
Hebbal

### 5. College of Fisheries, Mangalore

The academic year 1982-83 commenced on 29-9-1982 for III and IV B.F.Sc. and on 11-10-1982 for I and II B.F.Sc. and Jr. M.F.Sc. and Sr. M.F.Sc. classes. Offering courses to I B.Sc. students was started in the college for the first time in 1982-83 since I B.F.Sc. class was shifted to this campus during the period under report.

During the academic year, 23 students were admitted at Mangalore to the first year of the postgraduate programme, 15 for Fish Production and Management and 8 for Industrial Fishery Technology.

The class-wise break-up is follows :

Ph.D.	..	1	Final year B.F.Sc.	..	38
Senior M.F.Sc.	..	21	Third year B.F.Sc.	..	25
Junior M.F.Sc.	..	23	Second year B.F.Sc.	..	35
			First year B.F.Sc.	..	40

#### Students performances

Eighteen students completed their B.F.Sc. degree programme at the end of the academic year 1981-82, while another 2 students completed the same at the end of I trimester of 1982-83. 7 candidates completed their M.F.Sc. programme during 1981-82, while another 4 completed the same during I trimester 1982-83.

Break-up of students who were placed on academic probation during the year is as under :

Class	I trimester 1981-82	II trimester 1981-82	III trimester 1981-82
III B.F.Sc.	1	1	-
IV B.V.Sc.	5	4	5

*Student counselling:* 23 teachers were involved in student counselling programme during the year.

*Gold Medal for outstanding merit during 1982-83:* Mr. James David and Mr. S. Krishnamurthy, were awarded UAS gold medals for outstanding performance in B.F.Sc. degree programme of 1982-83.

*Appointments/Nomination to Expert Committee, Academic Bodies:* Professor H. P. C. Shetty, Director of Instruction (Fisheries) was appointed/nominated to the following bodies during the period under report.

1. Member of the Quinquennial Review Team of the Central Institute of Fisheries Education, Bombay constituted by the ICAR.
2. Member of an ICAR Accreditation Team to examine the establishment of College of Fisheries, Gopalpur On-sea, under Orissa University of Agriculture and Technology, Bhubaneswar.
3. Member of an ICAR Accreditation Team for College of Fisheries at Ratnagiri, under Konkan Krishi Vidyapeeth, Dapoli.
4. Member of ICAR's Quinquennial Review Team for Central Inland Fisheries Research Institute, Barrackpore.
5. Served on the Selection Committee of Agricultural Scientists' Recruitment Board on 9th and 10th August 1982 at New Delhi.
6. Nominated to the reconstituted Scientific Panel for Fisheries and Agricultural Education for a period of 3 years from 1-3-1982.
7. Served as an Expert Member for the selection of various posts in Teaching/Research/Extension in the discipline of Fisheries Science on 24-8-1982 for Andhra Pradesh Agricultural University's Veterinary Science Faculty.

#### **Visitors**

1. Mr. Kapu Sanjiva Shetty, M.L.A. and Member, Board of Regents, UAS, visited the various departments of the College on 12-4-1982.
2. Mr. C. Ramdas, IAS, Commissioner and Secretary, Education Department, Government of Tamil Nadu and Dr. K. Venkatasubramaniam, Director of School Education and Chairman, Board of Higher Secondary Education, Tamil Nadu met the Director of Instruction (Fisheries) on 24-4-1982 and sought his help in planning Vocational Education in Fisheries in Tamil Nadu.
3. Dr. S. V. Patil, Director of Instruction (PGS) visited the College on 4-5-1982.
4. Mr. R. Rajagopal, Correspondent of 'Caravan' came to the College on 25-5-1982 for collecting information about the College for an article.
5. Mr. A. D. Adigun, Fisheries Officer and FAO trainee from Nigeria visited on 4-8-1982.
6. Dr. D. N. F. Hall, Chief, Fisheries Division, Overseas Development Agency, Ministry of Foreign Affairs, U.K. was at the College from 14-8-1982 to 17-8-1982.

7. Dr. Aug Kok Jee, Dean, Faculty of Fisheries, Universiti Pertanian Malaysia, Malaysia visited on 30-8-1982 and 31-8-1982.
8. Two U.N. volunteers, Mr. Santiago Bertuman from Philippines and Mr. S. H. Yoset Susanto from Indonesia went round the College on 6-9-1982 and 7-9-1982.
9. Mr. R. V. Swaminathan, Minister of State for Agriculture, Government of India visited on 15-9-1982.
10. Mr. Veerappa Moily, Minister for Finance and Tourism, Government of Karnataka, also visited on 15-9-1982.
11. The Fisheries Minister of Kerala went round the College on 25-9-1982.
12. Dr. B. Misra, Vice-Chancellor, Orissa University of Agriculture and Technology, Bhubaneswar visited on 25-9-1982.
13. Dr. Dutt, Member, ICAR Quinquennial Review Team, visited the various departments of the College on 25-10-1982.
14. A FAO team consisting of Scientists and Fish Processors visited the College on 29-11-1982.
15. Dr. Dickson, Gear Technologist from U.K. who visited the College on 29-11-1982 gave a talk on Gear Technology.
16. Eight Laotian Officers were in the College from 2-12-1982 to 5-12-1982 collecting information on various aspects of Fisheries, including Extension.
17. Dr. N. G. Perur, Vice-Chancellor, UAS, visited the various departments of the College on 14-12-1982 for inspection.
18. Shri S. D. Tripathi, Scientist S-3 and Project Co-Ordinator, Composite Fish Culture and Fish Seed Production, CIFRI, Dauli went round the various departments of the college on 31-12-1982. He also gave a talk in the area of his specialisation.
19. Dr. T. A. Mammen, Fisheries Development Advisor and Ex-Officio Secretary to the Government of Kerala and Mr. P. S. Kumardas, Director of Fisheries, Government of Kerala visited the College on 1-2-1983.
20. Dr. S. V. Patil, Dean, UAS, visited the various departments of the College for inspection on 7-2-1983.
21. Mr. A. T. Marsiott, Senior Lecturer, Department of Management and Business Studies, Grinspy College of Technology, U.K. was here from 21-2-1983 to 4-3-1983, in connection with the Workshop on Fishery Economics held at the college.

22. A group of 10 progressive fishermen accompanied by two officers from Gujarat who came for studying fishery activities in Dakshina Kannada visited the college on 7-3-1983.
23. Dr. K. C. Jayaram, Joint Director, Zoological Survey of India visited the college on 10-3-1983.
24. Mr. A. A. H. Moss, a Pollution Expert from U. K. visited the college on 29-3-1983 and gave a talk on "Problems of Aquatic Pollution in U.K".

#### **Seminar**

A two-day State level seminar on "Strategy for Fisheries Research in Karnataka" was held at the College on 17 & 18-5-1982. Dr. N. G. Perur, Vice-Chancellor, UAS inaugurated the Seminar. Dr. K. Krishnamurthy, Director of Research, UAS presided. The gathering was welcomed by Prof. H. P. C. Shetty, Director of Instruction (Fisheries), while Dr. K. V. Devaraj, Chief Scientific Officer (Inland Fisheries) proposed the vote of thanks.

A two-day Seminar on "Economic Evaluation of Purse-Seining Industry in Karnataka" was organised at the College in collaboration with the FAO on 27 & 28-7-1982. The seminar was inaugurated by Mr. M. Jayaraj, Director of Fisheries, Government of Karnataka. Prof. H. P. C. Shetty, Director of Instruction (Fisheries) presided. The Chief Guest spoke on the progress made in the fish catches of the State following the introduction of purse-seines. The three technical sessions were conducted by Mr. Keith Haywood and Mr. Chris Curr of Sea Food Industries Authority, U. K. through computer modelling. The Plenary Session was chaired by Mr. David James, Coordinator, Small Pelagic Project, Fish Utilization and Marketing Service, Fishery Industries Division of FAO.

A two-day workshop on "Fisheries Economics" was held at the College on 27 & 28-2-1983. The Workshop was organised in association with the Overseas Development Administration, U. K. Mr. S. K. Amin, Chairman, Karnataka Fisheries Development Corporation, inaugurated the Workshop. Mr. M. Jayaraj, Director of Fisheries, Government of Karnataka presided. Prof. H.P.C. Shetty, Director of Instruction, College of Fisheries, welcomed the gathering. Mr. A. T. Marriott, Senior Lecturer, Grinsby College of Technology, U. K. who was instrumental in organising the workshop, presented technical papers.

Director of Instruction,  
College of Fisheries,  
Mangalore

H. P. C. SHETTY  
Director of Instruction.(Fisheries),  
Mangalore

### 6. College of Rural Home Science, Dharwad

#### Students Strength

Class	III trimester 1981-82	I trimester 1982-83	II trimester 1982-83
<i>Undergraduate :</i>			
I year	26	27	25
II year	27	26	26
III year	27	20	20
<i>Postgraduate :</i>			
Junior M.Sc.	6	9	9
Senior M.Sc.	9	6	6

#### Earn while you learn :

1. Hostliers are maintaining two dairy cows as a project.
2. One batch of students reared 200 broilers.

LEELA PHADNIS

Director of Instructson (Home Science)  
Dharwad

### 7. Agricultural Engineering Institute, Raichur

The academic year started on 20-9-1982 for the Institute with the starting of the I trimester.

#### Students Strength

Class	III trimester 1981-82	I trimester 1982-83	II trimester 1982-83
I year DAE ...	17	20	20
II year DAE ...	14	17	17
III year DAE ....	21	25	23

#### Students Performance

In all 86 courses amounting to 236 credit hours including repeat courses were offered during the year. 14 students successfully completed the diploma during the year.

The class-wise break up of the students on the basis of their CGPA is detailed below :

CGPA	III trimester 1981-82			I trimester 1982-83		
	I	II	III	I	II	III
4.00	—	—	—	—	—	—
3.00 to 3.99	2	5	4	3	2	6
2.00 to 2.99	6	3	13	4	7	7
Below 2.00	9	6	4	13	8	12



Fourteen students successfully completed the diploma during the year

#### **Visitors**

1. Mr. V. B. Balasubramanian, Divisional Commissioner, Gulbarga and Administrator, UKP, CADA
2. Mr. Maruthi D. Male, Member, Board of Regents, UAS, Bangalore
3. Mr. Halappanavar, Member, Board of Regents, UAS, Bangalore

Seminar on teaching methodology was conducted for the benefit of new teachers, where the following topics were presented and discussed.

1. Philosophy of trimester system and internal evaluation
2. Question construction in trimester system
3. Techniques of evaluation in trimester system
4. Audio-visual aids to teaching.

Following three equipments developed at this Institute were released by the State Level Release Committee.

- a) Power operated groundnut pod plucking machine
- b) Adjustable blade hoe
- c) Power tiller operated blade borrow

A research project on "Development of Land Formation Equipment" has been sanctioned to the Institute for one year period with financial assistance of Rs. 3,07,000.

Dr. N. L. Maurya, the Principal of the Institute has been nominated as Member of Re-constituted Scientific Panel of Agricultural Engineering (ICAR) for a period of three years from April, 1982.

N. L. MAURYA  
*Principal*

#### **3. College of Basic Sciences and Humanities, GKVK, Bangalore**

The academic year 1982-83 for the College of Basic Sciences and Humanities (BSH) began on 11-10-1982.

**Students Strength**

Degree Programme	Students on rolls (March 83)
B.Sc. (Agri)	197
B.V.Sc.	119
B.Sc. (Hort)	41
B.Sc. (Ag. Mark. & Coop.)	19
B.Sc (Dairy Tech.)	21
B.Sc. (Sericulture)	19
M.Sc. (Agril. Biochemistry)	1
M.Sc. (Agril. Statistics)	2

Only one foreign student from Iran was on the rolls.

During the month of July, 82 on account of students' strike the College of BS&H was closed from 22-7-82, and it reopened from 9-8-82. An appeal was issued to the parents of the students explaining them the circumstances that led the University to closure of the College and requested them to persuade their lads to return to classes.

Under U.G.C. sponsored Indo-Syrian Cultural Exchange programme the Director of Instruction (BS&H) visited Syria for a period of six weeks from 25-4-82.

A seminar on Strategy for Research and Research Management in Basic Sciences and Humanities was organised on 4 & 5-2-1983 when the Vice Chancellor, Director of Research and other officers of the UAS participated along with the teachers of the BSH Faculty from Bangalore, Dharwad, Raichur and Mangalore.

Mr. T. Rudrappa, Asst. Professor of Chemistry presented a paper at the Symposium on "Medicinally important compounds from wild growing plants" at Himachal Pradesh University, Simla, during October, 1982.

Dr. G. Nagendrappa, Assoc. Professor of Chemistry presented a paper at the Symposium on "Heterocyclic and Organometallic Chemistry" at Karnatak University, Dharwad during December, 1982.

Dr. N. Sundararaj, Professor of Statistics and Mr. L. Siddappa, Assistant Statistician, AICRP for Buffaloes attended VI Conference of Research

Statisticians at New Delhi in October, 1982. In this conference Dr. N. Sundararaj, presented a paper.

Mr. E. Vasantha Kumar, Asst. Professor. of Statistics, attended a Seminar on 'Stochastic Models' at Karnataka University, Dharwad in December, 1982.

The teachers of the Department of Sociology attended XVI All India Sociological Conference at Chidambaram during December, 1982; National Seminar on Rural Development - ISEC in November, 1982; a Seminar on Religion and Secularism - Indian perspective at Gandhibhavan, Bangalore and a National Conference at Ecumenical Centre, Bangalore on Nationalism in crisis in April, 1983.

Mrs. S. Parvathamma, Instructor in Mathematics attended the ISTAM Conference at Calcutta in December 1982 and presented a paper.

Mr. M. R. Lakshminarayana, Instructor in Physics attended XIV Annual Symposium of AMRS at Indian Institute of Science, Bangalore in January, 1983 and presented a paper.

Mr. M. Rangappa, Asst. Professor of Biology, Virginia State University, Petersburg, delivered a talk on germplasm collections and seed production programmes of UASDA in Cabbage, Beans and Soyabeans on 3-1-1983.

R. NARAYANA

*Director of Instruction. (BS & H)*  
GKVK

### C. University Library

We live in a multimedia world and we expect the library also to reflect man's knowledge by making readily available its resources and services in all formats in which it has been recorded.

Library, on its part is attempting to satisfy this demand by expanding its activities to serve the varietal information needs of a even more varied clientele. This transition from traditional static library to the present dynamic institution is not easy. Budget needs are greater but available funds are often less. This pinch was felt during this year also. The number of titles added to the collection was meagre and no new journals could be subscribed. On the other hand 30 journals were dropped from the list and 20 journals were kept in abeyance from renewing for 1983.

On the other hand, there was a steady increase in the number of readers using the library. This could be seen from the tables which provide the statistical data of the facets of the University Library and other campus libraries.

Special care is being taken to develop the Research Station libraries on the lines of the University Library. So far, seven research station libraries have been organised and basic library records are built up. This programme will be extended to other research stations in the coming years in a phased manner.

*Library Sub-committees:* The Library Sub-committee at GKVK continued to play an important role in assisting the University Librarian to build a meaningful and multidimensional library collection. The Committee met four times during the year to review the indents received from the various faculties at Hebbal and GKVK campuses. It recommended such titles that would enrich the collection and would be of use over years.

The Library Sub-committees of other teaching campuses, viz., Dharwad, Mangalore and Raichur met periodically under their respective Chairman. The approved lists of books and journals were received in the University Library for further formalities.

*Acquisition:* At Centerl Library, about 1854 titles of books were recommended by various faculties. While screening these recommendations, 350 titles were deleted as they were already available in the Library, 1504 titles were placed before the Library Sub-committee for perusal and recommendation. The Committee approved 1458 titles and rejected 46 titles.

*National Agricultural Research Project (NARP):* The I. C. A. R. made available special grants of Rs. 2 lakh 10 thousand for strengthening the Library facilities of the NARP Sub-Projects at Bijapur, Bidar, Mudigere, Naville (Shimoga), Brahmavar (Mangalore) and Nagamangala.

Accordingly, lists of recent books were made available to these NARP Centres for perusal and selection. The selected titles were ordered after obtaining the final approval of the Director of Research.

*Details of additions to the University Library, GKVK and Hebbal campuses*

Sl. No.	Particulars	Year 1981-82	Year 1982 83
1.	Purchase	1825	1656
2.	Gift	234	457
3.	Pamphlets	298	300
4.	Dissertations/Theses	174	151
5.	Microfilms/Photocopies	9	—
6.	Bound periodicals	582	991
7.	Maps	—	3
Total		3122	3558

*Spectrum of the University Library collection at GKVK and Hebbal campuses*

Sl. No.	Particulars	Year 1982-83
1.	Books (including bound periodicals)	96,929
2.	Pamphlets (including standards)	8,263
3.	Dissertations/Theses	1,289
4.	Reports	5,985
5.	Microfilms/Photocopies	66
6.	Maps	54
7.	Microfiche	166
		<hr/> 1,12,752 <hr/>

**Text Book Bank :** The Text Book Bank at Hebbal campus continued to be the most sought after collection by the students of all courses. The particulars of the activities of this section are noted below. For want of funds its resources could not be strengthened further.

Sl. No.	Particulars	1981-82	1982-83
1.	Total collections	1107	1107
2.	No. of members	175	341
3.	No. of books issued	345	372
4.	Amount collected and remitted	Rs. 1,035	Rs. 1,116

**Text Book Bank for BC & M :** The District Officer for Backward Classes and Minorities, Bangalore (Urban) District, released Rs. 25,500 for the establishment of a separate Book Bank for the benefit of Backward Classes and Minorities students of the University.

One hundred thirty titles were recommended by various faculties to be procured in multiple copies for this Book Bank. Of these, 277 volumes were added during the year forming a nucleus of the BC & M Book Bank. It is proposed to improve this collection from the beneficial grants of the State Government for this purpose.

**Gifts :** As in earlier years, the Library continued to receive a number of publications magnanimously donated by the national and international institutions. Some of the important donations are noted below :

- |    |  |    |
|----|--|----|
| 1. | US Educational Foundation in India (USEFI), New Delhi                        | 15 |
| 2. | International Rice Research Institute (IRRI), Manila                         | 10 |
| 3. | Directorate of Sericulture, Bangalore<br>(FAO Manual - Mulberry Cultivation) | 50 |

4. National Productivity Council, New Delhi (books and journals)	28
5. International Labour Organisation (ILO), Bangkok	4
6. Agricultural Development Council (ADC), Bangkok	10
7. Lions Club of Hebbal	15
8. ICRISAT, Patancheru	10
9. Tropical Products Institute, London	5

*Membership and use of the Libraries at GKVK and Hebbal Campuessq:*  
Circulation Section is the nerve center of the activities of the Library. This section looks after the membership enrolment of staff and students, issue and return of books, arranging reservation of books loaned out and issuing of 'No-due' certificates. It also arranges to borrow/lend books on inter-library cooperation.

*Membership of University Library from 1-4-1982 to 31-3-1983*

Sl. No.	Particulars	Potential			Actual		
		1980-81	1981-82	1982-83	1980-81	1981-82	1982-83
1.	B.Sc. (Agri)	897	878	827	623	679	753
2.	B.Sc. (Hort)	150	150	151	80	112	131
3.	B.Sc. (Ag.Mark. & Coop)	98	98	91	58	82	70
4.	B.V.Sc.	496	543	545	346	305	438
5.	B.Sc. (D.T)	17	36	57	15	34	53
6.	Postgraduates	434	447	448	319	415	338
7.	Ph.D.	82	111	97	65	81	77
8.	B.Sc. (Sericulture)	—	—	19	—	—	16
9.	Staff	—	—	—	742	776	870
Total					2248	2484	2746

*Technical Section:* During the year, 2193 titles comprising of 2512 books were classified and catalogued. The progressive total of titles and books so far classified and catalogued are 46,547 and 55,654 respectively. During the year, 6700 catalogue cards were prepared, typed and merged at GKVK and Hebbal campus library catalogues. The Section also prepared 2180 shelf list cards and merged in the shelf catalogue.

*Periodicals Section:* Even though the Library Sub-Committee had approved 12 new titles for subscription, none could be subscribed for want of funds. On the other hand, the raising cost of subscriptions coupled with stringent budget situation compelled the Library to drastically cut down the number of journals already being subscribed. 30 journals were dropped from the subscrip-

tion list from 1983, while 20 titles are kept in abeyance from renewing for 1983. These will be renewed if the financial position improves during 1983-84.

*Details of journals received by the University Library*

Category		As on 31.3.82	As on 1.4.83
I.	1) Subscription	1011	971
	2) Gift	220	180
	3) Exchange	210	160
		1441	1,311
II.	No. of issues received	13,756	18,203
III.	No. of reminders sent	647	1,695

On account of increase in the cost of production, postage etc., several institutions that were earlier mailing their publication on gratis or exchange have insisted on subscription instead of free supply. One notable among such institutions is the U. S. Dept. of Agriculture, Washington.

Because of the inordinate delay in the publication of Mysore Journal of Agricultural Sciences, several of the institutions on exchange list for MJAS are not mailing their journals on exchange basis.

991 volumes of journals were got bound during the year.

**Reports Section** : This Section continues to be in much use by the PG and Ph. D. students and scientists alike. The scientific and technical reports of several Indian and foreign institutions and organisations, theses, ISI standards, UNESCO, WHO, FAO, UAS, ICAR publications are located in this Section. The seminar papers submitted by the students and staff of several faculties are bound year-wise and kept in this Section. A separate catalogue is provided exclusively for this Section, to help the readers in easy consultation.

*Growth of Reports Section*

	1980-81	1981-82	1982-83
Acquisition of Reports	690	742	362
Acquisition of Theses	152	174	151

**Documentation Section** : The Documentation Section continued to play an important role in providing relevant information to the students and scientists as well as compiling bibliographies and reading lists.

Under the Project-Oriented Documentation Service (PODS), 2000 articles of interest from the current journals were notified to the scientists working at the various research stations. Photocopies of 450 articles were provided to these scientists against BAT.

150 primary journals on agriculture were scanned and 4100 articles of interest were indexed.

As in previous years, "Recent Additions" and "Library Bulletin" were issued regularly providing information regarding new books and journals received in the University Library.

Following bibliographies were published by the University Library :

	<i>Compiled by</i>
1. Select Bibliography on Ragi (850 entries)	Mr. Sreenivasa Raju Mr. K. K. Manjunatha
2. Annotated Bibliography on Sucker Control in Tobacco - 1972-1982 (135 entries)	Mr. K. K. Manjunatha
3. Annotated Bibliography on Cardamom (185 entries)	Mr. K. K. Manjunatha

In addition to the above, the following bibliographies were compiled and are maintained on 5" x 3" catalogue cards :

1. Select Bibliography on Eucalyptus (1973-1982) (1200 entries)	Mr. K. K. Manjunatha
2. Select Bibliography on <i>Ephelis oryzae</i> (60 entries)	Mr. K. K. Manjunatha

Following reading lists were prepared and made available to the scientists of the University :

1. Impact of irrigation on socio-economic aspects of rural society.
2. Crop Insurance
3. Literature published during 1981 on diseases of sugarcane, rice, coconut, arecanut and cashewnut and their control.

**Reprographic Services:** This is the most sought after service at both the campuses by the students, scientists and University offices alike for the photocopying facilities. Details of work done by the Reprographic Unit are furnished below :



	1981-82	1982-83
I. Requests received	2276	2617
Pages copied and supplied	27305	38788
Amount collected	Rs. 17948-30	Rs. 27714-50
II. B. A. T.		
Requests received	256	273
Pages copied and supplied	8597	5342
Amount claimed	Rs. 4739-00	Rs. 3592-10
III. Photocopies received from outside	9	nil

*Outstation Libraries:* Efforts are being made to develop the libraries of all the Research Stations on the lines of the University Library. As a first step in this direction, basic library records were built up at the Libraries of the following stations :

1. Agricultural Research Station, Dharwad
2. Agricultural Research Station, Shimoga
3. Agricultural Research Station, Siruguppa
4. Agricultural Research Station, Bijapur
5. Agricultural Research Station, Gulbarga
6. Regional Research Station, Mandya
7. Regional Research Station, Mudigere.

In a phased manner, libraries at other research stations and NARP centres would also be organised. Mr. Stanley Madan Kumar, Asst. Librarian has been entrusted with this work.

Consequent upon the occupation of new library building at Dharwad campus, there was immediate need to provide additional furniture and equipment to the Library. A sum of Rs. 1.70 lakhs was made available from the University Library grants towards this purpose.

Mr. Stanley Madan Kumar, Asst. Librarian participated in the All India Workshop on Information Services for Agriculture, sponsored by the Indian Association of Special Libraries and Information Centres and the Bidhan Chandra Krishi Viswavidyalaya, from August 7-8, 1982 at Mohanpur, West Bengal. A paper entitled "Agricultural Information and its Users: An overview" written by Mr. H.R. Ramachandra and Mr. Stanley Madan Kumar was presented at the Workshop.

Mr. Stanley Madan Kumar, Asst. Librarian contributed a paper entitled, "Agricultural Information Services in India: An Assessment" for the Tenth IASLIC National Seminar held during December 1982 at Kanpur.

H. R. RAMACHANDRA  
University Librarian

#### D. Student Welfare

As in the previous years promotion of student welfare was one of the foremost concerns of the University during the year under report. The progress made in different areas of student welfare during the year is being reviewed from two angles - maintaining the facilities that were already established during the previous years and development of programmes in new areas for promotion of student welfare.

*Student Counselling and Orientation Programme :* An orientation programme was arranged on 11-10-1982 in all the campuses when the faculty members and also administrators participated in the programme. Majority of the fresh students admitted for the first year classes and some of their parents were also present. During this programme, the students were acquainted with the new system of education that is being followed in the University, the amenities available to them on the campus and also the responsibilities on the part of students. The students were taken round the campus to acquaint them with various facilities in the laboratories, libraries, class rooms, hostels, cafeterias etc., before they assembled in the afternoon session to register for courses under the guidance of the teacher counsellors.

As in the previous years, the fresh students were assigned to the teachers - about 15-20 for the purposes of counselling and advisory services. The students of the other classes including the Postgraduate continued to be under the counselling of the same teachers to whom they were assigned in the previous year. In respect of Postgraduate students, the concerned Professors themselves served as the counsellors.

*Student Associations:* The Student Associations were formed in all the campuses. The formation of student associations for the year 1982-83 which should have taken place in the month of November or December, 1982, was delayed as the University was examining the question of changing the mode of student elections in order to avoid the student disturbances that occur frequently during the election times.

As some more time was needed for the University to take a decision in this regard, the institutions were permitted to conduct the student general elections adopting the same existing procedure. Thus the elections were conducted and Associations formed.

*The activities of the Student Associations and Hostels*

Campus	Date	Function	Invitees/Chief Guest
1	2	3	4
Hebbal	19-6-1982	Agril. College Hostel Day Celebrations	Dr. H. Narasimhaiah Ex. Vice-Chancellor, Bng. University  Mr. M. P. Ganesh, Special Officer, Directorate of Youth Services, Govt. of Karnataka  Dr. K. S. Krishna Sastry Director of Instruction (Agri)
Raichur	3-7-1982	Agril. Engg. Instt. Hostel Day	Mr. Vinayakumar Deputy Commissioner Raichur  Prof. N. L. Maurya Principal, AEI
G.K.V.K.	9-7-1982	Valedictory Function of the GKVK Students' Association	Mr. T. K. Tukol, Justice Mrs. B. Saroja Devi Chairman, K.F.I.D.C. Bangalore  Dr. R. Narayana, Director of Instruction (BSH)
Raichur	10-7-1982	Valedictory Function of the AEI Students' Association	Mr. V. Balasubramanyan Divisional Commissioner Gulbarga  Dr. N. L. Maurya, Principal, AEI
G.K.V.K	12-7-1982	Release of Souvenir 'NENAHU' by AGM&CO Club	Mr. G. L. Nallore Gowda, President of the Co-operative Apex Bank

1	2	3	4
			Dr. A. N. Krishnamurthy Managing Director BAFCO Mr. R. Krishnappa Registrar, UAS
Dharwad	14-7-1982	Annual Social Gathering	Dr. D. M. Nanjundappa Vice-Chancellor, Karnataka University Dr. R. K. Hegde, Director of Instruction (Agri) Dharwad
Mangalore	17-7-1982	Fisheries College Hostel Day Celebrations	Mr. S. K. Amin, Chairman, K.F.D.C. Prof. H. P. C. Shetty Director of Instruction (Fish.)
Hebbal	24-7-1982	Vety. College Hostel Day Celebrations	Mr. A. R. Nizamuddin IPS, Commissioner of Police Dr. H. Narasimhaiah Ex. Vice-Chancellor, Bng. University Dr. K. T. Rao, Director of Instruction (Vety)
Hebbal	15-9-1982	Valedictory Function of the Vety. College Students' Association	Prof. N. S. Ramaswamy Director, Indian Instt. of Management, Bangalore Mr. H. T. Sanghiana IPS, D.C.P. Dr. K. T. Rao, D.I. (Vety)
Dharwad	20-3-1983	Inaugural Function of the Agril. College Students' Association	Shri S. R. Bommai, Hon'ble Minister for Industries and Commerce, Govt of Karnataka Dr. S. V. Patil, Dean, UAS

Apart from these association activities conducted by the respective associations, some activities were organised by the Director of Student Welfare at the University level.

1. At the request of the Chief Conservator of Forests, Government of Karnataka, an essay writing competition on "Wild Life" was conducted in the University in 1982, and the essays were forwarded for evaluation at State level. The essay submitted by Mr. M. C. Nandeesh, Sr. M.F.Sc., has been adjudged as the best and he has been awarded FIRST PRIZE of Rs. 500.

2. Two Kannada debators of the Agril. College, Hebbal—Mr. T. N. Prakash, Sr. M.Sc (Agri.) and Mr. B. Narayanaswamy, III B.Sc(Agri.) were deputed to participate in the Inter-Collegiate Kannada Debate conducted by the V. V. Puram Science College, Bangalore, on 30-10-1982. It is gratifying to report that our debators won the Rolling Shield in the debate.

3. An essay writing competition on "Wild Life" was also conducted at Inter-Collegiate level, in connection with the Vanya Prani Saptah 1982, during 1982. The essays have been sent to the Forest Department for judging and awarding prizes. The results are still awaited.

4. On behalf of the Department of Health and Family Welfare Services, Government of Karnataka, an Inter-Collegiate Kannada essay writing competition on "Famil Welfare" was conducted during the year for the Under-graduate students of the University. The essays written by the following have been adjudged as the best and cash prizes as furnished below have been awarded :

- |   |                     |
|---|---------------------|
| 1. Mr. S. M. Byre Gowda, V. B. V. Sc.                               | I Prize – Rs. 300   |
| 2. Mr. S. C. Kallormath, IV B.Sc (Ag.)<br>Agril. College, Dharwad   | II Prize – Rs. 250  |
| 3. Mr. S. R. Mohan Kumar, I B.Sc (D.T)<br>B. S. & H. College, GKVK. | III Prize – Rs. 200 |
| 4. Mr. B. Chandrakanth Bhat, IV B.V.Sc.                             | IV Prize – Rs. 150  |
| 5. Mr. G. Chandrappa, I B.Sc. (Ag. Mark.<br>& Coop.) G.K.V.K.       | V Prize – Rs. 100   |

5. The Department of Health and Family Welfare Services, Govt. of Karnataka conducted, as in the previous years, an essay writing competition in Kannada on Family Welfare, for the Postgraduate students, we also conducted the same competition in our University and forwarded the entries for evaluation at State level.

All the three prizes were won by our students.

- |  |                    |
|--|--------------------|
| i) Mr. M. C. Nandeesh, Sr. M.F.Sc.<br>Fisheries College, Mangalore     | I Prize – Rs. 500  |
| ii) Mr. Azad Ismail Saheb, Sr. M.F.Sc.<br>Fisheries College, Mangalore | II Prize – Rs. 300 |
| iii) Mr. Pulikeshi, Karamaddi, Jr. M.Sc.(Agri.)<br>Dharwad             | III Prize –Rs. 200 |

6. At the instance of the National Council for Co-operative Training, New Delhi, a debating competition at Inter-Collegiate level was conducted on 11-3-1983 at the GKVK Campus of the University.

Following three students were adjudged winners :

- |   |                  |
|---|------------------|
| i) Mr. Sreenivasa Murthy, II B. F.Sc., Mangalore    | I Prize Rs. 100  |
| ii) Mr. Sudheer Dhum<br>Final B.Sc. (Agri.), Hebbal | II Prize Rs. 75  |
| iii) Miss Sreedevi, II Agri. Mark., GKVK            | III Prize Rs. 50 |

The first two winners participated in the National Debate on Co-operation held in our University from 18 to 20-3-1983.

7. For the first time, we took the responsibility of hosting the National Debating competition on Co-operation at the request of the National Council for Co-operative Training, New Delhi. This programme was conducted from 18 to 20-3-1983 at our Hebbal Campus when debators from forty universities all over the country participated.

#### ***Hostels and Cafeterias***

Hostels and Cafeterias worked satisfactorily in all the campuses even though the food charges in some of the hostels were comparatively higher mainly due to raise in the cost of essential commodities like, rice, oil and vegetables. Shortage of accommodation in the boys hostel at Dharwad Campus was solved to some extent by the commissioning of the newly constructed Postgraduates Hostel. Similarly at Hebbal Campus there was heavy rush for admission in the Girls' Hostel. This was temporarily solved by releasing two "D" type quarters for accommodating girls. Meanwhile action has been taken to construct one more block adjacent to the existing ones.

Following staff members served as Rectors, Chief Wardens and Wardens in different hostels of the University :

Campus	Designation	Name of the official working
<i>Hebbal :</i>	Rector	Vacant
Agril. College Hostel	Chief Warden	Dr. A. Bomme Gowda
	Warden	Dr. B. Shivaraj
Vety. College Hostel	Chief Warden	Dr. R. V. Patil
	Warden	Dr. R. N. Srinivasa Gowda
UAS Girls' Hostel	Warden	Mrs. Shakunthala Raju
<i>GKVK :</i>	Rector	Vacant
	Chief Warden	Mr. Chandrashekar Buggi
	Warden	Mr. A. G. Huddar
	Warden	Mr. Nanjundagowda
<i>Dharwad :</i>	Rector	Dr. L. A. Dixit
Agril. College Hostel	Chief Warden	Dr. P. C. Hiremath
	Warden	Dr. N. C. Hulimani
	Warden	Dr. S. D. Shashidhar
Rural Home Science College Hostel	Warden	Mrs. V. Goankar
P. G. Hostel	Warden	Dr. M. C. Devaiah
<i>Mangalore :</i>		
Fisheries College Hostel	Warden	Mr. K. V. Rajagopal
<i>Raichur :</i>		
AEI Hostel	Warden	Mr. P. Palkonda Reddy

The strength of the boarders in the different hostels and the average food charges during 1982-83 were as follows :

Name of the UAS Hostels	No. of Rooms available	No. of boarders accommodated	Daily average food charges	
			Vegetarian	Non-Vegetarian
1	2	3	4	5

#### Hebbal Campus

<i>Agril. College Hostel</i>			Rs.	Rs.
I Block	63	169	3.74	4.75
II Block	62	194	3.74	4.75

1	2	3	4	5
<i>Vety. College Hostel</i>				
I Block	60	192	4.81	5.34
II Block	63	168		
<i>UAS Girls' Hostel</i>				
Ground floor } First floor }	13	70	3.23	—
'D' type quarters -43 and 44	2			
<b>GKVK Campus</b>				
I Block	64	192	4.42 (P.G. Rs. 4.18)	5.27
II Block	65	192		
III Block	66	195		
<b>Dharwad Campus</b>				
<i>Agril. College Hostel</i>				
Suyoga Block	16	140	4.50	—
Spurthi Block	20			
Pragathi Block	100			
Krishik Block	107			
<i>P. G. Students' Hostel</i>	32	57	5.30	—
<i>Rural Home Science College Hostel</i>				
A - Block	4	21	3.25	—
B - Block	4	25		
<b>Mangalore Campus</b>				
<i>Fisheries College Hostel</i>				
Cauvery Block	18	59	6.71	—
Narmada Block	18	58		
Ganga Block	18	45		
<b>Raichur Campus</b>				
<i>Agril. Engineering Institute Hostel</i>	18	54	4.43	—

**NCC and Physical Education**

Courses in N.C.C. and Physical Education were offered at GKVK campus while the courses in Swimming, Boating and Rowing were shifted to Mangalore campus this year since the 1st year students of B.F.Sc., were registered for



courses at the College of Fisheries, Mangalore from this year. The annual N.C.C. camp for the year has been postponed for September, 1983 and will be conducted at GKVK campus.

Following were the number of students registered for N.C.C., Physical Education, Boating and Rowing during 1982-83 :

Campus	Class	Strength	
		Boys	Girls
NCC			
GKVK Campus	All I year classes excluding the Veterinary College (UAS COY. 1)	168	—
	First year B.V.Sc. (UAS COY. 2)	127	—
Dharwad Campus	All I year classes, of Agricultural College, Dharwad campus	80	—
Physical Education			
GKVK Campus	All I year classes	125	45
Dharwad Campus	All I year classes of Agricultural College, Dharwad	70	—
	All I year classes of R.H.Sc. College	—	24
Mangalore Campus	Boating and Rowing	27	—
Raichur Campus	Physical Education course	20	—

#### Sports and Games

*The UAS Inter-Campus Athletic Meet* : The 16th UAS Inter-Campus Athletic Meet was conducted at GKVK campus on 18 to 19-2-1983.

The Athletic Meet was inaugurated on 18-2-1983 at 3.00 p.m. by Dr. N. G. Perur, Vice-Chancellor, UAS. Shri P. Ramdev, M.L.A., was the Chief Guest for the closing function on 19-2-1983, when Dr. S. V. Patil, Dean, UAS presided.

Mr. Sham Ponnappa, III B.Sc. (Agri) student of Hebbal and Miss K. B, Akkamma, Final B.Sc. (Hort.) of GKVK campus secured the individual championship among the men and women sections respectively.

The team championship in Athletics went to GKVK campus.

*Karnataka State Inter-University Sports Meet* : The UAS teams participated in the Karnataka State Inter-University Sports Meet conducted this year by the Mangalore University at Mangalore from 25 to 27-2-1983. Following are the teams that were deputed :

Volley ball, Basket ball, Foot ball, Hockey, Kabaddi, Kho-Kho (Women), Table Tennis (Women), Lawn Tennis (Men) and Athletics (Men & Women).

*Positions secured :*

Athletics	:	Mr. Viswanath of II B.Sc. (Hort.)
		I Place in 1,500 Mtrs.
Games	:	i) Foot ball – Runners-up
		ii) Basket ball – Runners-up
		iii) Hockey – Runners-up

During the year, our UAS Teams were sent to participate in 12 Inter-University Tournaments conducted by the Sports Board of India for both men and women in different states. The calendar of events, venues and results of Inter-Campus and Inter-University Tournaments are furnished in Table I.

**Local Tournaments**

Hockey League Tournament of the Karnataka State was held from 12-3-83 to 9-3-1983, at Bangalore. As in the previous year, two U.A.S. Teams – “A” and “B” were represented in the tournament. The performance of both the teams was very good and as a result our “A” team entered “B” Division and “B” team has entered “C” Division this year. This is a significant improvement in our hockey teams.

*Chess*: Mr. D. S. Hegde, a student of IV B.V.Sc., represented Karnataka State Chess team at the All India Inter-State Chess Tournament conducted at Palani (Tamil Nadu) for the year 1982-83.

*Kho – Kho* : Mr. Renuka Prasad of GKVK Campus and Mr. Suresh Kumar of Hebbal Campus (Vety. College) represented Karnataka State Kho-Kho team for the South Zone Kho-Kho Tournament conducted at Trivandrum from 26 to 29-9-1982. Mr. Renuka Prasad was also the Captain of Karnataka State Team for the year 1982-83.

*Best-Physique* : In the best physique competition conducted during the year 1982-83, the following were declared as the winners:

- |                          |             |
|--------------------------|-------------|
| 1. Mr. Jagadish M. Desai | Mr. Agrico. |
| 2. Mr. Sambashiva Reddy  | Mr. Vetico. |
| 3. Mr. R. Nagaraj        | Mr. GKVK    |

#### ***Indoor Games Complex for GKVK Campus***

The foundation stone for the Indoor Games Complex at GKVK Campus was laid on 2-3-1983, by Mr. B. L. Gowda, Hon'ble Minister for Agriculture and Pro-Chancellor of the University.

#### ***Award of UAS Gold Medals for Outstanding Sportsmen***

University awarded gold medals for the year 1982-83 to the following students in recognition of their contribution to sports.

- |  |   |            |
|--|---|------------|
| 1. Mr. D. S. Hegde, Vety. College              | — | Chess      |
| 2. Mr. Sridhara Murthy, Agril. College, Hebbal | — | Cricket    |
| 3. Miss K. B. Akkamma, College of BSH          | — | Athletics  |
| 4. Mr. H. C. Anand, Fisheries College,         |   |            |
| Mangalore                                      | — | Basketball |

#### ***N.S.S. Programme***

The regular National Service Scheme is successfully working only in the Rural Home Science College, Dharwad. The annual camp was also organised in Mugad village from 9 to 19-5-1982 when 27 student volunteers participated. In the other institutions, it was tried but could not be introduced as there was no response from students nor the teachers. The University has been examining whether it could be introduced as a curricular programme along with other co-curricular programmes like N.C.C. and Physical Education.

#### ***Medical Services***

The hospitals in all the campuses worked satisfactorily during the year. The construction of the hospital building at GKVK Campus was completed and was opened and released for use on 1-10-1982. The staff including the Medical Officer, has been already created and action is being taken to appoint them. The annual medical examination of students in all the institutions is under progress.

TABLE I  
Calendar of Sports and Games conducted during the year 1982-83

Games	Inter-Campus			Inter-University			(W)—Winners	(R)—Runners
	Date	Venue	Results	Date & Venue	Results			
1	2	3	4	5	6			
Chess	26th 30th Aug. 1982	Fishco. Mangalore	Vetico. (W) GKVK (R)	1st to 9th Sept. 1982 at Mangalore University, Mangalore	Secured 7th place out of 79 Universities participated. Won against Bangalore, Allahabad & Manipur Universities.			
Table Tennis (Men & Women)	3rd to 5th Sept. 1982	Agrico. Hebbal	GKVK (W) (both Men & Women) Agrico. D (R) (both Men & Women)	29th Oct. 1982 Jabalpur University, Jabalpur	Vikram University.			
Football	UAS Football team selections conducted at Hebbal on 29th & 30th Sept. 1982			3rd & 4th Oct. 1982 Kerala Agril. Univ. Trichur	First Match against Mangalore Univ. draw -1-1 Rematch next day lost to Mangalore Univ. by 0-2.			
Kabaddi		do		30th Sept. to 2nd Oct. 1982 at Shivaji Univ. Kolhapur	Won three preliminary rounds and lost to Kolhapur Univ. in the quarter finals.			
Volleyball	14th & 15th October 1982	Agrico. Hebbal	Agrico. H (W) Agrico. D (R)	2nd Nov. 1982. Andhra University, Waltair	Lost to Osmania University.			
KHO-KHO (Men & Women)	20th & 21st Nov. 1982	Agrico. Hebbal	Men Section : Vetico (W) GKVK (R)	Men Section : 22nd Jan. 1983, Poona Univ., Poona	Secured 5th place in All India Inter-Univ. Kho-Kho Tournament.			

1	2	3	4	5	6
			<i>Women Section</i>	<i>Women Section</i>	
Hockey	20th & 21st Nov. 1982	Agrico. (H) Hebbal	GKVK (W) Vetico. (R)	2nd to 5th Jan 1983 Sardar Patel University, Anand (Gujarat)	Lost in first round
Cricket	11th to 13th Dec. 1982	Agrico. (H) Hebbal	Agrico. H. (W) GKVK (R)	28th to 1st Jan 83 Osmania University, Hyderabad	Played against Kaktiya, Nagarjuna and lost to Bharthiyadasan University
Shuttle Badminton (Men & Women)	12th & 13th Jan. 1983 14th Jan. 83, Selections conducted to Girls at Agriculture College, Hebbal	Fishco. M Agrico. H	Agrico. H. (W) GKVK (R)	18th to 26th Dec. 1982 Bharathiyadasan Univ. Trichurapalli	Lost in second round
Basketball	8th & 9th Jan. 1983	Agrico. H	Agrico. H. (W) GKVK (R)	15th to 17th Jan. 83 Calicut Univ., Kerala	Lost in first round
Athletics	27th Dec. 1982 UAS Athletic team selections conducted at Hebbal	Agrico. H	Agrico. H. (W) GKVK (R)	14th to 16th Jan. 83, Annamalai University (Tamil Nadu)	Played against Calicut Univer- sity and lost in the first round,
Ball Badminton	22nd Feb. 83	Agrico. H	Fishco. M (W) Agrico. H (R)	16th to 20th Jan. 83 Mysore University 26th Feb. 1983 Madras University, Madras.	Participated in All India Inter University Athletic Meet. Lost to Bharathiyadasan Univ.

The students of the final year and pre-final year classes who went on educational tours were inoculated and protected against Cholera and Typhoid.

***University Employment Information and Guidance Bureau***

The Government of Karnataka has started an University Employment Information and Guidance Bureau for the benefit of the students and alumni of the University. The Deputy Chief was posted to the Bureau on April, 1982. He has already started some preliminary work with the assistance of his staff in collecting information, registering the graduates and feeding information in respect of employment opportunities, higher studies, fellowships etc., to the students and the registered alumni.

***General***

We recognise that a lot more has to be done to improve the welfare of the student community of the University but the limiting factor is the funds. However, the essential needs at least are to be attended early as and when funds are available. The undersigned acknowledges with gratitude the general financial support and valuable guidance received from the University. In particular, acknowledgements are due to the Vice-Chancellor and the Dean for the sustained encouragement afforded to the undersigned in the discharge of his responsibilities.

K. SUBBAIAH  
*Director of Student Welfare*

## PART III

### RESEARCH

Under the National Agricultural Research Project (NARP) a research station at Nagamangala came into being from 25-1-1983 at a cost of Rs. 40.70 lakhs during the year. Government of Karnataka transferred the lands to University of Agricultural Sciences for the establishment of a research station at Brahmavar during November 1982. These two stations are the new additions to the existing 40 research stations of the University, which are located in 10 agro-climatic zones, regrouped into 6 regions. Research at these research stations has been concentrated on the problems pertaining to plant science, animal science, fishery science and home science of the region.

Besides, research projects are financed by the State Government and also by Indian Council of Agricultural Research, New Delhi. There are 38 All India Coordinated Research Projects and 23 ICAR Adhoc Research Projects being operated in the University. Moreover, there are 23 projects which are also funded by US held rupee projects, BARC, UGC and several other agencies.

The work on seed production and research investigations on various crops and management practices and several other new problems like control of *Nephantis*, studies on areca yellow leaf disease, control of uzi-fly of silkworm are being continued. The research report on plant science, animal science, home science and fishery science for the year 1982-83 is as follows :

#### 1. Plant Science

##### 1.1 Agronomy

###### 1.1.1. Rice

In the nitrogen variety trial conducted during *kharif* season at Mandya, it was observed that variety IET-5882 and IET-6080 gave highest yields of 6771 and 6669 kg/ha respectively at 120 kg N/ha followed by IET-7302 which gave 6499 kg/ha at 40 kg N/ha. In other trials, varieties IET-6211, KMP-39 and IR-20 gave higher yields of 7357, 7167 and 7088 kg/ha respectively, at 160 kg N/ha ; whereas Mandya Vani gave 5591 kg/ha at 120 kg N/ha. Intan Mutant - 2 has given highest yield of 8044 kg/ha with 160 kg N/ha compared to 7242 kg/ha in IR-20.

On an average over seven years' (1976-1982) results at Mandya during *kharif* season, application of urea supergranules placed at 10-12 cm soil depth between every pair of crop rows and every 4 hills, at 56 kg N/ha has given the highest yield of 4800 kg/ha compared to application of prilled urea in 2 equal splits at the same level of nitrogen which gave 3840 kg/ha. Sulphur coated urea broadcast and incorporated at planting gave 4360 kg/ha. The results of residual application of urea super granules applied during *kharif* season of 1981 was not observed in summer season of 1982. In another trial, urea super granule application at any time between transplanting and 20 days after transplanting gave 34 per cent increase in yield over prilled urea. The studies on dual cropping of *Azolla* in rice at Mandya did not show marked advantages in yield due to poor multiplication of *Azolla* and damage due to snails.

In nitrogen variety trial at Mugad, variety IET-5899 gave the highest yield of 7281 kg/ha as compared to 4813 kg/ha in IET-2254 (check) at 120 kg N/ha. In another trial also IET-5899 gave highest yield of 7672 kg/ha at 120 kg N/ha, as compared to highest yield of 5364 kg/ha in Intan (check) at 60 kg N/ha. In trial on chemical weed control in upland rice at Mugad, use of Bentazon followed by one mechanical weeding gave 3138 kg/ha compared to 3233 kg/ha in weed free check and 2293 kg/ha in hand weeding twice. Application of 100 kg N/ha in three splits *i.e.*, at 20, 40, 60 days after sowing for upland rice variety IET-2254 gave highest yield of 5458 kg/ha compared to 4919 kg/ha in two equal splits *i.e.*, at sowing and 40 days after sowing at Mugad.

At Nagenahalli, use of 2,4-D EE 4 per cent at 0.8 kg a.i./ha gave effective weed control and highest yield of 5195 kg/ha compared to 4914 kg/ha in weed free check and 4731 kg/ha in twice hand weeding.

#### 1.1.2. *Ragi*

In the nitrogen variety trial on ragi under rainfed conditions at Bangalore, Indaf-5 gave the highest yield of 4874 kg/ha at 60 kg N/ha whereas at Mandya under irrigated conditions HR-919 gave 4745 kg/ha at 120 kg N/ha. In another trial HR-1523 gave the highest yield of 6045 kg/ha, followed by Indaf-8 and HR-911 which gave 5809 and 5662 kg/ha respectively at 100 kg N/ha at Bangalore under rainfed conditions. At Mandya under irrigated conditions, HR-911 gave the highest yield of 4858 kg/ha at 125 kg N/ha compared to 4191 kg/ha in Indaf-5.

In the variety-spacing-nitrogen trial at Bangalore, Indaf-5 gave higher yield of 4506 kg/ha compared to 3521 kg/ha in Indaf-9 and it also responded up to 100 kg N/ha. A row spacing of 30 cm with 12.5 cm within plant row gave better yields. Application of nitrogen, 50 per cent through poultry manure and



another 50 per cent through urea gave 3577 kg/ha compared to all N through urea which gave 3241 kg/ha, as an average over the last 3 years results.

Use of azospirillum in ragi gave 3839 kg/ha compared to 3493 kg/ha in control both with no nitrogen application, on an average over 4 years. With  $\frac{1}{3}$ ,  $\frac{1}{2}$  and full recommended N level of 50 kg N/ha, the response were 130, 75, 60 kg/ha respectively. Use of Rock phosphate +  $H_2SO_4$  (2 per cent) and Pyrates + Rock phosphates (50 : 50) to ragi have shown promising results.

#### 1.1.3. *Sorghum*

In the crop sequence studies at Dharwad, no much difference in yield on sorghum CSH-6 and its ratoon were noticed when harvested at physiological maturity or normal harvest stage. The yields of sequence crops viz., safflower, bengalgram and wheat were 953, 630, 1016 kg/ha when grown without sorghum ratoon and 385, 199 and 645 kg/ha when grown with ratoon respectively. The highest total gross income of Rs. 11,577/ha was obtained with sorghum in *kharif* and wheat in *rabi* with ratoon crop of sorghum. In another study sorghum + fodder cowpea in *kharif* followed by wheat in *rabi* gave better performance. The intercropping of redgram ST-1 at 40,000 plants/ha in sorghum paired row planting of 30-90 cm which gave 2920 kg/ha of sorghum and 599 kg/ha redgram was found promising.

Amongst the different genotypes tried at Dharwad, SPV-351 has recorded the maximum grain yield of 5132 kg/ha at 2 lakh plants/ha with 50 kg N/ha. In the sowing date trial on *rabi* sorghum variety E 36-1 gave the highest yield of 2142 kg/ha over three sowing dates during September-October as compared to 2027 kg/ha in SPV-86, 1830 kg/ha in M 35-1 and 1373 kg/ha in local.

#### 1.1.4. *Wheat*

Studies conducted at Bangalore to assess the adaptability of new wheat varieties to dates of sowing, showed that variety DWR-39 gave maximum yield of 4055 kg/ha when planted on 25-10-82 followed by APAU 1577 which gave 4013 kg/ha when planted on 8-11-82. In another study, amongst 16 genotypes tried, DWR-39 gave highest yield of 3942 kg/ha followed by NI-5439 which gave 3773 kg/ha. In intercropping studies on wheat with blackgram and soybean, entire wheat recorded highest gross income.

The study on seed rates (100 to 200 kg/ha) and methods of sowing viz., broadcasting, row spacing of 15 or 20 cm and cross sowings with 15 or 20 cm conducted at Dharwad and Navalgund during *rabi* 1981-82 season. In both the locations, there was no significant differences in the yields due to treatments. In the studies on the response of wheat varieties for lower rates of nitrogen,

HD 2189 and DWR-39 gave 2740 kg/ha at 20 kg/ha and 3324 kg/ha at 40 kg N/ha. Amongst the different varieties tried for dates of sowing, DWR-39 gave the highest yield of 5542 kg/ha when planted on 31-10-81; APAU-1560 gave 5231 kg/ha for the same date on planting. Ten varieties were tried for limited and assured irrigation water levels at Dharwad. Variety DWR-39 has given highest yield of 2278 kg/ha followed by variety NI-8188 which gave 2236 kg/ha with two protective irrigations. Over the varieties, adequate irrigations gave 4208 kg/ha, two irrigations at CRI+BL stages, gave 1897 kg/ha as compared to 1150 kg/ha when only one irrigation was given at CRI stage.

#### 1.1.5. *Groundnut*

Studies conducted during *kharif* season at Dharwad showed that maximum pod yield of 4156 kg/ha was obtained in the treatment where 250 kg/ha of gypsum was applied and the yield of control was 3668 kg/ha. Yield of groundnut was better with spacing of 40 × 5 cm.

In weed control trial at Raichur, highest yield of 958 kg/ha was obtained in weed free check followed by 885 kg/ha in use of herbicide Ronstar 25 EC at the rate of 1.5 l/ha *plus* one hoeing at 40 days and unweeded check gave 562 kg/ha.

#### 1.1.6. *Niger*

In the nitrogen varietal trial on niger conducted at Raichur, variety No. 71 gave maximum yield of 278 kg/ha at 20 kg N/ha. On an average over nitrogen levels *i.e.*, 0-40 kg N/ha variety No. 71 gave the highest yield of 238 kg/ha followed by IGP-76 and Gouch No. 1 which gave 211 and 200 kg/ha respectively, whereas local gave 114 kg/ha. In another trial, improved method of niger cultivation *i.e.*, variety No. 71, application of 20-40-20 kg N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O/ha and adoption of plant protection measures gave 376 kg/ha. Niger has also responded to split application of nitrogen.

#### 1.1.7. *Castor*

Varietal-cum-nitrogen trial on castor was conducted at Raichur. On an average over the nitrogen levels *i.e.*, 0-80 kg/ha, Gouch gave 861 kg/ha followed by 651 kg/ha in Aruna and 615 kg/ha in RC-8. Application of 60 kg N/ha gave maximum yield of 810 kg/ha compared to 615 kg/ha in control. In another trial, use of improved variety Aruna, fertilizer application at 80-40-40 kg N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O/ha and no plant protection recorded the maximum yield of 868 kg/ha as compared to use of local variety Rosy and fertilizer application and no plant protection which gave 653 kg/ha.

#### 1.1.8. *Sunflower*

In the intercropping studies conducted at Bangalore ragi + sunflower in 4 : 1 or 4 : 2 row proportions gave maximum returns. The yield levels were 1394–1468 kg/ha of ragi + 342–414 kg/ha of sunflower compared to 1577 kg/ha in entire ragi and 588 kg/ha in entire sunflower. Under drought conditions of the season, BSH-1 gave 996 kg/ha as compared to MSFH-1 which gave 1096 kg/ha. Over the varieties, closer spacing of 45 × 30 cm gave 1205 kg/ha compared to 751 kg/ha in 60 × 30 cm.

The crop sequence studies conducted at Bangalore for 3 cycles showed that sunflower can be taken up successfully after groundnut, *avare*, ragi and maize crops, without reduction in returns. Taking sunflower after soybean, sorghum and cowpea gave lower returns. Taking sunflower after sunflower gave lower yields.

In the spacing-cum-fertilizer trial conducted at Kathalagere, highest yield of 1541 kg/ha of sunflower was obtained with 60 × 30 cm spacing and 80–80–40 kg N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O kg/ha. The studies on use of herbicides at Siruguppa showed that use of Fluchloralin at 1.0 to 2.0 l/ha gave 1807 to 1832 kg/ha compared to 1879 kg/ha in weed free check and 1698 kg/ha in normal cultural method of weed control.

In the date of sowing trial conducted at Bangalore, variety EC-68415 gave maximum yield of 3024 kg/ha with 6.5 g/100 seed and 40.8 per cent oil and 2.25 leaf area index. The yields and quality of seed reduced when planted late. In another trial row spacing of 60 × 45 cm has given better quality seeds *i.e.* 8.09 g/100 seeds.

#### 1.1.9. *Pulses*

Effect of row spacing and plant population on redgram varieties was tried at Bangalore. Variety TTB-7 gave 1068 kg/ha compared to 709 kg/ha in Lam-36 and 428 kg/ha in Hyd. 3C. Row spacings of 60 and 75 cm were slightly superior over 45 cm. A plant population of 1 lakh/ha gave 857 kg/ha compared to 764 kg/ha with 75,000 plants/ha and 584 kg/ha with 50,000 plants/ha. In another experiment, Hyd-3C gave 446 kg/ha with 100 kg—DAP/ha compared to 292 kg/ha in control under the drought situation. Studies on the component distribution in redgram production conducted at Bangalore indicated that plant protection was the most important factor which increased the yield from 737 kg/ha to 1028 kg/ha.

The studies on the response of cowpea genotypes to dates of planting at Bangalore showed the varieties V-16, V-37 and KBC-1 which gave 1122, 1035,

1026 kg/ha respectively were better than C-152 which gave 508 kg/ha. The variety C-152 suffered from rust. Planting on 28th July gave 959 kg/ha compared to 753 kg/ha when planted on 16th September.

The studies on the response of horsegram genotypes to dates of planting and row spacings conducted at Bangalore showed that variety BGM-1 with 16th September planting gave maximum yield of 803 kg/ha with 30 cm row spacing. In another trial, this variety gave optimum yield of 1413 kg/ha with 10 kg N + 30 kg  $P_2O_5$ /ha. Large scale trial on intercropping of redgram variety TTB-7 with blackgram gave 1090 kg/ha of redgram and 63 kg of blackgram at Bangalore.

The studies conducted at Gulbarga on bengalgram during *rabi* 1981-82 season showed that Annigeri-1 gave the highest yield of 1122 kg/ha with 30 cm row spacing. Soil application of 100 kg/ha of DAP was found promising. The studies on the comparative performance of *rabi* crops indicated that bengalgram and safflower are more promising than *rabi* jowar, wheat and linseed. In another trial, Annigere-1 gave maximum yield of 1353 kg/ha at 50 kg  $P_2O_5$ /ha and 100 kg seed rate/ha. During *kharif* 1982 at Gulbarga, intercropping of redgram in paired rows with bajra gave maximum income of Rs. 7695/ ha with yield levels of 1446 kg/ha of redgram and 1731 kg/ha of bajra.

#### 1.1.10. Soybean

The studies on date of planting with different varieties of soybean at Bangalore showed that variety KHSb-7 gave maximum yield of 2291 kg/ha when planted on 29-7-82. In varietal-cum-plant population trial, KHSb-2 gave maximum yield of 2886 kg/ha with 0.4 M plants/ha. Spraying of herbicide Dual at 1 kg a.i./ha gave maximum yield of 2522 kg/ha compared to 3 hand weedings which gave 1800 kg/ha. Application of 30 kg N/ha with seed treatment of rhizobium culture gave promising results. This crop also responded for all N as basal rather than split application. Growing of one row of soybean in redgram spaced 60 cm gave higher income compared to pure crop of redgram. Similar results were obtained on intercropping of ragi spaced 60 cm with soybean.

The results of the varietal-cum-plant population studies conducted for three years *i.e.*, 1980 to 1982 at Dharwad showed that variety KHSb-2 and Monetta both at 0.4 M/ha gave higher yields of 2344 and 2255 kg/ha respectively. In another trial premonsoon sowing of KHSb-2 gave 3233 kg/ha. Delayed sowings reduced the yields. Maximum monetary returns of Rs. 5199/ and Rs. 5239/ per ha were obtained with intercropping of soybean in uniform planting of redgram at 60 cm and paired row planting with 30-90 cm respectively. Yield levels of redgram were 1505 to 1534 kg/ha and that of soybean were 192 to 228 kg/ha.

On an average over two years results at Dharwad, intercropping of two rows of soybean in sugarcane has given maximum monetary returns. There was no reduction in the yield of sugarcane and an yield of 808 kg/ha of soybean was obtained.

#### 1.1.11. Cotton

The results of various experiments conducted during *rabi* 1981-82 season in brief are given below :

Studies on the response of cotton to higher levels of  $P_2O_5$  and  $K_2O$  conducted at Dharwad showed that Sharada variety with 40-40-0 NPK/ha gave maximum yield of 1710 kg/ha. At Siruguppa the application of 150-75-75 kg NPK/ha gave maximum yields of 2767 kg/ha. In intercropping studies at Dharwad maximum gross income of Rs. 9044 per ha was obtained with cotton planted in paired row planting with  $1\frac{1}{2}$  times the recommended fertilizer and intercropping of groundnut receiving no fertilizer. At Arabhavi, higher income of Rs. 9584 per ha was obtained with cotton receiving  $1\frac{1}{2}$  times the recommended level of fertilizer and maize as intercrop also receiving full dose of fertilizer.

At Siruguppa, studies on scheduling of fertilizer application to Jayalaxmi cotton showed that application of 25 per cent N basal + 25 per cent top dressing each three time *i.e.*, at 50, 80, 110 days after planting gave the highest yield of 2413 kg/ha. On an average over 3 years data *i.e.*, 1979-80, 80-81 and 81-82, IV week of June planting of rainfed cotton at Dharwad gave 1134 kg/ha followed by 1029 and 820 kg/ha when planted on II week of July and I/II week of August respectively. Application of 40-20-20 NPK/ha has given 1018 kg/ha compared to 820 kg/ha in control. Application of CCC at 60 ml/ha at 75 days after sowing to cotton gave promising results at Dharwad.

The studies on the intercropping vs double cropping conducted at Arabhavi for two years 1980-81 and 81-82 showed that gross income was highest *i.e.* Rs. 15,264 per ha in DS-56 cotton in *kharif* followed by wheat in *rabi* as compared to Rs. 13,210 per ha in entire crop of hybrid cotton Varalaxmi and Rs. 10,956 per ha in DS-56. Cotton + maize mixed cropping gave income of Rs. 7400 to Rs. 9900 per ha.

The studies on seed production technology conducted at Dharwad showed that immature seeds were more in *hirsutums i.e.*, Laxmi and Sharada *i.e.*, 7.8 per cent whereas in *herbaceums i.e.* Jayadhar and DB 3-12 it was 3-4 per cent. In another study, it was observed that percentage of mature seeds was more in July sown crop than August sown crop. Application of higher doses of fertilizer

had marginal effect in producing good seeds. It was observed that seeds from third picking had highest immature seeds *i.e.*, 11.2 per cent compared to 7.0 and 6.6 per cent in 2nd and 1st pickings respectively.

#### 1.1.12. Tobacco

At Nippani, application of 50 per cent N as cake and 50 per cent as ammonium sulphate gave highest yield of bidi tobacco *i.e.*, 1738 kg/ha as compared to 1476 kg/ha when either of them were applied on 100 per cent basis. In varietal-cum-fertilizer-cum-topping trial, variety A-119 has given the highest yield of 2048 kg/ha compared to 1814 and 1769 kg/ha in PL-5 and NPN; 190 respectively. Application of 150-80-60 kg NPK/ha and topping at 20 leaves gave higher yields of 2932 kg/ha compared to 2812, 2756 and 2703 kg/ha in 75 × 75 cm; 100 × 75 cm and 100 × 50 cm respectively.

#### 1.1.13. Chillie

On an average over two years results *i.e.*, 1981-82 and 1982-83 chillie-onion intercropping gave the highest monetary returns of Rs. 8,758 per ha with yield levels of 814 kg/ha of chillie and 3999 kg/ha of onion.

#### 1.1.14. Sugarcane

The results of trials conducted during 1981-82 are as follows :

In the final yield trial of sugarcane varieties conducted at Mandya, CO-62175 gave the highest yield of 231 t/ha followed by CO-7804 which gave 174 t/ha as compared 172 t/ha in CO-419. Comparative performance of urea and urea supergranules at 50-250 kg N/ha showed no superiority of urea supergranules for increasing yields of sugarcane. In case of ratoon, use of urea supergranules gave higher yield of 111 t/ha compared to 77 t/ha in urea. In varieties-cum-nitrogen trial conducted at Mandya CO-62175 gave the highest yield of 201 t/ha with 250 kg N/ha. KHS-3296 has been found to be early maturing and gave 149 t/ha with 375 kg N/ha. CO-419 gave 149 t/ha at 375 kg N/ha.

The studies conducted at Sankeshwar during 1982-83 on response of sugarcane varieties to time of nitrogen application showed that CO-740 gave 105 t/ha compared to 99 t/ha in CO-7318. Application of nitrogen in 3 splits *i.e.*, 1/3 each at planting, at 6th week and at earthing up was better. In the trial on fertiliser management of seed crop of sugarcane, application of 25 per cent of additional dose of  $P_2O_5$  than recommended gave 13 t/ha more yield than recommended level of fertilizers. Planting of single eye bud sets gave less yield by 9 t/ha compared to three eyebudded sets planting.

The results of varietal trial conducted at Bidar during 1981-82 showed that CO-7219 gave 153 t/ha followed by 138 t/ha in CO-1295 compared to 118 t/ha in CO-740.

#### 1.1.15. *Dry Farming*

The results of the experiments conducted during 1982-83 at Bangalore are given below :

Early season cowpea fodder gave 17.9 t/ha and cowpea grain gave 500 kg/ha whereas in case of horsegram 9.2 t/ha of fodder and 67 kg/ha of grain were obtained. Yield of ragi in crop sequence varied from 1200 to 1883 kg/ha whereas yield levels of 1498 to 2167 kg per ha were obtained as single crop sown in July. Intercropping studies in ragi showed that cowpea intercropped with ragi either for grain or fodder reduced the yield of the main crop whereas cowpea as green manure crop showed beneficial effect on ragi. Inclusion of cowpea as an intercrop in maize either for green manure or for green fodder reduced the yield of maize significantly. Relaying horsegram in ragi at ear emergence gave beneficial effect on ragi at low fertility level.

In the studies on strip cropping of grass and fodder legumes in ragi, introduction of NB-21 grass+stylosanthes strip of 1.5 m width at every 7.5 m interval gave 13.8 t/ha of green fodder and 1419 kg/ha of ragi and in case of subabul strip 441 kg/ha of subabul and 2149 kg/ha of ragi. whereas entire crop of ragi gave 2474 kg/ha. In another trial, May sown redgram has given 2053 kg/ha compared to 470 kg/ha when it was sown in July. Giving two protective irrigations to the crops raised after cowpea increased the yield of ragi by 133.8 per cent i.e., 1020 kg/ha over a basal level of 760 kg/ha without irrigation. The yields of tomato and chillie increased by 38.9 and 11.7 per cent respectively.

In the inter-terrace management in ragi, graded bund at 11 m interval gave a maximum yield of 3217 kg/ha compared to 2930 kg/ha in furrow at every 2 seed drill width and 2969 kg/ha in normal method of cultivation. In another study, maize residue incorporation gave 3258 kg/ha of compared to 2521 kg/ha in control.

The results of operational research project on farmers fields showed that on an average, 7900 kg/ha of green fodder African maize+cowpea can be obtained when sown in May. Mixing DAP at 100 kg/ha with ragi and sowing gave 29 per cent increase in yield over control i.e., 25 kg/ha DAP mixed with seeds and 75 kg/ha DAP broadcast which gave 971 kg/ha. On farmers fields, yields of redgram variety TTB-7 obtained, ranged from 200-635 kg/ha and September

sown cowpea gave 210 kg/ha compared to 140 kg/ha in horsegram. The trials on soil and water management showed that graded border strips, and furrowing every two seed drill width were promising. Use of seed-cum-fertilizer drill gave a response of 265 kg/ha in ragi compared to use of seed drill and broadcasting of fertilizers. Broadcasting of ragi in plough furrow was also promising compared to seed drill.

The results of experiments conducted at Bijapur during *rabi* 1981-82 and *kharif* 1982 are given below :

On an average over two years results, at Bijapur growing *rabi* sorghum and redgram in 2 : 1 with 100 per cent population of each crop gave maximum gross returns of Rs. 4017 per ha with yield levels of 2490 kg/ha sorghum and 89 kg/ha of redgram. Based on 2 years data, yields of 921 kg/ha of bengalgram and 862 kg/ha of safflower were obtained when grown as intercrops in 3 : 1 row proportion. The yields of entire crops were 1324 and 1520 kg/ha in bengalgram and safflower respectively. This treatment also gave the highest LER of 1.25.

The studies on row spacing and plant population on *rabi* sorghum indicated, that SPV-86 gave higher yield of 1857 kg/ha compared to 1583 kg/ha in Muguti. A row spacing of 45 cm gave 1804 kg/ha compared to 1636 kg/ha in 90 cm. A plant population of 0.90 to 1.35 lakh/ha was optimum. In case of safflower, row spacing of 60-90 cm and plant population of 0.6 to 1.2 lakh/ha were on par.

At Bagalkot, sowing of *rabi* jowar gave the highest yield of 3693 kg/ha when planted on 24th September and it progressively reduced to 2079 kg/ha when planted late on 30th October. At Bijapur, application of fertiliser at recommended level gave 1017 kg/ha of cotton compared to 891 kg/ha with 50 per cent of the recommended level and 697 kg/ha in control.

The results of experiments conducted at Hagari and Bagalkot also indicated that bengalgram+safflower in 2 : 1 or 3 : 1 proportions gave higher returns than as entire crops. Higher yields of *rabi* jowar were also obtained with 50 kg N + 30 kg  $P_2O_5$ /ha at these locations.

On an average over three years i.e., 1978 to 1981 at Bijapur intercropping of Hy. bajra and redgram at 60 cm row spacing has given 1405 kg/ha of bajra and 1075 kg/ha of redgram with LER of 1.53. On an average over the three years results, highest gross return of Rs. 5551 per ha was obtained in groundnut + redgram in 2 : 1 proportions with yield levels of 662 kg/ha of groundnut and 1214 kg/ha of redgram compared to 1202 and 1323 kg/ha of groundnut and redgram respectively when grown as entire crops.



#### 1.1.16. *Forage crops*

On an average over three years results, both Sirsa-9 and Anand-2 varieties of lucerne gave similar yields of 51.47 to 52.63 t/ha at Dharwad. Row spacing of 15 or 22.5 cm also gave similar yields. In another trial, irrespective of seed rate and fertility levels, pioneer hybrid × 988 sorghum gave higher yields of 98.55 t/ha compared to 72.97 t/ha in J-set-3 and 62.83 t/ha in S. B. 1079. In another trial on sweet sorghum varieties; J-Set-3 gave 79.68 t/ha and Brandies gave 78.9 t/ha. South African maize + cowpea gave 95.32 t/ha and was superior to Deccan hybrid F1 or F2 seeds.

At Bangalore, 17.26 t/ha of lucerne was obtained with 160 kg N/ha compared to 14.74 and 23.09 t/ha at 80 kg N/ha and control respectively. At lower levels of nitrogen lucerne responded to rhizobium treatment. In another trial green panic yielded 85.27 t/ha with clipping at every 40 days and application of 200-100-60 kg NPK/ha. NB-21 at 30 × 90 cm and BN-2 at 30 × 60 cm have yielded 104.32 and 120.16 t/ha respectively at Bangalore. Higher yield of 47.23 t/ha was obtained in NB 21 at 90 × 30 cm spacing under rainfed conditions.

#### 1.1.17. *Irrigation Water Management*

On an average over 3 years results 1979-80, 1980-81 and 1981-82 at Navalagund, irrigation to wheat at 0.9 IW CPE ratio gave 3818 kg/ha compared to 3695 and 3070 kg/ha when irrigated at 0.6 and 0.3 IW/CPE ratios respectively. CSH-5 sorghum responded to 0.6 IW/CPE ratio during 1981-82 season giving 5243 kg/ha compared to 5176 and 4770 kg/ha when irrigated at 0.4 and 0.8 IW/CPE ratios respectively. On an average over 3 years data, safflower gave higher yields of 1542 kg/ha when irrigated at 0.6 IW/CPE ratio up to flowering and later at 0.3 IW/CPE ratio. Only one irrigation at sowing gave 1088 kg/ha. On the basis of two years *i.e.*, 1980-81, 1981-82 results, bidi tobacco gave the yield of 1839 kg/ha at 0.6 IW/CPE ratio followed by 1820 kg/ha in 0.8 IW/CPE ratio and 1777 kg/ha in 0.4 IW/CPE ratio. The highest yield of 22.75 t/ha onion bulb was recorded when irrigated at 0.7 IW/CPE ratio compared to 18.19 t/ha in unirrigated control.

The large scale trials and demonstrations on on-farm development and water management of crops under Krishnaraja Sagar Command Area were taken up at Mandya. The average conveyance losses of water in the field channels was 13 per cent. The water distribution efficiency was low *i.e.*, 22-64 per cent in October and increased to 92-95 per cent in May. The perched and varying water table depth based on opening and closing of distributory varied from 13-82 cm during July in plots from low land to upland. The gross irrigation

water requirement for both maize and ragi was 38 cm. In case of paddy 214 cm of water was required including rainfall.

#### 1.1.18. *Saline Water Use*

The results of studies conducted during *rabi* 1981 season at Dharwad showed that yield of safflower decreased from 2319 kg/ha to 1640 kg/ha when saline water of 2 to 16 mmhos/cm was used as compared to 2501 kg/ha in control. Studies on the conjunctive use of saline water with good quality water for cowpea conducted in summer 1982 showed that alternating good quality water and saline water irrigation did not adversely affect the yield of crop. Similar results were obtained in *kharif* maize crop also. In another experiment, use of saline water from 2 to 16 mmhos/cm reduced the *kharif* maize yield from 5991 to 4177 kg/ha as compared to 6963 kg/ha with use of good quality water.

#### 1.1.19. *Weed Control*

At Nagenahalli, use of integrated method of weed control in paddy *i.e.*, cultural practices along with benthocarb or pendimethalin at 1.0 kg a.i./ha gave yield comparable to plot receiving herbicide at 2.0 kg/a.i./ha along with cultural practices. At Hebbal, use of metribuzin at 0.25 kg/a.i./ha gave higher soybean yield of 2629 kg/ha compared to 2292 kg/ha in no chemical weed control. At Nagenahalli, use of Butachlor at 1.25 kg a.i./ha and pendimethalin at 2.0 kg a.i./ha gave 2012 and 2082 kg/ha respectively of paddy compared to 1721 kg/ha in unweeded control and 2070 kg/ha in hand weeding twice. At Hebbal, use of Atrazine at 1.0 kg/a.i./ha to maize crop gave 3964 kg/ha compared to 3686 kg/ha in unweeded control. Use of fluazifop butyl at 0.5 kg/ha 30 days after sowing to groundnut crop gave 1103 kg/ha compared to 1048 kg/ha in hand weeding 30 days after sowing; 1217 kg/ha in hand weeding+ hoeing 30 days after sowing and 431 kg/ha in unweeded control.

#### 1.1.20. *Black Cotton Soil Research*

Studies on sources of phosphate fertilizer in *kharif* legumes followed by wheat showed that for legumes like cowpea, soybean for grain and lucerne, diammonium phosphate was superior than other sources. Studies were conducted on the effect of farm waste on physico-chemical properties of black soils and their influence on plant growth. On an average of 3 years (1980-82), application of cotton stalks at 5 t/ha produced maize grain yield of 3230 kg/ha and it was 27 per cent higher than use of fertilizers alone. In another study the highest grain yield of 5100 kg/ha of maize was obtained when 375 kg/ha of neem cake was added along with recommended dose of NPK which was 15 per cent higher than use of fertilizer alone.

### 1.1.21. Model Agronomy

The results of experiments during 1981-82 are as follows :

In an experiment on production potential and economics of high intensity crop rotations at Siruguppa, introduction of Bengalgram or safflower in place of wheat during *rabi* and cowpea during summer in place of jowar resulted in considerable savings of fertilizer input and increase in total physical production. In the study on identification of most efficient *rabi* crop under resource constraints, at Siruguppa, the crops of Bengalgram A-1 (20.2 q/ha) and safflower A-1 (19.6 q/ha) were found to be better than wheat HD 2189 (19.0 q/ha).

In an experiment on intercropping in sugarcane, the intercrop of onion had no significant effect on the yield of main crop *i.e.* sugarcane in any one of the planting patterns of sugarcane. Highest yield of 69.9 t/ha of sugarcane was obtained with skip row planting of sugarcane with 12 rows of intercrop of onion in the vacant space with 50 per cent recommended fertilizer to intercrop. An additional yield of 71.1 q/ha of onion with a net return of Rs. 11,891/ha was obtained.

In the studies on agronomic evaluation of rice varieties at Siruguppa, the variety Prakash (52.71/ha) performed better as compared to MR-292F (49.8 q/ha) and Sona Masuri (49 q/ha). Yields of all the varieties decreased with delayed planting and increased with increasing levels of N application. In an experiment on substitution of chemical nitrogen through FYM on CSH-5 jowar at Siruguppa there was no significant difference in yield due to different proportions of N through FYM or chemical fertilizer. In this experiment optimum dose of P and K were applied. In a similar experiment on rice at Mangalore the results indicated that application of a part of N (50 to 75 per cent) through chemical fertilizer gave higher yields.

In an experiment on the efficiency of coal acid treated urea on rice crop at Siruguppa no significant effect of coal acid treated urea was obtained during *kharif*. While during summer season its effect was more pronounced. At 100 kg N/ha the yield of increase was from 62.5 q/ha to 85.4 q/ha with 15 per cent coal acid treated urea and to 87.2 q/ha with 100 per cent coal acid treated urea. The results of the experiment on the efficiency of phospal as a source of phosphorus on rice crop at Siruguppa indicated the equal efficiency of single superphosphate and phospal.

In the study on varietal combinations for achieving high yields in rice-rice rotation conducted at Mangalore highest grain yield of 8.10 t/ha was obtained by growing Phalguna and Jaya varieties in *kharif* and *rabi* seasons. In

an experiment to study efficiency of *Azolla* as an organic manure at Mangalore during *kharif* season, application of 10 t/ha of fresh *Azolla* + 30 kg N/ha gave the highest yield of 5.3 t/ha. Application of 5 t/ha of fresh *Azolla* along with 30 kg N/ha also produced yields (5.1 t/ha) which were on par with yields at  $N_{50}$  (4.9 t/ha) and  $N_{90}$  (5.0 t/ha).

#### 1.1.22. Experiments on cultivators fields

Average response of crops to fertilizer levels obtained during 1981-82 are as follows :

Fertilizer level of 120-60-60 kg N- $P_2O_5$  -  $K_2O$ /ha to *kharif* rice varieties, Intan and Pushpa in Hassan, Kolar and N. Kanara districts gave responses to the extent of 25.5 to 28.4 q/ha. In case of summer rice in Rasi and IR-20 varieties, the responses were to the extent of 22.1 to 28.4 q/ha. The yield of control ranged from 26.9 to 48.7 q/ha.

Fertiliser level of 90-60-60 kg N,  $P_2O_5$ ,  $K_2O$ /ha to Indaf-1 ragi gave a response of 9.8 to 18.4 q/ha in Kolar district, the control yields were 7.6 to 11.6 q/ha. Application of 20-60-40 kg N- $P_2O_5$  -  $K_2O$ /ha to *rabi* groundnut in N. Kanara district gave a response of 14.1 q/ha over a control yield of 15.0 q/ha.

The pulses like greengram, blackgram and horsegram in general gave a response of 2.3 to 5.7 q/ha to 20-40 kg N- $P_2O_5$ /ha, in Kolar, Hassan and Bidar districts. In case of *rabi* cowpea in N. Kanara district, application of 20-40-20 kg N- $P_2O_5$  -  $K_2O$ /ha gave a response of 12.3 q/ha over the control yield of 2.9 q/ha.

Application of 20-60 kg N- $P_2O_5$ /ha to summer groundnut gave a response of 12.7 q/ha over a control yield of 17.3 q/ha in Kolar district.

The results of the performance of crop varieties showed that Pushpa during *kharif* and Rasi during summer produced higher yields of paddy in Hassan district. The varieties Indaf-9 and HR-911 of ragi produced higher yields during summer season in Kolar district. The varieties Dh-3-30 and TMV-2 of groundnut produced almost similar yields during *rabi* season in N. Kanara district.

The results of adoptive trials conducted in Bangalore region showed that HR-911 ragi, TTB-7 redgram are promising. Yield of soybean was only 76-79 kg/acre when grown with redgram yielding 341 to 439 kg/acre. Relay cropping of tomato in redgram is promising. Use of urea super granules to rice crop at 50 per cent of recommended N level and of 100 per cent prilled urea were on par.

In Dharwad region IET-5899, IET-5882, IET-5656 and Gama varieties of paddy performed better than local. DSM-1 hybrid sorghum gave better yields than local hybrid checks by about 20 per cent. Dh-8 variety of groundnut recorded 31 per cent higher yield over local checks.

At Mandya, use of urea supergranules to 20 and 40 kg N/acre gave 21.7 q/acre respectively compared to 22.5 q/acre in check which received 40 kg N/acre of prilled urea. At Raichur, SPH 218 *rabi* jowar gave 18.0 per cent increase over M-35-1.

## 1.2 Plant Breeding

### 1.2.1. Rice

In the project on exploitation of hybrid vigour in rice utilising male sterile lines (KMS, IRRI lines), out of 5 male sterile lines received from IRRI, viz., V-20, Yairai-Zhal, Woo-10, MS-577 and Pankhari-203, Pankhari grow normally. Among the locally developed male sterile lines KMS-4 is more vigorous than KMS-5. Out of 400 test entries combined with different male sterile lines, 17 entries appear to restore male fertility, while several entries produced male sterile progenies. Back crossing programme is undertaken to develop B lines. In the programme on hybrid seed production in rice, using KMS-1 as female and Pushpa, Intan mutant as male parents, an out crossing of 6-12 per cent is observed. For increasing the hybrid seed set, staggered planting of 10 days was studied, and an increased seed setting of 8-16 per cent has been observed due to better synchronization. Among the four techniques employed for better pollen distribution, rope pulling and beating with bamboo sticks caused higher seed set, where the seed set percentage was increased to 6-12 per cent. Among the four male parents used, Intan gave 8-16 per cent of set compared to 6-12 per cent of Vani and Pushpa. In China, more than 10 per cent seed setting was found economical for commercial seed production. Isolation requirement was also studied in rice using purple gene marker adopting different spacings from 30 to 1500 cm. With and without inter planting and using male sterile and normal lines, it was observed that seed set percentage of 0.66 per cent only was observed on MS-lines when pollen source was 340 cm away compared to 4 per cent seed set with 20 cm distance. The seed set was very low due to out-crossing on normal plants compared to male sterile lines.

Several hybrid combinations were tested for the extent of hybrid vigour and some of the combinations viz., KMS-1  $\times$  Pushpa, KMS-4  $\times$  IET-6211, KMS-5  $\times$  Sona Mahsuri manifested a marked hybrid vigour. In the project on the development of rice varieties adapted to environmental stress (cold and

adverse soil), the varieties CT-1351, CT-97, CT-12, Puraviya, produced significantly higher yields compared to checks besides being free from blast. The cultures cold Kothandan, cold Adakkan-27, Chettivelian, and Puraviya produced yields on par or superior to Mangala. Cold Kothandan and Adakkan were found to be highly tolerant to cold. Under fertilizer stress condition some of the derivatives of Intan-Mahsuri cross, were found to be promising compared to Mahsuri and Intan. In the project on breeding varieties for grain quality, the cultures KMS-5914-5-6 (6131 kg), IET-57-22 (6136 kg) were found to be superior compared to Jaya with 6106 kg per ha. In the elite rice variety trial, the culture, KMP-41 gave the highest yield of 4318 kg per ha followed by IET-6262 with 4242 kg. In the International varietal trial, the cultures IR-29484 (5151 kg), IR-30864 (6074 kg), IR-29509 (4924 kg) were found to be promising compared to 4964 kg of KMP-39 besides being early by about 15 days compared to KMP-39. In the uniform varietal trial-1, IET-6639 and ES-18 which yielded 3788 and 3788 kg/ha respectively. In the uniform varietal trial-2, the culture IET-6985 (7666 kg) followed by IET-7267 (6666 kg) were found to be superior to KMP-39 with 6222 kg/ha. In uniform varietal trial-3 of long duration varieties, IET-5688 (7777 kg) followed by IET-6074 (7555 kg) and IET-6262 (7111 kg) were found to be superior to KMP-41 with 6222 kg/ha. In the project on development of salt tolerant varieties the culture KMP-152 (6666 kg) and IR 3871 (5749 kg) were found to be highly promising compared to Getu (4832 kg) and Mangala (4999 kg).

In the project on breeding varieties for blast resistance at Ponnampet variety 301 was found to be highly promising with 5729 kg compared to Intan. The disease score for culture 301 was 1 compared to 7 for Intan.

In the development of varieties for hill tract (low lands) in the trials conducted at Ponnampet, the cultures, IET-6261 (4835 kg), IET-6466 (4423 kg) were found superior to KMP-39 with 3966 kg and Intan which was highly susceptible to blast and did not give any yield. In the low land trials, the cultures TNAU-17069 was very promising with an yield of 3663 kg and blast score of 3. In the uniform trial conducted at Sirsi, the culture 6231 gave the highest yield of 6133 kg compared to 5433 kg of Jaya and 5463 kg of Shakthi.

In the uniform varietal trial conducted at Kankanadi, Mangalore, the culture 6709, gave the highest yield of 3564 kg compared to 2928 kg/ha of Jaya.

In the upland rice trial conducted at Mugad, the cultures 58 BMB-105-2 was the highest yielder with 6601 kg followed by IRRI-6 with 6437 kg compared to 5769 kg of DR-2-2. In the Midland varietal trial, the culture 6279 with 7286 kg was the highest yielder followed by IET-5909 with 7103 kg compared to 5301 kg/ha of A-61. In the low land varietal trial, the cultures

IET-5899 (6674 kg), IET-6144 (6299 kg) and IET-5882 (6247 kg) were promising compared to 5062 kg of A-200 and 3113 kg of Y-4.

For Tungabhadra project area, trials conducted at Siruguppa indicated the cultures 7303 (6088 kg), 7302 (5825 kg) were promising compared to 4109 kg of Jaya and 4836 kg/ha of Shakthi. In salt tolerant varietal trial, the culture TNAU-4327 gave the highest yield of 5161 kg followed by 5128 kg of Sona-Mahsuri compared to 4219 kg of Prakash, and 2720 kg/ha of Mahsuri.

In the elite varietal trial conducted at Ankola, the culture 3626 gave the highest yield of 4236 kg compared to 2912 kg/ha of Jaya.

In Hill rice varietal trial conducted at Mudigere, the culture IR-30871 gave the highest yield of 4030 kg compared to 3219 kg of Intan and 3362 kg/ha of Puttabatta. In another trial, KMP-40 with 5767 kg was the highest yielder compared to 4250 kg/ha of Puttabatta. In the local rice varietal trial, the culture, Bilihasadi was the highest yielder with 4899 kg followed by Biliakki 4499 was compared to 3523 kg of Jaya and 3235 kg of Intan.

In the salt tolerant varietal trial conducted at Hiriyur, the old variety S-317 (3764 kg) was the highest yielder compared to 1618 kg of Mangala. In the salinity-alkalinity trials conducted at Gangavati, the variety 30864 was the highest yielder with 4381 kg followed by 4163 kg of Sona Mahsuri.

In Mangalore in the project on breeding for Gall midge resistance and suited to mid land conditions, the variety KMP-6 was found to be superior with 5377 kg compared to 5266 kg/ha of Shakthi.

#### 1.2.2. **Wheat**

Due to continuous breeding work a number of rust resistant wheat varieties have been isolated. Among them, the cultures DWR-16, DWR-26, DWR-39, DWR-77, 78, 79 under irrigated conditions and DWR-137, DWR-34, 43, DWR-306-7-6, DWR-17, DWR-305-1-5 have been found to be most promising both for yield and rust resistance. These give 15 to 25 per cent higher yield than the standard variety either HD-2189 or Bijaga yellow respectively. The cultures DWR-16 and DWR-137, have been released for general cultivation and they have become very popular among the farmers. The All India Co-ordinated Project has identified DWR-39, as the most promising variety for the whole of peninsular Sona. This variety is under seed multiplication and minikit programme. It gives 15-20 per cent more yield than HD-2189 and DWR-16. Similarly the culture DWR-26, has been recognised as a quality type and is being popularised.

### 1.2.3. Maize

There were 16 trials conducted during the year under report. In trial-I with late maturing genotypes of stage I, with the experimental varieties SynB-21, NLD-composite, none of the entries were superior to Deccan 103. In the medium maturing genotypes SynB-41 (46.42 q), composite B-7 White dent (54.86 q), B-7 White flint (48.26 q) were promising compared to 49.49 q of G-16 local. In the advanced testing of medium maturing genotypes the culture MCV-314 with 57.52 q was superior to Tarun with 43.27 q and local with 35.02 q/ha. In the preliminary testing of very early composites and hybrids MCV-501 with 27.96 q was the highest yielder followed by MCV-78-1022 with 26.93 q compared to 24.54 of local and 22.25 q/ha of Diara.

In the advanced testing (Stage III) of early and very early maturing genotypes, the hybrid Tarun × Hunius with 30.41 q was the highest yielder followed by G-26 with 29.38 q compared to 25.75 q/ha of local. In the top cross trial, the performance of HS-114, HS-502, SynB-19E, Cuba-24 were promising genotypes. In the station trial to test the performance of hybrids, the hybrids EH-457199 (55.66 q) and EH-460079 (54.81 q) were highest yielders compared to 54 q/ha of Deccan 101. In another station trial to assess the performance of composites, it was seen that the performance of G-33 (66.59 q) and G-11 (64-60 q) were highly promising compared to 44.4 q of Deccan 101.

At Mandya centre, attempts are made to find out the time of occurrence of downy mildew and leaf blight under natural conditions by sowing it at 10 days intervals around the year. With available data, it is seen that April and October sown crop will have maximum incidence of downy mildew and August sown crop will have maximum incidence of blight. Attempts are also being made to improve the resistance level of CM-500 for the diseases. It is observed that sporulation of *Peranoaclerospora sorghi* occurs between 2.30-4.00 a.m. at 20°C and 80 per cent R.H.

To improve the resistance of the CM lines 202, 206, 300, 400, 500 and 600 the blight resistance sources like Phil DMR-1, Phil DMR-2, Phil DMR-5 and Thai composite are employed. For downy mildew resistance, sources like B-57, HTN-RN6Ht-1, CM-105, CM-114, are used. All the five national pools are being improved for their level of resistance to downy mildew and leaf blight by half sib selection, full sib selection and S<sub>1</sub> selection.

### 1.2.4. Sorghum

In the project on developing hybrids and varieties for yield, adaptability and reaction to pests and diseases, the entries SPV-462, SPV-463, SPV-472 have



given the highest yields of 6949, 6911 and 6911 kg/ha respectively in the advanced varietal trial. In the advanced hybrid trial, the hybrids SPH-196 (DCH-1), SPH-225 and SPH-232 have given the highest yields of 6115, 6115 and 5153 kg per ha compared to 4663 kg/ha of CSH-9. SPH-196 has recorded its superiority in fodder yield by giving 8256 kg fodder compared 5198 kg/ha of CSH-9. In the preliminary varietal trial-1, out of 26 entries SPV-546 gave the highest yield of 5550 kg against 5443 kg of SB-1079. In the PVT-2, culture SPV-544 recorded the highest yield of 42.5 q against 36 q of SB-1079. In the preliminary hybrid trial, SPH-266 and SPH-162 recorded 59.6 and 57.0 q/ha compared to 42.9 q of CSH-9.

In the project on developing high yielding varieties and hybrids with wider adaptability under different agroclimatic conditions of the state, the cultures SB-2419, SB-2513 and SB-6203 gave the highest yield of 5572, 5343 and 5099 kg/ha respectively against 48.3 q of SB-1079. In the multilocation hybrid trial, the hybrids 296A  $\times$  SB-2407, 2919A  $\times$  SB-1079 gave the highest yields of 76.7 and 74.3 q as against 52.9 q of CSH-6. The promising hybrids based on multilocation data appear to be 296A  $\times$  SB-6601, 296A  $\times$  SB-2407, 296A  $\times$  SB-1085, while amongst the varieties, SB-2516, SB-5512, SB-5506, appear to be promising compared to SB-1079 used as check.

#### 1.2.5. *Rabi Sorghum*

In Bijapur centre in the Co-ordinated trials of *rabi* sorghum of the hybrids SPH-218 (38.8 q), MSH-49 (34.9 q) among hybrids and SPV-489 (36.1q), SPV-504 (34.2 q) among the varieties were found to be promising for grain yield. In the state varietal trial, the entries (5-4-1  $\times$  3691) 90-1-1-2 (43.8 q) was the most promising entry compared to SPV-86 (42.0 q).

In Dharwad Centre in the project for breeding for shootfly resistance, F6 progenies with high resistance to shootfly were selected with the shootfly resistance ranging from 36-65 per cent. F5 progenies are backcrossed to resistant parent and the shootfly resistance is improved from 40-66 per cent.

In the Co-ordinated varietal trial during *rabi* 1982, the hybrid NSH-48 gave the highest yield of 3024 kg followed by SPH-257 (2901 kg) and SPH-162 (4793 kg). However the hybrid SPH-219 alone was tolerant to Charcoal rot. In the advanced varietal trial, the entries SPV-422 (32.7q), SPV-419 (25.61 q), SPV-504 (24.99 q) and SPV-518 (24.69 q) were superior compared to 24.38 q/ha of CSV-8R and 20.06 q/ha of CSH-8R. In the preliminary hybrid trial, the hybrid SPH-218 topped the list in grain yield with 32.87 q followed by MSH-51 with 31.94 q compared to 25.15 q of CSH-8R and 27.75 q of 5-4-1. In the

preliminary varietal trial, the grain yield of SPV-574 (31.32 q) was highest compared to 27.46 q of SPV-8R.

In the multilocation hybrid trial which was laidout at Annegeri, Bagalkot and Hagari, the hybrid 296A × (BJ 111 × SB 1066) was the top yielder with 59.6 q compared to 56 q of 5-4-1. The hybrid 296 A × M148-138-1-1-2 recorded the highest grain yield of 59 q/ha at Bagalkot. However the variety 5-4-1 stood first at Dharwad centre with 23 q. In multilocation varietal trial, the cultures (5-4-1 × IS 3691) 90-1-1-2, (SPV-86 × BJ 111)-3-3 were the promising entries. In the project on development of new male sterile lines, SPV-86-21A, SPV-85-3A and SPV-85-7A have been developed which were found to be male sterile stable varieties. Ten new hybrids have been produced for evaluation in the next season. Five F<sub>2</sub> populations were grown and selections were made based on grain type and earhead type, tolerance to Charcoal rot.

#### 1.2.6. Bajra

Among the bajra populations studied during the year under report, the performance of the cultures APC × J 934 (21.48 q), RB-56 × APC (15.25 q) and BYL-1 (15.01 q) were superior compared to 9.30 q of BJ-104.

In bajra multilocation population trial, the performance of the cultures WB-20-4-1-1-2 (22.04), WB-20-4-1-1 (19.75) and WB-4-1-5-2 (18.73) were promising compared to 9.77 q/ha of BJ-104.

In the bajra inbred trial, the cultures WB-415 (36.62), WB-20-4-1-3-1 (33.36q) and WB-4-1-4 (31.16q) were promising compared to 16.81q of BH-104. In the initial pearl millet hybrid trial, the hybrids PHB-106 (35.48 q), ICH-440 (34.25 q), PHB-105 (30.55 q), UCH-9 (38.27 q) and ICH-220 (37.03 q) were very promising compared to 19.74 q of BJ-104. In the initial pearl millet population trial, the cultures RHRB-363 (30.86 q), DCP-7904 (28.59 q), ICMS-7704 (32.91q) and ICMS-7703 (32.5q) were very promising compared to 19.74 q/ha of BJ-104.

#### 1.2.7. Setaria

In the multilocation trial of Setaria, the cultures RS61-5-2, recorded the highest yield of 2794 kg per ha closely followed by RS67-60-1-1, RS-61-60-3-2, RS61-60-5-1, RS61-80-1-5 which recorded 2712, 2655, 2539 and 2526 kg per ha respectively compared to 2150 kg/ha of K221-1.

In trial 2, the entry RS 159, recorded the highest yield of 23.52 q as against 21.89 q of HK-289. In the third trial, the culture ISI-60 with 21.90

q was the highest yielder compared to 19.72 q of K221-1. In the advanced *Setaria* trial, the cultures of 5307 (23.60q), STC-1 (23.15 q) and SIA-805 (22.91 q) were the highest yielders compared to 19.1 q/ha of RS-118. In minor millets, the cultures MS14-92 of *Miliaceum*, VL-28 of *Echinoclova* RMP-44, among maliare IPS-147-1 among *Paspalum* were the highest yielding cultures.

#### 1.2.8. *Ragi*

At Hebbal in the multilocation trial of elite ragi varieties conducted at 7 locations the culture-23-16-12 (PES-172 × Indaf-3) was the earliest. The entry HR-8-2-1-3 recorded the highest yield of 53.47 q/ha followed by HR-911 with 49.54 q/ha. In the initial evaluation trial with 19 entries the progeny 6-2-7-1 from the cross IE-974 × IE-882 recorded the highest grain yield of 46.4 q followed by 2-11-2-1 (45 q) besides having better level of tolerance to blast. Early generation material of diverse crosses were evaluated, 500 single plant selections have been made with high yield potentiality and higher level of blast tolerance.

In the co-ordinated ragi initial evaluation trial, HR-911 which has been recommended for adaptive trial in the State is the top yielder with 30 q followed by JNR-47-1 (29.3 q) compared to the check PR-202 (25.5 q). In the Co-ordinated ragi varietal trials, PR-1044, Indaf-7. HR-154 and PR-177, were the promising cultures.

#### 1.2.9. *Cowpea*

A national cowpea germplasm of 1230 accessions were grown during the year for seed multiplication. Forty one fresh crosses involving different parents have been made. 38  $F_2$  populations were grown during the season and several selections have been made. In the cowpea co-ordinated varietal trial, the cultures V-317, V-59, V-240 and V-89 gave the highest yields 1927, 1794, 1782 and 1754 kg respectively, compared to 1183 kgs of KBC-1 and 1600 kg/ha of V-16, In the multilocation trial, the culture V-37 (13.19 q) was found to be superior to KBC-1 (12.7 q). In the red gram Co-ordinated the maximum yield of 7.3 q per ha was recorded by DL-82 followed by 6.3 q of H-76-4. In the redgram varietal trial-2, the entries MT-H-2 recorded the highest yield of 14.2 q followed by ICPM-2 (13.2 q) compared to 8.3 q of BDN-1 and 9.2 q/ha of C-11.

A redgram varietal trial was laid out in 1982 summer at Bangalore and Mandya to identify suitable varieties for summer season for Southern Karnataka. The yield levels were very poor. However, the cultures S-14, VL-23 and ICPL-6

were the promising entries with 2.4, 2.4 and 2.3 q/ha respectively.

In the blackgram co-ordinated varietal trial, the crop growth was very bad, and the trial is taken as vitiated ; likewise in greengram also, the trial was taken as vitiated.

#### 1.2.10. *Redgram*

In the redgram varietal trial-2 with 20 entries GS-1, gave the highest yield of 1736 kg/ha followed by ICPL-270 (1677 kg), BDN-3 (1495 kg), BDN-1 (1497 kg) compared to 1392 kg/ha of PT-221 and 1378 kg/ha of C-11.

In the trial of promising cultures of redgram, the released variety GS-1 topped the list with 1951 kg/ha followed by 282 (1864 kg) and BDN-3 (1852 kg) compared to 1713 kg of PT-221 and 1642 kg/ha of C-11.

In ICRISAT, medium maturity pigeon pea with 24 entries, the culture ICPL-262 (1230 kg), ICPL-265 (1155 kg), ICPL-276 (1151 kg) were promising compared to BDN-1 (832 kg).

In the greengram co-ordinated varietal trial with 16 entries, the culture Pusa-105, was the top yielder with 900 kg followed by TAP-7 (880 kg) compared to 570 kg of PS-16. In the initial evaluation trial, the culture Pusa-108, with 958 kg per ha topped the list compared to 614 kg PS-16. In the cowpea co-ordinated trial with 20 entries, the culture RC-19 was the top yielder with 1039 kg followed by 8-21-B (1008 kg) compared to 586 kg of C-152. In cowpea varietal trial of promising cultures developed at Dharwad, the culture selection 43 gave an yield of 854 kg/ha compared to 746 kg of C-152. About 70 new crosses were effected in redgram, 2 crosses in avare, 6 crosses in greengram and 2 crosses in Bengalgram. Several new pulse crops like lima bean, sword bean, winged bean and moth bean have been introduced.

In the redgram varietal trials, the released variety GS-1 again proved to be the most consistent in its performance. It is known for its recovery resistance for pod borer. The varieties GS-1 and GS-2, the local selections have proved to be better than C-11 and BDN-1. In the advanced multilocation trial, the cultures C-24-95 (16.37 q), GS-3 (15.78 q) were found to be superior to PT-221 (15.19 q). In the small scale yield trial, the variety C-1-199 recorded the highest yild of 1329 kg followed by C-25-17 (12.58 kg) compared to 12.38 kg of PT-221.

In the initial evaluation trial, the highest yield has been recorded by the culture GS-2  $\times$  PD-1 (2042 kg) compared to 794 kg of GS-1. Twelve F<sub>1</sub> crosses were studied during the year.

In chickpea large scale yield trial, the culture 2375, was the earliest. The culture (V-24  $\times$  A<sub>1</sub>)-68-6-36 gave the highest yield of 1499 kg compared to 1408 kg/ha of local.

In the small scale yield trial, the culture-A<sub>1</sub>-50 (1669 kg) was the highest yielder compared to 1577 kg of A<sub>1</sub> in the early group, while IC-511 with 1650 kg and IC-74780 with 1462 kg were the top yielders compared to 1450 kg of A<sub>1</sub> in the late group.

In the initial yield trial of Desi and Kabuli crosses, the culture 2375 with 1329 kg recorded 10 per cent higher yield over A<sub>1</sub> with 1259 kg. In 26 F<sub>2</sub> populations studied, 1200 single plant selections were made. Seven fresh crosses have been effected.

#### 1.2.11. *Soybean*

In the elite trial, KHSB-2 with 19.97 q was the highest yielder followed by KHSb-1 with 16.97 q. In advanced varietal trial, KHSb-2 which was used as check was the highest yielder with 20.78 q followed by JS-76-184 with 14.95 q/ha. In the initial evaluation trials, the cultures VLS-1 (16.39 q), PK-471 (16.08) and DS17-2 (16.00) were the promising cultures.

Mean of the three demonstrations and seven trials conducted over 5 years indicate the superiority of the released variety KHSb-2 although the varieties KHSb-5 and Jupiter were found to be numerically better. Five F<sub>2</sub> populations were studied during the season. 300 germplasm collections were maintained and evaluated. The varieties Monetta and Hardee have been recommended for intercropping for Dharwad and Bangalore regions respectively.

#### 1.2.12. *Groundnut*

In the initial evaluation trial with 21 entries, the variety J-11 with 36 q was the highest yielder. RC-15 had the highest percentage of shelling (82.5 per cent). In the co-ordinated varietal trial with 14 entries DH-12 an entry from Dharwad was the highest yielder with 28.34 q highest shelling of 78.77 per cent was recorded by selection-7 followed by DH-12 with 78.6 per cent.

In the national elite trial, the national check-J-11 was the highest yielder with 21.99 q/ha followed by DH-3-30 with 19.21 q compared to TG-17 with 13.25 q which was the lowest. JL-24 recorded the highest shelling percentage of 76.5 per cent. J-11 was also found to be tolerant to leaf spot and rust. In exotic varietal trial with 8 entries, the culture Comet was the highest yielder with 28.48 q followed by DH-3-30 with 24.49 q. JL-24 had the highest 100 kernel weight of 50.2 g. In the multilocal trial in groundnut with

10 entries DH-15 with 29.13 q was the highest yielder. The culture ICGS-9 from ICRISAT gave the highest shelling percentage of 76.9. In the large scale yield trials with 21 cultures DH-3-30 with 25.56 q was the highest yielder. The cultures which were selected for iron absorption efficiency at Belavatgi were tried in large scale trial and the culture GP (B-27) gave the highest yield of 24.92 q/ha.

#### 1.2.13. *Sesamum*

In the national elite trial, the newly released variety E-8 (KDS-1) yielded highest with 970 kg/ha compared to 317 kg of TC-25. In the co-ordinated varietal trial with 13 entries E-8 with 716 kg/ha was again the highest yielder maturing in 105 days, while TNAU-2 maturing in 80-90 days gave an yield of 371 kg. In the initial evaluation trial with 32 cultures, E-8 was again the highest yielder with 631 kg followed by 579 kg of X-64. In the multilocation trial with 12 entries Gulbarga local gave the highest yield of 1031 kg/ha followed by E-8 with 982 kg/ha.

In the ad-hoc project on sesamum, 950 germplasm collections were evaluated for 10 characters in addition to scoring for resistance to powdery mildew and bacterial leaf spot. Fifteen lines were identified as tolerant to both the diseases. 28 F<sub>2</sub> populations of different crosses were studied besides conducting 3 varietal trials. In the co-ordinated varietal trial the culture, PDP-1-2 gave the maximum yield of 748 kg/ha followed by TNAU-2 with 694 kg compared to 539 kg of local. In the national elite trial, the culture C-7 gave the highest yield of 563 kg followed by local with 512 kg/ha. In the station trial with 8 entries, the culture TNAU-2 recorded the highest yield of 680 kg as compared to 500 kg of local.

The culture JLT-2 was the highest yielder with 8 q/ha compared to 5 q/ha of Gulbarga local followed by GT-5, AT-20 and AT-1 at Raichur. In the co-ordinated varietal trial the culture JT-7 was the highest yielder with 7q followed UT-43 (7 q) and TC-25 with 7 q compared to 4.8 q of Raichur local. In the national elite trial, culture 6-7 with 6.62 q was the highest yielder followed by Punjab Til-1 (6.2 compared to 5.4 q of Raichur local. In the multilocation trial, BS-6-1-1 (10.14) and JT-66-135 (10.11 q) were the highest yielders compared to 9.6 q of TC-25. Thirty four new crosses were effected during the season.

#### 1.2.14. *Linseed*

The released variety S-36 with 3.15 q was the highest yielder compared to 3.3 q of Gulbarga local in the national elite trial. In the multifocations trial, culture EC-81-R was the best with 10.6 q compared to S-36 (8.21 q) but S-36 is

is fairly tolerant to powdery mildew. In the coordinated varietal trial, the culture LMH-408 was promising in one trial, while Gulbarga local and S-36 were promising in the other. In the initial evaluation trial, the culture R-1141-1 was the highest yielder with 7.0 q/ha, with high level of resistance to powdery mildew compared to 5.6 q of Gulbarga local and 6.0 q/ha of S-36.

#### 1.2.15. Sunflower

In the indigenous hybrid trial with 9 entries MHSF-1, FC-64450, BSH-1 and PKVSH-1 gave yields ranging from 1642-1682 kg/ha. Morden was early to mature in 85 days with 1289 kg/ha.

In the scheme on elite sunflower seed production 50 q of elite seeds of EC-68415 was produced during summer 1982. About 2801 individual plant selections were made based on 100 seed weight, grain yield, oil content and head diameter. During the *kharif* 1983, 40 q of EC-68415 was produced and 1252 individual plant selections were made. 3.2 q of super elite seeds of EC-68415 were produced during the summer of 1982. Super elite seed production involving Morden was taken up during 1982 and 2 q of seeds were produced. About 1510 individual plant selections have been made with an average yield of 55 g and 43.5 per cent oil. During the year 80.6 q foundation seeds of EC-68415, 36 q of Morden was produced and supplied to the various agencies.

In a project to develop self-fertile high yielding and high oil populations superior to presently cultivated varieties, 340 single plant selections were made in the panmictic population of Canadian gene pool (CGP-1). Out of these, 114 progeny lines were selected and bulked, and were grown during *kharif* and the data collected on individual plant basis. Finally 93 lines have been selected with an average of 70 g and above grain yield and more than 42 per cent oil. Five new sunflower hybrids are evaluated during the year. The hybrid SFH-1 recorded the highest yield of 1848 kg grain per ha and 734 kg of oil compared to 1701 kg of grains and 677 kg oil of BSH-1.

#### 1.2.16. Cotton

In the ad-hoc project on the commercial exploitation of hybrids (*Intra hirsutum* hybrids) for assured rainfed areas of Karnataka in the pilot project demonstrations, the cultures DP-197 and DP-452, gave an yield of 12.7 and 12.8 q which was 15 per cent higher than CPD-8-1. In the major strain trial with 33 entries, the strains DP-198, DP-1291 and RRD-18 gave 15.1, 15.8 and 16.6 q as against 15.4 q/ha of CPD-8-1. But they were earlier and superior in fibre characters. In trial-2, the cultures DRC-50, DRC-52 and DRC-78 gave significantly higher yields over CPD-8-1 with an yield level ranging from 8.3 to

10.3 q per ha as against 6.5 q of CPD-8-1. In the intra hirsutum hybrids, the cultures DCH-597 and DCH-337 gave yields of 12.1 to 15.8 q as against 11.2 q of CPD-8-1 in the pilot project demonstration. In the major trials with hybrids, the cultures DCH-374, 475, 471, 460, 458, 530, 519 and 518 recorded 15 to 29 per cent higher yield over CPD-8-1. In the initial trial DCH-461, 455, 466, 454, 462, 481, 479, 500, 499, 501, 506, 525 and 527 recorded higher yield of 36 to 41 per cent over CPD-8-1.

In the progeny selection of Sharada (CPD-8-1) the selections S-6 (39.11 q), S-43 (38.93 q) and S-12 (37.14 q) were found superior to Sharada with 35.45 q. In another experiment with 10 cultures, the culture MESR-16 with 30.88 q per ha was the highest yielder compared to 35.45 q of Sharada. In another experiment, the culture JK-356 with 36.53 q was the highest yielder compared to 35.45 q/ha of Sharada.

In the All India Coordinated Project on Cotton Improvement in the pilot project demonstration, none of the cultures were significantly superior to Sharada. However, DS-44 and DP-225 were high ginners and qualitatively on par with Sharada. In the coordinated varietal trial of *Gossypium hirsutum* cultures under rainfed conditions, the cultures DP-445 and DP-498 were significantly superior. In the preliminary varietal trial Set-1, the culture DP-1291, DP-640, JK-285, DP-1293 and DP-1773 were promising with yield levels of 12-15 q and on par with Sharada in yield while they are superior to Sharada in quality. In the ad-hoc trial of *Intra-hirsutum* hybrids, DCH-337 was significantly superior both in yield and quality. In the pilot project demonstration of *herbaceum* cultures, DB-3-12 was superior in ginning compared to Jayadhar. DB3-12 and DB-3124 gave significantly higher yields over Jayadhar.

At Shimoga, two promising strains of *Barbadense* cotton BCS-9-70 and Menouffi, were tried in the adoptive trials. BCS-9-70 has recorded 1348 kg/ha compared to 1025 kg of Suvin.

In the coordinated trial, BCS-22-73 (7.8 q) was significantly superior to Sea Island Andrews (4.7 q). One hundred thirtynine germplasm selections from Coimbatore, 49 selection from Surat and 25 from Nagpur of *G. barbadense* were collected.

At Sirguppa over the locations and 4 seasons, culture DS-70-480 recorded the highest yield of 16.9 q/ha against 13.2 q of control, besides having higher ginning outturn of 36.5 per cent and mean fibre length of 25.9 mm against 33.9 per cent of ginning and 24.4 mm of staple length of control and this is under adaptive trial in GLBC and TBP river valley project areas.



Another variety JGL-14515 has recorded highest yield of 28.7 q as against 23.8 q of check varieties besides having, ginning outturn of 38 per cent. In the hybrid cotton trials, based on 4 years data, the hybrids H-134 and H-64 have recorded yields of 29.3 and 27.0 q as against 25.9 q of Jayalaxmi and 29.1 q of Varalaxmi. In the initial evaluation trial of 28 cultures DS-50948 (28.6 q) and RRD-229 (26.9 q) were found to be superior compared to DS-59 with 18.5 q as local check.

In the preliminary varietal trial and the cultures TSH-126, DIC-9 with 29.9 and 24.0 q were the highest yielders compared to 21.9 q/ha of Hampi. In the coordinated varietal trial DS-27 (21.8q), HK-118-25-54 (21.6 and q) BS-28 with 21.4 q of kapas were the highest yielders compared to 19.4 q of Hampi. In set-2, the cultures JGL-14-515 (28.4 q) and SRG-584 (27.2), MCV-7 (26.2 q of kapas) were the highest yielders compared to 23.4 q/ha of DS-56.

#### 1.2.17. *Sugarcane*

Thirty clones were added to the existing germplasm. Three hundred and ninety nine clones maintained were evaluated for cane weight, millable canes per metre row length and pol per cent at 12 month age. Only forty eight clones scored above the minimum norms viz., 2 kg cane weight 9 milliable canes per metre row length, 19 per cent pol in juice. These 48 clones as well as clones with special attributes like tolerance to various stress situations are being used for further exploitation in hybridization.

Eighty clones comprising KMS, KHS, Co, MS and exotic clones were evaluated in four preliminary varietal trials, 2 pre-final varietal trials, 4 final varietal trials, 4 zonal varietal trials at Mandya, Sankeswar, Gangavathi, Bidar, Siruguppa and Nagenahalli. None of the clones out yielded the standard CO-62175 or CO-740 in cane yield. However, the clones KMS-615, KMS-1385, KMS-2084, KMS-2107, CO-7804, CO-7808, COM-7117, COM-7125, CO-7219, and CO-7318 are some of the promising clones at par with the standard in cane yield. These clones are promoted for further evaluation.

CO-7219 has excelled the standard CO-740, as well as CO-6415 in pol per cent of juice by 0.5 to 1 per cent at 10th as well as 12th months during the past 3 years. Further, it has yielded 1015 per cent more in cane yield per ha over standard CO-740 and has been approved for adaptive trials during 1983-84. Similarly CO-7314, a smut resistant variety has also numerically out-yielded CO-740 at Bidar and has been approved for adaptive trials during 1983-84.

Thirty two clones, including 10 exotics have been utilized in hybridization programme to produce 920 g fluff from 63 crosses and 2180 g of fluff from 24 open pollinated clones.

### 1.2.18. *Breeding programme in dryland project*

During the year under report 19 varietal trials comprising cowpea (3), groundnut (6), sesamum (2), horsegram (1), redgram (2), maize (1), blackgram (1), greengram (1), niger (1) and millets (2) were conducted. Germplasm evaluation of 120 horsegram cultures, 140 blackgram cultures, and 180 sesamum cultures were made during early *kharif* in rod rows. More than 1500  $F_2$  cowpea lines were evaluated in rod rows with C-152 as sliding check for every 10 rows.

In cowpea trial (early group) with 20 entries the new cultures 3231 and 3252 are the top yielders with 10.8 and 10.5, q/ha as against 8.24 q of TVX-944-02E. In the late group the highest yielders are 3219-1, 2128-1 and 3274.4 with an yield of 11.1, 10.7 and 10.5 q/ha respectively as against 9.6 q/ha of Vita-4 and 7.6 q/ha of TNK-944-02E.

The groundnut (early group) trial with 20 entries, has revealed superiority of entry RSHY-1 and RSHY-3 with 19.9 and 18.3 q/ha as against 18 q of DH-3-30. In the late group with 18 entries, highest yielders were IARI-52 (16.9 q) and No. 22 (16.1 q) as against 14.8 q/ha of BH-8-18.

In sesamum multilocation trial, highest yielder was TNAU-2 with 6.5 q/ha followed by Kanakapura local with 6.1 q. The variety BS-6-1-1 was early maturing in 82 days but yielding 5.9 q/ha.

In the finger millet trial the performance of Indaf-5.9 and PES-176 were very promising.

In pigeon pea trial with 30 entries, the cultures 265 (9.4 q) H-22 (8.4 q) and 330 (8.2 q) were the highest yielders compared to 7.5 q of Hy 3C.

### 1.2.19. *Agrostology*

In the trial of fodder cowpea with 6 cultures, the culture (CR  $\times$  RG-6) gave the highest yield of 42.52 tons/ha compared to 34.4 t of IGRFI-912. The culture (CR  $\times$  RG-6) has a different plant type. It was proposed to subject it to agronomic manipulations.

In a trial with horsegram for fodder purpose, the culture IC-10982 gave the highest yield of 32.40 q/ha compared to 29.97 q/ha of local check.

In the project on improvement of fodder sorghum, the hybrid 1394  $\times$  1079 gave the highest yield of 84.42 tons/ha followed by 1080  $\times$  J. Set-3 (84.27 tons) as compared to 80 tons of J. Set-3.

### 1.2.20. *Cytogenetics*

In the project on cytogenetical studies in *Dolichos* and *Microtyloma*, the Chromosome numbers ranged from  $2n=20$  to  $2n=22$ . *Microtyloma axillare* and

*M. ellipticum* were found to be immune to yellow mosaic virus. Crosses were effected between horsegram and two *Microtyloma* species.

In teaching department at Bangalore there are two BARC projects one on watermelon and the other on winged bean. Attempts have been made to develop seedless watermelon and determinate type of winged beans. There are two ICAR Ad-hoc projects *i.e.*, one on sesamum and the other on tomato. In sesamum, genotypes maturing in 75–80 days are undergoing testing in  $F_3$  generation. Some cultures maturing in 95–100 days which are significantly superior in yield over the local have been identified. In tomato NTDR-1, a nematode resistant variety has been released. Some of the new hybrids like Red to/ $\times$ NTDR-1 and Heniz  $\times$  NTDR-1 exhibited 30–35 per cent heterosis.

In a project on developing suitable strains in *Hibiscus cannabinus* have been collected and grown. They were studied for various morphological characters. Ten  $F_1$  crosses have been made.

### 1.3 Crop Physiology

#### 1.3.1. Ragi

Total plant conductances determines both  $CO_2$  exchange rate and the transpiration rate. Genotypes with high dry matter production with low plant conductances are desirable for rainfed conditions. Studies on plant conductances and productivity in 100 genotypes of ragi had shown that it is possible to identify genotypes differing in plant conductances producing high dry matter.

Assessment of several physiological parameters indicated that genotypes with low leaf area, stomatal frequency and high dry matter showed high photosynthetic carbon fixation rate. Such genotypes are desirable for rainfed situations. Further, genotypes with low plant conductances had high partitioning factor.

Genotypic variation in leaf area distribution at different canopy levels and its relationship to growth and productivity at different seasons showed that in medium duration varieties higher distribution of leaf area at the bottom canopy is possibly correlated with higher productivity.

#### 1.3.2. Dolichos (Field beans)

Studies on genotypic variation in growth and yield attributes have shown that one of the limiting factors for productivity in field bean is inadequate development of leaf area and LADP.

In determinate cultivars of field bean like Ha-3 high percentage of lower drop can be attributed to the inadequate source size and improper distribution of photosynthates especially during the inflorescence development period. These physiological constraints results in differential sink capacity in each and late formed sinks.

Enhancing the source size, by application of nitrogen resulted in increased pod set per dent.

Foliar application of NAA (10 ppm) +  $\text{CaCl}_2$  (0.1 per cent) reduced the abscission of flowers and also increased the pod set and also seed yield.

Based on sink-source relationship in determinate HA-3 the desirable plant characters for higher productivity would be a plant with 3 inflorescences with synchronous flowering and not more than 6 to 7 nodes per inflorescence. High leaf area at anthesis and equal distribution of leaf area in respect to individual inflorescence.

#### 1.3.3. *Sunflower*

In sunflower the dry matter accumulation was directly related to plant stomatal number which is a reflection of leaf area and plant stomatal number. Under stress condition significant genotypic variation was observed in the leaf water potential and stomatal resistances. Maintenance of high leaf water potential by stomatal regulation is a desirable character for higher productivity under intermittent moisture stress conditions.

The leaf expansion rate under stress showed marked variation under moisture stress. Genotypes which showed higher leaf expansion rate under stress also showed higher dry matter accumulation under stress.

In sunflower genotypes, there is considerable variation in the enzyme, nitrate reductase activity and also the amount of nitrogen reduced by the plant in different genotypes at all the growth stages. The nitrate flux is related to the NR activity in the plant though there was no relationship in the total dry matter produced and NR activity. However the genotypes with higher NR activity per plant showed higher dry matter accumulation and there is a high significant correlation in these characters.

#### 1.3.4. *Rice*

The studies on physiological basis of yield decline of yielding cultivars under *kharif* conditions in Mandya area showed that the decline is mostly due to lower dry matter accumulation particularly after post-flowering period

lesser spikelet and grain number, and low 100 grain weight and not due to spikelet sterility.

Higher productivity of Rasi cultivar is due to increased biomass production and LAI at all the growth stages.

In both dwarf and tall rice cultivars the greater contribution towards grain yield is mostly from the primary tiller as compared to secondary and tertiary tillers.

#### 1.3.5. *Sorghum*

Studies on 18 *rabi* sorghum cultivars on the pattern of translocation of stored photosynthates indicated that at higher nitrogen levels there was movement of photosynthates from the stem to the ear as indicated by the decrease in stem weight.

Among eight *rabi* sorghum genotypes tried at Bijapur under rainfed conditions, the hybrid SPH-218 had higher leaf and stem weight and high CGR compared to other genotypes. These physiological factors are responsible for the high yield potentiality of this hybrid.

#### 1.3.6. *Cotton*

Experimental results on seed cotton yield and seed quality in relation to flower position indicated that the contribution of needle position bolls was highest (50 per cent) while those from upper and middle together constituted 50 per cent (25 per cent each) of the total yield. No apparent difference was observed in the number or per cent of immature seeds with respect to different positions. Pickwise, the first two picks generally were of good quality, (*i.e.* w.r. t. good seed size and in number of immature seeds) than the later picking. Generally the seeds from second picking remained viable for longer period than those of first or later pickings. The results confirmed the previous years observations.

Presowing soaking of the seeds of Jayadhar in 0.2 per cent succinic acid gave 8.0 per cent more significant increased yield over control unsoaked seeds. None of the treatments improved the seed quality. The beneficial effects of presowing seed treatments offers to restrict to early germination particularly with gibberllic acid and hydration-dehydration (in water) treatments.

Oil: Laxmi (17%)	Jayadhar (13%)	Acala (11%)
Gossypol: Jayadhar (0.78%)	Laxmi (0.50%)	Acala (0.11%)

The germination of developing seeds was observed only from 50 days after sowing. At final harvest the germination as in the order of :

Jayadhar (80%)                      Acala (60%)                      Laxmi (6%)

The results in general confirmed earlier report that Laxmi has a period of dormancy (around 20 days.) The seed dormancy appears to be due to accumulation and maintenance of relative high quantities of phenol in the seeds.

Research on seed dormancy and viability in cotton genotypes showed that dormancy for periods ranging from 6 to 36 days. Heat treatment (45°C for 7 days) of sundrying for two consecutive days was effective in breaking the dormancy in the variety IRA-5166.

Presowing hydration-dehydration in water, sodium phosphate dibasic ( $10^{-4}$  M) or calcium pantothenate (10 ppm) improved the germination (viability) considerably in both artificially and naturally aged seeds of Sharada, Bhagya, Laxmi and Jayadhar

Studies on the physiological analysis of yield in American upland cottons in the transition zone of Dharwad indicated that JK-FORN-97 gave the higher yield of seed cotton. Although plant height and DMA was lower in this variety, it had high monopodial and sympodial branches and high leaf area.

### 1.3.7 Tobacco

Studies with  $^{14}\text{CO}_2$  fixation showed that varieties with higher rate of fixation in the young expanding leaf discs also higher leaf expansion rate and a higher per cent of chloroform soluble fraction.

The nutrient uptake capacity as reflected by the  $\text{K}^+$  and N contents per unit weight, varied among the varieties and at different stages of growth. Both K and N were higher during the early periods. Varieties 1975, 2338 and 10/2 seemed to show greater capacity for nutrient uptake.

Nursery light treatment exhibited an influence on the number of leaves in the earlier stages after transplanting the seedling in the field.

Zinc sulphate treatment promoted the establishment of tobacco transplants to a greater extent compared with ammonium molybdate and IBA either alone or in combination with zinc sulphate.

### 1.3.8 Physiological and biochemical adaptation of crop species to moisture stress

*Proline metabolism:* The rate of synthesis and possible degradation of hydroxyproline during moisture stress and during stress alleviation period was studied. During moisture stress period, there was no marked difference in

hydroxyproline content, though there is an increase in proline with decreasing RWC. During the stress alleviation there was a marked increase in hydroxyproline content and there was decrease in proline content.

The studies on diffusivity of proline have shown that, the diffusivity of the property of proline was much higher compared to other osmotically active compounds like, glucose, KCl, glycine and mannitol.

*Polyol metabolism:* Enriching plants with mannitol by exogenous application resulted in maintaining higher water potential in the leaves. The other carbohydrates, though provided exogenously did not help in maintaining higher water potential under stress.

*Effect of moisture stress on membrane integrity:* One of the primary effect of the moisture stress would be perturbation to membranes leading to loss in membrane integrity. Several compounds which accumulate under moisture stress conditions may help in maintaining membrane integrity during tissue dehydration.

ABA one of the compounds which accumulate under stress enhanced membrane integrity when the plant tissue were subjected to dehydration. Proline and glycine when exogenously supplied also imparted membrane integrity under moisture stress conditions. The plants which were subjected to a cycle of stress also showed higher membrane integrity when stressed during later stages of growth.

In cowpea and ground nut, the plants which were enriched with calcium maintained higher relative water content under stress and showed less membrane damage when subjected to moisture stress.

The differences in volume of water content in control and moisture stressed plants can serve as a parameter to assess the genotypic variations in waterholding capacity under stress. The water content to volume ratio was higher under stress compared to normal conditions. Amongst the groundnut genotypes, varieties RS-114, DH-3-30 and PR-202 in ragi had higher water content to volume ratio.

*Growth response of geotypes under nutrient stress;* Reduction in the zinc level in the nutrient media decreased the leaf area and dry matter both in ragi and french beans. French bean varieties were more sensitive in respect to reduction in total chlorophyll. Plant grown under zinc deficient condition showed higher Ribonuclease activity.

Weed competition studies with *Echinochloa* have shown that higher ratios (2 : 1 crop vs weed) considerable reduction in dry matter production of main crop was observed. The growth rate of *Echinochloa* is higher than that of paddy.

In rice nursery herbicide Pendimethionine was found effective in controlling *Echinochloa* weeds. Seed treatments with ethrel (50 ppm) or hot water treatment of seeds enhanced the seed germination by overcoming dormancy. In maize, herbicides such as atrazine and simazine, even at low concentration as 0.25 at kg/ha controlled the weeds most effectively. Similar results are observed in *rabi* sorghum as well under the irrigated condition in Malaprabha Project area.

Fusilade, was found effective in controlling dicot weeds in cotton. The same chemical at 1 kg ai/ha very effectively controlled *Cynodon dactylon* and the results are comparable to the application of Bromacil or Terbacil at the same dosage. In wheat Isoproturon at the rate of 1 kg/ha (a.i.) as post emergence trial was found to be effective not only in controlling the weeds in general but also parthenium in particular.

#### 1.4 Agricultural Chemistry and Soils

An experiment conducted at Dharwad on the use of farm residues such as cotton stalks, maize stalks and FYM without NPK fertilizers under irrigated conditions revealed the significant improvement in the crop yields due to enhanced availability of P, Mn and Fe.

The use of local tar coated urea at 1 per cent was effective in increasing rice yield at R.R.S., Mandya. The higher yields registered due to CTTU was 28 per cent over untreated urea.

The studies at Mugad confirmed the efficiency of neem cake coated urea compared to untreated urea.

Use of rockphosphate with pyrites in the ratio of 1:5 by weight enhance the grain yield of rice under flooded conditions at Mandya. Increase in yield and the available  $P_2O_5$  and recovery of P was also found higher. Among the various methods of application of P, cowdung treated super phosphate and with green manure recorded the highest grain yield and also the recovery of added phosphorus.



Due to application of nitrogen the percentage of reducing sugars in tobacco increased up to 12.91 per cent phosphorus and potash did not have any significant difference.

Studies on releasing pattern of applied and native phosphorus with neem cake at field conditions in Dharwad, indicated that the residual nutrients left by the application of 250 kg neem cake with 37.5 kg  $P_2O_5$ , 150 kg nitrogen, 37.5 kg  $K_2O$ /ha to maize crop yielding 47.0 q/ha enhanced the yield of wheat up to 26.2 q/ha. Addition of neem cake increased available  $P_2O_5$  from 11.5 to 18 ppm and Mn from 13 to 15 ppm.

Application of micronutrients like zinc, iron and manganese in the form of sulphates in the ratio of 2:1:1 along with 25 kg N, 12.5 kg  $P_2O_5$  enhance the grain and straw yield of wheat by 25 and 34 per cent respectively over control.

Sorghum hybrid CSH-5 responded to Fe application at 20 kg/ha enhancing the grain yield from 26 to 35.7 q/ha when applied with FYM at 5 tons/ha.

Seed treatment of bengalgram with 2 g of ammonium molybdate/kg of seed was found to improve the yield of crop and increase in yield was in the order of 25 per cent.

Application of boron and sulphur in safflower had positive effects. The application of 10 ppm of sulphur and 2 ppm of boron along with recommended fertilizers recorded a yield of 18 q/ha of safflower compared to 11.42 q/ha with only recommended level of fertilizer.

Application of  $K_2O$  at 62.5 kg/ha along with 62.5 kg nitrogen and 75 kg  $P_2O_5$ /ha was found optimum for BSH-1 sunflower. It is postulated that addition of  $K_2O$  over and above 62.5 kg/ha can modify the adverse soil properties like free swell and degree of dispersion.

Studies at Raichur showed that application of manganese at 20 kg  $MnSO_4$ /ha yielded 13.4 q/ha of groundnut pods compared to 9.4 q/ha in control. In rainfed cotton 10 kg  $FeSO_4$ /ha gave an yield of 7.65 q/ha of seed cotton followed by that of  $CuSO_4$  at 10 kg/ha yielding 7.64 q/ha. The control treatment yielded only 7.08 q/ha.

## 1.5 Horticulture

### 1.5.1 Fruit Crops

In fruits, 27 research projects have been in progress during the period under report relating to various aspects of fruits such as mango, citrus, sapota, papaya, grapes, guava, avocado, tamarind and jack.

#### 1.5.1.1 *Mango*

At GKVK, in the project on mango on clonal selections, 28 Alphonso and 18 Pairi clones already established are being assessed for their performance.

Among the introductions from other parts of India, the varieties like Mallika, Dashehari and Langra have been found to be performing quite well. The quality of Dashehari and Langra, the popular varieties of North India are found to attain quite satisfactory quality traits under Bangalore conditions also.

At Dharwad, in the studies on induction of flowering on the fruited shoots (old wood) to find a solution to the irregular bearing in mango, treatment where three sprays of 100 ppm each by TIBA + ethyl in two per cent  $\text{KNO}_3$  was given has resulted in successful fruiting in the 'off year'. Further, spraying of micronutrients indicated the prospects of flowering directly on the fruited twig or on the new shoot that developed in the fruited twig. Although it was possible to induce vegetative growth early in the season by pruning the trees, these shoots did not flower appreciably in the following year.

For standardizing the epicotyl grafting in mango at Dharwad, among the six types of bud sticks used for the purpose, the highest percentage of success (46 per cent) was observed when the bud sticks removed from the shoot that had flowered (but not fruited) were used.

In the mango improvement programme, two selections –  $S_1$  and  $S_2$  made out of the introductions have been planted and are being used for further multiplication. In addition to these two selections, four hybrids have been evolved at the station and planted for further study.

At the R.R.S., Raichur, in the varietal performance studies, variety Alphonso (Khader) was found to be the best performer with consistent yields, followed by Neelum. Among the hybrids, Neelgoa and Neeleshari are found quite promising, while A. U. Rumani had the highest T.S.S. (21 per cent).

#### 1.5.1.2 *Papaya*

At Dharwad centre, the papaya improvement programme has been concluded. Inbreeding over generations has yielded three selections which are being tested at different University Centres.

The studies on regularisation of bearing in Solo cultivar of papaya have indicated the fruits to be heavier in weight when one fruit per cushion was allowed.

In the studies on inter-relations between soil moisture regimes and NPK levels, the observations have revealed that irrigation once a week increased the yield and also produced heavier fruits. Lack of phosphorus adversely affected the tree girth and yield, irrespective of nitrogen levels used in combination with phosphorus.

#### 1.5.1.3 *Grapes*

In the experiment on fruit bud differentiation in Anab-e-Shahi, the results have shown that spraying etherel at 200 ppm at weekly intervals, 45 days following back pruning induces 80 per cent fruitfulness in the proximal zone and 65 per cent fruitfulness in the distal end of the shoot as compared to 30 and 40 per cent fruitfulness in the control. On similar lines, another experiment in Thompson Seedless has been in progress.

#### 1.5.1.4 *Sapota*

In the project on performance and economic evaluation studies in Hort-Silviculture inter-cropping system in fruit crops, the main crop sapota has been planted in 1981 at a spacing 10 × 10 m. As inter-crops, 6 forest species (*Casuarina equisetifolia*, *Eucalyptus citriodora*, *Eucalyptus hybrid*, *Laucaena leucocephala* (k-8 var.), *Guavillea robusta* and *Inga duleis*) have been planted during 1982 season in between the sapota plants. The plants are under observation for their growth and the project is in its initial stage.

The nutritional trial on sapota where the treatments include 4 levels of N (0, 200, 400 and 600 g/plant), 3 levels of P (0, 100 and 200 g/plant) and 4 levels of K (0, 200, 400 and 600 g/plant), is in progress. It is a long ranged experiments and observations on various growth parameters, yield and quality traits of the fruits are being recorded regularly.

At Dharwad campus, inter-varietal hybridization has yielded as large number of F<sub>1</sub> hybrids which are in their different stages of growth and fruiting. Several F<sub>1</sub> hybrids which have come to bearing are being assessed for different vegetative parameters, yield and quality of fruits.

#### 1.5.1.5. *Citrus fruits*

At Dharwad campus, inter-varietal crossing among limes and lemons with the object of getting hybrids resistant to citrus canker, increased yield and with economic qualities such as reduced thorniness, have yielded five hybrids and they have been planted in the field for evaluation.

The evaluation of mandarins on different root stocks at R.R.S., Raichur, has indicated the declining trend of Coorg mandarin on rough lemon root stock.

With trifoliate orange rootstock, quite encouraging performance with higher yields has been observed.

In the varietal performance studies, among sweet oranges, the cultivar Sathgudi; among lemons, the cultivar Lisbon; and pink flushed variety of pumello have been found to be performing well under Raichur conditions.

At the Regional Research Station, Mudigere, the evaluation of six rootstocks have revealed, that Coorg mandarin on Rangpur lime and Rough lemon continue to perform better.

At GKVK, in the studies on relative economy in the use of water in sweet oranges, drip irrigation has been initiated and the work is in progress.

#### 1.5.1.6. *Guava*

At GKVK, the experiment on nutritional studies under the All India Co-ordinated Fruit Improvement Project of I.C.A.R. has indicated that application of 240 g each of NPK per tree increased the yield considerably (162 kg/tree). The experiment is in progress.

In the investigation on selection of superior strains of Navalur guava, three clones viz., C.I.U.-2, C.I.W.-4 and C.I.W.-5 have been found to be quite promising in respect of fruit size and soft seededness. These clones are being further assessed and propagated for multilocation trials.

#### 1.5.1.7. *Tamarind and Jack*

In the project on improvement of indigenous fruits, certain clones of tamarind and jack fruit have been identified to be superior. Survey to locate some more selections in other parts of Karnataka is in progress.

#### 1.5.2. *Plantation crops*

There are 16 research projects relating to crops such as cashew, pepper, coconut and arecanut.

##### 1.5.2.1. *Cashewnut*

In the trials at GKVK, Bangalore, 20 clones and 9 seedling selections obtained from the Cashew Research Station, Ullal, have been maintained in the multiplication block for planting and further evaluation.

A nutritional trial using the selection 8/46 Taliparamba, considered to be the best clone for the *maidan* area has been laid out.

A study on the floral biology of some of the important plantation crops has been initiated and partly completed.

At the Cashew Research Station, Ullal, studies on survey, collection, isolation and hybridization, propagation and cultural aspects in cashew have been completed. Further work on these aspects with suitable modifications in the experiments has been proposed to be taken up under the Multi-state Cashew Project at Bramhavar taking into consideration the research findings so far obtained from the trials conducted at Ullal. The earlier studies carried out at Ullal have brought to light the clonal difference in rooting of the air-layers and the layers have been consistently found to give higher yields followed by grafts and seedlings. The propagation methods have been standardized using different concentrations of growth regulators (IAA and IBA) for better rooting.

#### 1.5.2.2. *Pepper*

In the mixed cropping trial, all other crops except pepper have been found to be performing well and the present pepper vines are being replaced with 'Karimallige Sara' variety.

In the trial on evaluation of different mulches for conservation of soil moisture in arecanut, leaf mulches has been found to give the highest yield.

In the trial on collection, maintenance and evaluation of pepper germplasm, some of the collections have been found to be performing better. In the multilocation trial laid out at this station involving VTL-3, VTL-11, VTL-17, VTL-13, Mohitnagar and local varieties of arecanut plants have started yielding and their performance is being evaluated.

#### 1.5.2.3. *Coconut*

In the trial on germplasm collection in coconut (open pollinated types), 19 introductions have been successfully established of which, Laccadive Ordinary, Philippines, Fiji, Arsikere Tall and TXD have been found to yield better. The TXD has recorded the highest yield followed by Laccadive Ordinary and Fiji. In the germplasm collection of selfed cultivars, 17 selections have been established and their performance is being studied.

In the manurial trial on coconut, with treatments 350 : 224 : 440 g NPK, 690 : 40 : 900 g NPK per plant per year and control and with two spacings 9.7 × 9.7 m and 7.3 × 7.3 m, the palms with closer spacing and receiving higher levels of NPK have been found to yield better both in red and black soils. The trial is to be continued.

Crops such as potato, french bean, ragi, redgram have been tried along with the control treatment (coconut alone) and the feasibility and economics of the inter crops are being evaluated. In the mixed cropping experiment involving mulberry as the inter crop with coffee as the main crop, a net income of Rs. 20,045 per ha was obtained against Rs. 2,940 per ha where only coconut was grown.

In the irrigation-cum-fertilizer trial, significant differences due to moisture regimes, fertilizer levels and their interactions have been observed in respect of various growth parameters. The interaction effect between the moisture level (80-100 available soil moisture) and NPK (1000 : 600 : 1500 g of NPK per palm per year) was found to be the best of all the interaction combinations.

#### 1.5.3. *Medicinal and Aromatic plants*

In the trial on the study of effects of different sowing dates and fertilizer levels in Isabgol (*Plantago ovata*), it was observed that sowing on 15th October was the best, although the maturity was delayed as compared to other sowing dates. The studies indicated certain correlations between the time taken for maturity and growth parameters. Plants that took longer period for maturity made the better growth. Application of 50 : 25 : 30 kg NPK/ha tended to influence positively the growth parameters.

#### 1.5.4. *Floriculture*

Eight research projects covering important ornamental plants such as rose, jasmine, chrysanthemum, hibiscus and crossandra are in progress.

##### 1.5.4.1. *Jasmine*

In the project on 'selection and improvement of commercial cultivars of jasmines', a survey for different species and varieties has been made in Karnataka and local varieties have been located. These local varieties are found to differ to some extent in their fragrance, size and shape of the bud, length of corolla tube etc.

The experiment on nitrogen management in Kakada (*Jasminum multiflorum*) with 12 NPK combinations and another experiment on propagation through cuttings (using growth regulators) have been taken up and are in progress.

##### 1.5.4.2. *Chrysanthemum*

In the trial on standardization of cultural practices in chrysanthemum, a nutritional trial laid out with 27 treatment combinations (80, 100 and 120 kg

N: 100, 125 and 140 kg  $P_2O_5$  and 75, 100, 125 kg  $K_2O$  per ha revealed significant effects of NPK and their interactions.

In the other trial on the effect of pinching and plant density, significant effect of pinching and spacing was obtained. The highest yield was obtained where pinching was done twice (once at the 4th and the other at the 7th week) in plants spaced at  $30 \times 15$  cm.

#### 1.5.5. Vegetable crops

There are 12 research projects covering improvement and culture of chillies, brinjal, tomato, onion, winged beans, sweet potato, turmeric and other indigenous vegetables such as ridge gourd, bitter gourd, ash gourd and drumstick. In addition, one research project is on chemical weed control and the other on multiple cropping.

##### 1.5.5.1. Onion

In the project on introduction and evaluation of onion genotypes, N-53 and N2-4-1 have been found to be highly promising and they have been included for multilocation trials in Navalgund and Arabhavi stations of University of Agricultural Sciences, to assess their suitability for the Malaprabha and Ghataprabha project areas. The other variety 'Junagad white' has been found to have high TSS (22 per cent), a character that could be used for breeding varieties suited for dehydration and export. The commercial variety 'Bellary Red' has been found to have large variation in bulb size, TSS, number of centres per bulb all of which have a relation to storage characters. Studies to select the best strains and to purify them are in progress.

##### 1.5.5.2. Brinjal

In the trials to evolve varieties resistant to bacterial wilt caused by *Pseudomonas solanacearum*, the species *Solanum torvum* and *Solanum macrocarpum* have been found to have high degree of resistance. The hybrids involving the resistant parents have been found to possess a fairly high degree of resistance to bacterial wilt in addition to their potential for higher yields. The physiological basis for resistance is being investigated and is expected that in the course of two or three years, wilt resistant selections could be made available.

##### 1.5.5.3. Chillies

In the project to study the nutritional requirements, an increase in the yield to an extent of 27.5 per cent has been possible in the Gouribidanur variety of chillies by adopting split application of fertilizer over application of fertilizers in a single dose.

In the studies on evaluation of tomato varieties under rainfed conditions, NMR-1 (NTDR-1) has been found to be more drought tolerant and high yielding as compared to 'Pusa Ruby', one of the other commercial varieties.

The project on weed control in chillies indicated that 4 litres of Lasso per hectare was quite effective in controlling the weeds and concurrently increasing the yields (20.36 t/ha) over handweeding (11.66 t/ha).

#### 1.5.5.4. *Turmeric*

In the studies on nutrition-cum-spacing in turmeric, the highest yield (77.31 q/ha) was obtained with the plants spaced at 30 × 15 cm and with fertilizer dose of 60 : 50 : 100 kg/acre of NPK given in 3 split doses (NPK) and single dose of P.

#### 1.5.5.5. *Indigenous vegetables*

In the project for improvement of indigenous vegetables, homozygous lines in ridge gourd, bitter gourd and drumstick have been developed and work on further purification to develop useful genotypes of these lines is in progress.

Under the All India Coordinated Vegetable Improvement Project (Voluntary centre), varietal evaluation of French beans has been made with 17 genotypes and the cultivar 'Wade' has been found to be the highest yielder. The genotypes are under further evaluation.

#### 1.5.5.6. *Tuber crops*

In crops such as colocasia, sweet potato and tapioca, the experiments on fertilizers, growth regulators and two tier cropping are in progress.

#### 1.5.5.7. *Potato*

*Preliminary yield trial with early maturing cultures in plains:* The yield in cultures or cultivars differed significantly. The culture JI-1808 and JF-547 yielded significantly higher (236 and 225 q/ha respectively) than the other cultures, the least being in Kufri Chandramukhi (121 q/ha).

*Adaptability yield trial with early, medium and late maturing cultures.* Among the early maturing cultures, none were found superior in yield over the ruling cultivars (Kufri Badshah). In respect of the medium maturing or late maturing cultures, though significant difference in yield could be recorded between the different cultures tried, none of them however proved to be better yielding ones as compared to Kufri Badshah and Kufri Sindhuru, the commercial cultivars.



**Preliminary yield trial :** Among the 7 cultivars tested against the cultivar *Kufri Lalima* (V<sub>8</sub>), only FR/B-105 yielded almost equal (210 q/ha) to *K. Lalima* which recorded the highest yield (216 q/ha).

**Studies on dates of planting :** Among the 6 different dates of sowing (1st, 10th and 20th of November and December), potatoes sown during November generally gave higher yields.

In the studies on surveillance of aphids of potato for raising a healthy crop, higher incidence of aphids was observed in January, February and March

## 1.6 Entomology

### 1.6.1 Sorghum

In the All India Coordinated Research Project at Dharwad SPV-186 recorded least incidence of pests followed by IS-2312, SPH-221, SPV-247 and SPV-472. As regards the incidence of stem borers, SPV-105 recorded the least stem tunnelling and other promising varieties were SPV-459, SPV-462, SPV-104, SPV-107, SPV-378, IS-2312 and Nandyal. The promising varieties showing least resistance to Army worm were SPH-190, SPV-346, SPV-389, SPV-105, SPV-107, SPV-221, SPV-235 and SPV-247. Least incidence of earhead midge was noticed in DJ-6514, SPV-245, SPV-472, SPH-232 and CSH-9, Nandyal recorded the maximum damage (61.7 per cent) and DJ-6514 the least (18.7 per cent). Evaluation of breeding material for resistance to pests of sorghum like shootfly, stem borers and midge is in progress.

In another trial at Dharwad the crop sown on 8.6.82 showed only 13.1 per cent incidence of shootfly and the one sown on 1.9.82 had 92.6 per cent. incidence. The peak activity of shootfly coincided with a mean minimum of 19.1°C and a mean maximum of 32.2°C and a low rainfall and high humidity. Even as regards the midge incidence crop sown on 8.6.82 had the least damage (11.6 per cent) and the maximum grain damage was when crop sown on 1.8.82 (41.3 per cent).

The most efficient control of jowar midge was obtained due to the use of Ripeord which gave about 222 per cent increase in the yield over control. A study of the natural parasites of jowar earhead midge showed that *Tetracinchus* and *Ellepellus* were noticed in Dharwad district and the former was found throughout the year whereas the latter was found only in June-July. Attempts to rear the *Tetrastichus* was met with partial success. Survey of natural enemies of pests in sorghum showed that among larval parasites *Apanteles flavipes* Cam gave the highest parasitization of the stem borer.

#### 1.6.2. Rice

Seedling root dip experiments conducted at Hebbal with Chloropyripos indicated that it gives protection against whorl maggot damage up to 35 DAT and for stem borer and gall midge even beyond this date. Similarly application of carbofuran (0.75 to 1.0 kg a.i./ha) 20 to 25 DAT gave good protection against the attack of whorl maggot, case worm, leaf roller, thrips and gall midge.

#### 1.6.3 Groundnut

For control of leaf miner, natural parasites like *Stenomesus japemica* and *Cheloris spp* are being studied at Raichur.

In an experiment at Raichur on bio-efficiency of carbofuran 3 per cent granule applied to soil at various levels to control the groundnut leaf miner showed that two application of the chemical at 0.75 kg/ha to be effective. In groundnut the plant products like neem oil, honge oil and neemseed kernel extract were not as effective as insecticides like monochrotofal and chlorophylliphol in control of leaf miner.

#### 1.6.4 Cotton

In control of cotton boll worm 20-40 g of pyrethroids/ha gave effective control than any other recommended chemical and the boll opening was also very good.

#### 1.6.5 Pulses

A study at Dharwad showed that the pod borer attack in cowpea can reduce the yield to 3.82 q/ha from 10.86 q/ha with full chemical control.

Observations at Bangalore showed that application of crude extract of neem kernel against piageonpea pod borer was found highly effective economical and viable.

In a trial on control of pod borers in redgram at Gulbarga, Syperimithril at 0.009 per cent recorded highest yield and was on par with endosulfan and methyl parathion. The plant products like neem seed karnel extract, neem leaf extract, honge oil and neem oil were all on par but inferior to endosulfan spray.

#### 1.6.6 Tobacco

Studies at Shimoga revealed that application of quinalphos at 0.05 per cent as soil drench and fenvelrate at 0.01 per cent as spray are effective against stem borer and leaf eating caterpillar respectively in the nursery.

### 1.6.7 *Biological Control*

Rearing and release of larval parasites like *Bracon* and *Brevicornis* and *Perisiorola nephtidis* against coconut black headed caterpillar are in progress at Mandya and Shimoga areas.

### 1.6.8 *Sericulture*

An attempt was made at Dharwad to manage Eri silkworm during the larval period using castor, tapioca and their combinations. The larvae fed on castor alone showed higher larval weight, cocoon weight, shell and pupal weight when compared to larvae fed on tapioca alone.

Among the 15 fungicides screened against the white muscardine fungus, thiram, Dithane-M-45 and Bavistine proved highly toxic to the fungus but safe to silkworm even when used directly on them except thiram. The application of Dithane-M-45 at 20 per cent and Bavistine at 0.2 per cent as dust was found highly effective.

The stored silk cocoons were observed to be damaged by several species of beetle pests and the incidents of *Attagenous fasciatus* was found very high. Hence the biology and control of this beetle were carried out and found that the beetle complete its life cycle in about 130-140 days on dried pupae.

### 1.6.9 *Stored grain pests*

In a trial using 4 insecticides against *Calosobruchus chinensis* in redgram showed that bromofos 8 g a.i., fenitrothion 5 g a.i. and methacrifos 5 and 10 g a. i/m ton had longer residual effect accounting for 90-94 per cent insects mortality. The residual toxicity which was highest at 0 DAT declined subsequently. It is concluded that fenitrothion 5 and 8 g a.i., bromofos 8 g a.i. and methacrifos 10 g a.i. proved better than malathion 10 g a.i. in protecting redgram seeds.

## 1.7 *Plant Pathology*

Bengalgram variety Annegeri-1 and 4651 showed a very low level of wilt incidence (7.2 per cent) whereas other important lines like 7512, 3735, 7223, 9791, 4651 and 1820 recorded susceptibility to wilt. Most of the lines were also susceptible to powdery mildew.

In a screening trial on bacterial blight in cowpea, the lines 488-9-1-1 and HG-22 were found to be resistant compared to C-152.

The studies at Hebbal showed that seed treatment of paddy with Dithane-M-45, Emison-6 and Thirum at 0.3 per cent reduced seed borne infection by *D. oryzae* from 42 per cent to below 1 per cent.

The survey for seed mycoflora of sunflower revealed that *Macrophomina phaseolina* to be seed borne and produce pyrenidia on surface of seeds. When this was cultured on artificial media phyzotomia state was produced instead of pyrenidial state.

In a varietal screening trial at Hebbal, HR-911 ragi variety showed very high susceptibility to *Helminthosporium* leaf blight. Varieties TNAU-303, VL-127, KM-27, PES-111-2, No. 57-1 and TNAU-301 were found to be resistant to blast disease.

In the Co-ordinated varietal trial, PES-23-2 was resistant to neck blast in early duration group HR-374 and TNAU-294 in mid-duration group, Indaf-10, HR-1523, PR-127 and PR-230 in late duration group. Variety KM-13 was resistant to both neck and finger blast. In the pre-screening trial of selected entries for blast GE-719, GE-2093 and U-45 were resistant both at Bangalore and Mudigere.

### 1.8 Agricultural Microbiology

In a study on response of chick pea to inoculation with VA mycorrhizal fungus and *Rhizobium* Sp. it was observed that there was 65 per cent increased shoot growth response with *Glomus* alone and 110 per cent increase with dual inocula over uninoculated control without P supplementation. Chick pea response to *Rhizobium* inoculation steadily increased with levels of P.

In finger millet, inoculation with VA fungus and *Azotobacter* Sp. at 50 per cent P level resulted in increased root and grain weights by 53.08 and 40.0 per cent respectively over uninoculated control at the same level of P.

The groundnut crop responded to inoculation with VA mycorrhizal fungus and *Rhizobium* Sp. There was 47 per cent increase in nodule number with VA fungus inoculation, 78 per cent with *Rhizobium* sp. and 122 per cent with dual inoculation. P application helped in better nodulation with individual as well as combined application.

The city waste compost at 2.5 t/ha increased the dry matter of ragi by 95 per cent over control. But the effect at higher dosage (5 t/ha) was almost equal to the control.

In a field experiment it was observed that inoculation of streptomycetes to seeds with recommended level of NPK showed a significant improvement in germination and growth of the crop.

Enriching the mechanically prepared compost with rock phosphate at 1 per cent level increased the total N content of the compost after 30 days. The increase in  $\text{NO}_3\text{-N}$  was more prominent with treatments receiving compost + rock phosphate + *Azotobacter* + *Aspergillus niger*.

Application of the city waste compost to chick pea indicated that it reduced that plant growth and nodule number especially at higher levels of application. Compost showed a high population of fungi ( $1.02 \times 10^5/\text{g}$ ) and actinomycetes ( $4.13 \times 10^5/\text{g}$ ).

In a study on the response of gram cv. Annigeri-1 to seed inoculation with multi strain *Rhizobium*, it was observed that *Rhizobium* inoculation gave 35 per cent and 19 per cent increase in seed yields at former and maximum levels of fertility respectively. The results have indicated that in the absence of competition from native soil *Rhizobia* inoculation with effective *Rhizobium* strains will meet entire nitrogen requirement of gram to produce optimum yield.

Both in groundnut and redgram, inoculation increased nodulation both at normal and higher levels of P. At higher P level either inoculation or application of N resulted in significant seed yield increase over the control.

Three effective strains of *Rhizobium* on blackgram viz. BMBS-1 UAS-VM-1 and DV-2 have been identified.

The cowpea variety KBC-1 interacted with all the four strains of *Rhizobium* viz., CMBS-1, DC-25, UAS-VU-1 and TAL-169 and produced more nodule weight, shoot weight and seed yield over C-152.

Application of low levels of P helped the VA fungus to increase the plant biomass in chickpea and greengram.

In a study on the effect of *Azotobacter* on vegetables such as carrot, brinjal, palca and amaranthus it was observed that the culture enhanced the germination of seeds in all the vegetables as compared to control, the growth and yield were also favourably influenced. *Azotobacter vinelandii* and *Bijerinckia Spl.* proved to be more effective than *A. chroococcum*. Favourable effects of treating with these cultures were also observed in ragi.

In ICAR Co-ordinated trial on biogas technology at Dharwad it was found that 2 per cent slurry of cattle waste or spent slurry significantly increased the

growth of algae in fogg's medium. In another study, two redgram varieties (GS-1 and T-21) and 5 strains of *Rhizobium* (IHP-195, KA-1, BDN-A<sub>2</sub>, GC-1 and 6-4) were used for interaction between cultivars of redgram and strains of *Rhizobium*, T-21 variety of redgram treated with *Rhizobium* strain generally proved to be better than untreated control suggesting the importance of host plant and *Rhizobium* interactions.

## 1.9. Seed Technology

### 1.9.1. Rice

Influence of mother plant nutrition and spacing on planting value of rice seeds was studied using rice cultivars Madhu and Intan Mutant adopting two spacings. Different levels of nutrition and spacing followed during mother plant growth, influenced significantly seed yield, 1000 seed weight, seed volume, protein content and shoot and root length of seedlings. Investigations on the effect of location and environmental stress on the next generation crop and effect of different density of seed on yield were carried out. Seeds of Jaya and Prakash produced at Sirsi gave significantly high yield. Pushpa seeds from Madikere gave significantly more yield than seeds from other places. Seeds of different densities did not show significant difference in seed and plant characters.

In the programme on exploitation of hybrid vigour in rice, 400 lines were screened for restoration of fertility. Only 17 entries restored fertility. In a study on percentage of outcross on KMS-1 female, 6-12 per cent seed set was obtained. Among the four techniques evaluated to increase the outcross, rope pulling and beating with bamboo stick enhanced seed set from 6-8 per cent to 12-15 per cent. Isolation requirement studies indicated a 0.66 per cent cross pollination when the contaminant is 340 cm away and 4 per cent cross pollination when the contaminant was 20 cm away.

### 1.9.2. Ragi

Twenty three ragi varieties were evaluated for seed dormancy. Two varieties viz., HR 95 and HR 374 lost their dormancy in 45 days; Indaf-5 and 11, HPB 7-6, HR 43, HR 344, PR 202 and JNR 852 completed their dormancy period in about 60 days; Indaf-11, 3, 8 and 9 and RR 24-3-5 prolonged their seed dormancy period up to 75 days. ROH-2, Indaf-10, HR-222, HR-911 and Purna had dormancy of 90 days. The longest dormancy of more than 110 days was noticed with Indaf-6 and 7. Seed dormancy in ragi is relatively weak and absolute dormancy does not exist in this crop.

### 1.9.3. *Chillies*

In the studies on graded doses of 'N' and 'P' in relation to production, quality and physiological maturity, the total seed recovery was significantly increased by addition of graded doses of nitrogen and phosphorus. The interaction effect of  $N \times P$  was also pronounced in increasing the yield. There was not much influence of N and P in improving the quality of seed.

### 1.9.4. *Groundnut*

Effect of various levels of phosphorus and gypsum on yield and quality was studied using Dh-3-30 variety. Increase in  $P_2O_5$  up to 100 kg and 500 kg gypsum with 25 kg N and  $K_2O$  per hectare increased the pod yield (28.5 q/ha) significantly. However, different levels of  $P_2O_5$  and gypsum had no effect on germination.

### 1.9.5. *Sorghum*

Effect of initial moisture content and packing material on storability of CSH-8R sorghum seed was investigated. The results suggest that CSH-8R seed with 10.7 per cent moisture content can be stored in vapour proof packings.

Polythene bags of 400 gauge (0.1 mm) is enough to make the package vapour proof as against 800 gauge (0.2 mm) recommended at present. In cloth and gunny bags CSH 8R seed cannot be stored for more than four to six months under Dharwad conditions. In air tight glass jar and polythene bags of 400 gauge thick at initial moisture content of 10.7 per cent, CSH 8R sorghum seed can be stored for more than 18 months without any deterioration in the quality.

## 1.10 **Agricultural Engineering**

1.10.1. The following agricultural implements have been released during the year.

### 1.10.1.1. *Groundnut Pod Plucking Machine*

This machine is used for separating the groundnut pods from the harvested groundnut crop. The separation of the pods is done one or two days after harvest of the crop. The drum with loop type spikes is used for separating the pod from the plant. The performance of the machine is good at 350 R.P.M. A blower is also provided for cleaning.

The machine separates 40 to 50 kg of pods with moisture content of 16 to 18 per cent per hour with two persons working on it. One H.P. motor is used to

run the machine. The cost of the machine is approximately Rs. 4000. A saving of 9 man hours is obtained per quintal with this machine.

#### 1.10.1.2. *Bullock Drawn Seed-cum-Fertilizer Drill for Ragi*

It drills ragi seeds and fertiliser simultaneously. A cone type wooden seed bowl is used for seeds and a metal funnel with double wall is used for fertilisers. The seeds and fertiliser bowls are kept at 60 cm apart so that three persons can walk behind the implement. Transparent tubes are used to collect the seed and the fertiliser from the bowls to the respective coulters. The row spacing is 30 cm. The seeds are dropped after the fertiliser is covered in the soil. The area covered is about 1.4 to 1.6 ha per day of 8 hours work. The cost of the implement is Rs. 350 approximately.

#### 1.10.1.3. *Adjustable Blade Hoe*

It is a bullock drawn implement used for interculture operation. The blades of varying size from 15 to 28 cm are used. It is mostly used in black soil for inter-culture operation in crops like wheat, jowar, groundnut etc. by changing blades. More than one unit can be hitched to a pair of bullock depending upon the crop and animal. The draft ranges from 20 to 30 kg according to the length of the blade. The area covered per day of 8 hours is approximately 1 to 1.2 ha. The cost of one unit is about Rs. 45. It can be easily fabricated by any village artisan.

#### 1.10.1.4. *U.A.S. Grain Storage Bin*

It is a cheap storage structure. It can be constructed with locally available materials such as brick, stone, slab, sand, cement and damp proof materials. The present spoilage of grain due to defective storage structure at the village level of about 6 to 7 per cent will be reduced considerably by constructing or effecting improvement to the existing structure. This structure is suitable for farmers growing food grains up to 20 to 40 quintals. The cost of construction of 1 tonne (10 quintal), 1½ tonne (15 quintal) and 2 tonne (20 quintal) approximately comes to Rs. 600, 700 and 850 respectively. Any village mason can easily construct storage structure since it does not involve complicated technology.

#### 1.10.1.5. *Power Tiller Mounted Blade Harrow*

It is an implement improved over the existing bullock drawn blade harrow with an additional attachment for mounting it to the power tiller. The blade is 140 cm in width, 8 cm in breadth and 1 cm thick with tapering towards one edge of the blade which goes into the soil. The weight of the implement is about 40 kg. The power tiller mounted blade harrow covers 50 per cent more



area per unit time than that of bullock drawn blade harrow at an average speed of 3.5 kmph. It is used for loosening the top soil, breaking of clods and cutting of weeds. It covers an area of about 0.5 ha per hour. The cost of the implement is about Rs. 300.

#### 1.10.1.6. *Foot Operated Winnower*

This machine is used when the availability of natural wind is uncertain specially during months of February and March for winnowing of ragi, paddy etc., It can be operated by foot and also with electrical power. Two persons are required to operate the machine. The output is approximately 15 to 20 quintals per day of 8 hours work. The machine can be easily fabricated by a village artisan. Approximate cost of the machine is Rs. 700.

#### 1.10.1.7. *Sunflower Thresher*

It is a manually operated device used for threshing freshly harvested sunflower crop. Threshing is done by pressing the flower head against the stripping plate which rotates at a speed of 700 to 1100 rpm by foot. The man hours required to thresh 1 quintal of sunflower seed is approximately 4 hr. The output is two to three times faster than compared to traditional method of hand beating. It can be fabricated easily by a village artisan and the cost of the machine is Rs. 350 approximately.

#### 1.10.1.8. *Bullock Drawn Intercultures-cum-earthingup implement for Groundnut crop*

This is a four row interculture equipment used for groundnut crop. It can cover 1.5 to 2 ha per day. It costs about Rs. 100 and can be fabricated by any village artisan.

#### 1.10.1.9. *Raichur Seed-cum-fertiliser Drill*

This seed drill is meant for deep black soils. It can also be used in light black soil of Bijapur, Raichur, Gulbarga and Bellary. The implement costs Rs. 550 per piece. Three persons are required to operate this seed drill.

#### 1.10.1.10. *Tungabhadra Pedal-cum-power Winnower*

The device can be operated both manually and also by power for winnowing the grains. The cost of the device is Rs. 5,000 per piece. About 20 quintals of jowar, paddy or sunflower can be cleaned per hour with electrical power and 10 quintals per hour by manual operation.

### 1.10.2 *Soil and Water Management*

In a study on the optimum stream size for groundnut at Dharwad, it was found that stream size of 10 litres per second was most advantageous. The check basin size of 25 or 50 sq m did not make significant difference.

In the red sandy loam soils of Dharwad 45 m length of furrow was ideal for uniform distribution of moisture and crop response as compared to 15, 30 and 60 m furrow length. In maize at Dharwad, alternate furrow system of irrigation with 45 cm row spacing is more suitable for moisture distribution. Applying irrigation water alternately to alternate furrows helped to save water to the extent of 26.51 per cent without appreciable reduction in grain yield.

## 1.11 *Agricultural Extension*

The research activities of the department include staff research projects as well as postgraduate research studies. During the year under report more than fifteen research studies have been completed. These studies cover many areas such as evaluation of on-going extension programmes, communication and extension methods, administration and management, special programmes for small farmers, and weaker sections of the community.

The salient findings of some of the important studies are reported below :

### 1.11.1. *A critical analysis of the contribution of education and extension guidance to economic performance of cotton farmers of Karnataka State*

Education and extension guidance are recognised as *Sin-quo-non* for agricultural development indicated by the experiences among various countries of the world. The main objective of the present study was to trace back the contribution of these scarce non-conventional inputs ploughed into cotton production in Karnataka.

The study was concluded at Nargund and Navalgund taluks in Malaprabha and Sindhanur taluk in Tungabhadra Command area. A scale to measure the extension guidance was developed and standardised subject to the tests of validity and reliability. The findings revealed that TBP and MPP farmers exhibited similar behaviour in their personal and Socio-Psychological characteristics but differed in production assets, level of input use and also economic performance.

Extension guidance was used by all the farmers on the same way for all the crop management items. The study confirmed the significant contribution

of extension guidance in both the command areas in an utter contrast to the contribution from education.

**1.11.2. A study on the use of visual aids by teachers of U.A.S., Bangalore**

This study was conducted with the main objective of ascertaining the extent of use of visual aids and the factors governing their use by the teachers of U.A.S., Bangalore. Two instruments, namely "Visual-aid use index" and "Visual-aid use determinants index" were developed and standardised for the purpose of this study. The data were collected from respondents and the main findings of the study were as follows :

- a) The visual-aids-use level of teachers in U.A.S. was less than their potential use with the exception of chalk board.
- b) The level of visual-aids use was not associated with age, academic qualification, cadre, higher education abroad, teaching experience, number of times a course offered, number of students per class, training on visual-aids, attitude towards visual aids and budget allotment on visual-aids.
- c) The visual-aids use index was significantly related to knowledge on visual aids, readily availability of material resources, facilities to use visual-aids in class room, administrator's support and follow up evaluation on the use of visual aids.
- d) These five factors were found to differentiate high and low users of visual aids.

**1.11.3. Development of a scale to measure the effectiveness of rural youth clubs and its application**

This study was taken up to develop an objective scale to measure the effectiveness of rural youth club and also to find out the relative importance of the sectors that affect the working of youth clubs.

The study was conducted using 40 youth clubs under operation in Bangalore district. The scale developed for measuring the effectiveness of youth clubs consisted of 26 items and each item had four sub-items. The validity of the scale was established by content and relevant validity methods. The scale developed was applied to 40 youth clubs and the findings were as follows :

- a) The effectiveness of youth clubs was significantly related to attitude of members towards youth club, their understanding of youth club objectives, the team spirit among the club members, the effective

leadership, guidance and encouragement by parents, the support from Panchayat and block agencies, follow up of club activities by Club leaders, recognition of achievements by parents, public and Government agencies.

- b) As regards the relative importance of various factors, it was found that recognition, follow up, sports and recreational activities, effective leadership, availability of equipments, and members understanding of youth club objectives were more important as revealed by discriminant function analysis.
- c) Next in importance were the maintenance of club records, individual economic projects, community service projects, funds, building team spirit, agricultural extension activities, support from block youth service agencies, meetings conducted, and guidance and encouragement from parents in that order.

Therefore, the study has indicated that while organising new youth clubs or reviewing the dormant ones, adequate care has to be taken to see that effectiveness in the clubs functioning is brought about by paying more attention to the factors which play relatively a prominent role.

## 2. Animal Science

### 2.1 Veterinary Microbiology

#### 2.1.1 *Leptospirosis*

Leptospiral envelope vaccine was prepared using two serovars viz., *L. icterohemorrhagica* and *L. canicola*. This vaccine was tried in dogs. When compared with the immune response of heat or formalin inactivated vaccines, envelope vaccine was found superior.

Studies on leptospiral ribosomal vaccine was also initiated. The vaccine was prepared using *L. pomone* and the immune response in hamsters and guinea pigs has been studied.

#### 2.1.2 *Mycoplasma*

Employing 56 strain of *Mycoplasma gallisepticum* coloured antigen, 858 birds were screened for mycoplasma infection. An incidence of 14.2 per cent was recorded.

### 2.1.3 *Sheep pox*

Renipet strain of sheep pox virus was attenuated by serial passage in lamb testis monolayer. The virus was found to be satisfactorily attenuated and afforded protection against challenge with virulent virus after one year in 10,000 cases.

### 2.1.4 *Rota virus*

Sero-epidemiological study on rota virus was made employing micro CFT technique. In all 241 samples collected from different species was screened. Of these 61 per cent had rota viral antibodies. Calves between 0.4 months showed a higher incidence (68 per cent). Sera from horses (45 per cent), sheep (65 per cent) and dogs (30 per cent) also had rota viral antibodies.

A direct electron microscopic examination of 40 dung samples was made. Seven samples revealed the viral particles morphologically suggestive rota virus.

### 2.1.5 *Egg drop syndrome (EDS)*

Three isolations of adenovirus have been made from cases of EDS. The viruses have been confirmed by serological test using reference antiserum. Its physiochemical characterization is under study.

## 2.2 *Animal Genetics and Breeding*

The birth weight of Jersey calves was found to be independent of haemoglobin type.

Karyological studies using modified lymphocyte culture technique revealed some of the congenital defects in the cattle are associated with linear measurements of chromosome, centromere index and arm ratio. Out of 11 bulls screened, one H. F. bull had chromosomal compliment of 60 Y/59 Y suggesting possible translocation.

In a study of sensitivity of organisms in antibiotics mainly *E. coli*, *Staphyloceaus*, *Klebsella* and *Commesnesel* organisms were found and were sensitive to Chlorompah'nico, septran, sulfadisine, Furalantion, Geotemycin, Streptomycin, Tetracycline, Chlrotetracycline and Penicillin.

The birth calves were found to be 28.21 and 27.39 kg respectively by 3rd month. It was 54.75 to 52.70 kg by 6 months, 70.3 to 58.61 kg by 1½ years and 140.0 and 115.32 kg. The weight of heifers above two years was 292.49 kg.

### **2.3 Veterinary Pathology**

In a study of common causes of mortality among exotic pigs and piglets, enteritis in one case, pneumonea in 9 cases, trauma and external injury in 10 cases, advance post-mortem changes in 8 cases were encountered.

Study of carcass quality of Dharwad sheep which is newly evolved strain in the UAS has been completed.

### **2.4 Veterinary Anatomy**

In a study of fat cushions of aorta and pulmonary trunk in buffaloes, 2 fat cushions were observed in buffalo, one situated around the base of the ascending aorta and another around the base of the pulmonary trunk.

### **2.5 Veterinary Gynaecology and Obstetrics**

In an investigation on infertility, it was observed that non-functional condition of ovary prevailed among the buffalo population screened. This is attributed to nutritional deficiency combined with lack of management practices and fodder developmental activities.

### **2.6 Poultry Science**

2.6.1 The Department of Poultry Science is at present maintaining two strains each of New Hampshire (UH. 1 and UH. 3), Plymouth Rock (UR. 1 and UR. 2) and a synthetic meat line (UM. 2). These strains are under different generations of selection for the improvement of body weight and egg production. These strains form the nucleus stock for the production of commercial hybrids (UBRO).

#### **2.6.1.1 Egg production and allied traits**

The age at sexual maturity ranged from 179.26 days in the UH.3 strain to 191 days in the UR.1 strain. The weight at first egg was least in the UH. 1 strain (2777.25 g) and heaviest in the UR.2 strain (3234 g). UH.3 strain had the least body weight of 3073 g while the highest body weight of 3382 g was recorded in UM. 2 strain at 40 weeks of age. Part time egg production was least with 51 eggs in the UM 2 strain and highest with 56 eggs each in UH. 1 and UR. 1 strains. The least layer house mortality of 1.28 per cent was observed in the UH. 1 strain, while the highest mortality of 2.55 per cent was observed in UR. 1 strain.

### 2.6.1.2 *Pure breeding*

Pure breeding of the strains was done by selection of the best parents within each strain in order to regenerate the progeny for the next generation. During the period under report an attempt was made to assess the progress of these strains in comparison to an unselected random bred control population. UH. 1, UR. 1 and UM. 2 strains were reproduced simultaneously along with a control strain, in the first phase. During the second phase both UH. 3 and UR. 2 strains were reproduced along with a control strain.

a) *UH. 1, UR. 1 and UM. 2 and control strains*: Fertility and hatchability (fertile egg set) traits in the selected strains were slightly lower than that of the control strain. Except for UH. 1 strain, the eight weeks body weight showed an increase of 121.74 g in the UR. 1 strain and 182.28 g in the UM. 2 strain in comparison to the control strain. The feed efficiency up to eight weeks of age was not much different in the selected strains from that of the control strain. UH.1, UR.1 and UM.2 strains showed lesser mortality up to eight weeks of age than that of the control strain. However, dressing percentage in the selected strains of eight weeks was slightly less than that of the control strain.

b) *UH.3, UR.2 and control strains*: In the UH.3 strain, fertility was nearly 4 per cent less while hatchability was nearly 2 per cent more than control strain. In the UR.2 strain, both fertility and hatchability showed a decrease of 6.59 and 2.27 per cent respectively in comparison to control strain. Eight weeks body weight, the direct trait under selection showed an increase of 197.06 and 315.3 g in UH.3 and UR.2 strain over the control strain. Feed efficiency was almost similar in both UH.3 and control strain, but slightly better in the UR.2 strain. The brooder house mortality was less by 1.12 per cent in the UH.3 strain and more by 2.21 per cent in the UR.2 strain when compared to the control strain.

2.6.2 Under the ICAR project White Plymouth Rock (IR.2 and IR.3) along with a pedigreed control population are maintained.

#### 2.6.2.1 *Reproductive performance of parent stock*

IC.2 strain matured earlier by 16.5 days, weighed 30.75 g less at the time of sexual maturity, 314.80 g at 40 weeks of age, laid one egg less and showed higher rate of layer house mortality by 2.67 per cent, when compared to that of the control strain.

IR.2 strain reached sexual maturity by 10 days earlier, weighed 64.75 g less at sexual maturity and 251.80 g at 40 weeks of age, laid 6 eggs more and had 0.80 per cent lower layer house mortality than that of the control strain.

IC.3 and IR.3 selected lines were also reproduced in 3 hatches along with a control population.

IC.3 strain (selected) matured earlier by 13.31 days, weighed 17.50g, less, at sexual maturity, and 112.0 g less at 40 weeks of age, laid fewer number of eggs (0.250) when compared to the control strain. Layer house mortality was 1.28 per cent in this strain.

IR.3 selected line matured earlier by 16.94 days weighed less, 195.50 g at the time of sexual maturity and by 338.50g, at 40 weeks of age, but laid 9.35 eggs more than that of the control strain. The layer house mortality was 0.68 per cent in this strain.

#### 2.6.2.2 *Pure breeding*

From the selected parents of these ICAR strains, pure breeding was made to produce progenies for the next generation. In the IC.2 strain, fertility and hatchability showed a decline by 5.93 per cent and 4.35 per cent, respectively, when compared to that of the control strain. Day old body weight was lesser by 1.20 g, feed efficiency lower by 0.12 and dressing per cent almost similar in the selected line in comparison to the control. However 8 week body weight, the direct trait under selection showed an improvement of 54.65 g in the IC.2 strain which had 0.49 per cent brooder house mortality.

IR.2 selected line had lower rate of fertility (4.78 per cent) but higher hatch of fertile eggs by 2.57 per cent. Though day old body weight was almost similar in both IR.2 and control strains, 8 week body weight of the IR.2 line showed an improvement of 59.03 g. Dressing percentage was almost similar in both the lines. However, feed efficiency was better by 0.18 and brooder house mortality less by 3.08 per cent in the IR. 2 line when compared to the control line.

A similar trend as observed for the IC-3 strain was evident in the IR-3 selected line when compared to the control line. Both fertility and hatchability decreased to an extent of 3.25 and 4.74 per cent respectively. Day old and 8 week body weight showed an improvement of 1.12 and 138.60 g respectively, dressing percentage was almost similar, while feed efficiency was better by 0.26 and brooder house mortality lower by 3.15 per cent.

#### 2.6.2.3. *Performance of reciprocal crosses*

IC-3 and IR-3 strains, which are the elite strains used in the production of IBB-80 broilers, were, reciprocally mated to produce and evaluate the crossbred progenies. For this purpose, the parents of IC-3 and IR-3 strains



belonging to the 8th and 6th selected generations, respectively were randomly selected and allotted to individual (single-sire) mating pens in the ratio of one sire to 5-6 dams per pen. Totally, 60 breeding pens were set up for this purpose and two hatches were taken out. Both fertility and hatchability were almost similar in both the types of crosses. IC-3  $\times$  IR-3 crosses which weighed lesser than their reciprocal crosses by 2.90 g at day old, had heavier body weight at 8 weeks of age, the superiority being 46.60 g. Except for superiority of IC-3  $\times$  IR-3 cross as its reciprocal cross, both the crosses showed similar feed efficiency, brooder house mortality, and dressing percentage at 8 weeks of age. Based on these results, best parents of IC-3  $\times$  IR-3 strains were selected utilising the crossbred progeny performance for 8 week body weight and pure breeding done to produce progeny for the 9th and 7th generations in the IC-3 and IR-3 strains, respectively.

#### 2.6.2.4. *Performance of the test crosses*

IC.2 and IR.3 strains of Cornish were utilised as the male parents to be crossed with the female parent lines of IR.2 and IR.3. Totally, four groups of crossbred chicks were produced in a single hatch and the performance studied up to 8 weeks of age for various broiler traits. It was also aimed to pinpoint the better breed of sire and dam for production of commercial crossbreds. The fertility ranged from 88.70 per cent in the IC.2  $\times$  IR.2 cross to 92.61 per cent in the IC.2  $\times$  IR.3 cross. Hatch of fertile eggs ranged from 78.77 per cent in the IC.2  $\times$  IR.2 cross to 88.13 per cent in the IC.2  $\times$  IR.3 cross. Day old body weight was almost similar in all the 4 crosses. Eight week body weight ranged from 1096.20 g in the IC.2  $\times$  IR.2 cross to 1133.40 g in the IC.2  $\times$  IR.3 cross. Feed efficiency was almost similar in all the 4 crosses. While brooder house mortality was least in the IC.2  $\times$  IR.2 cross (2.69 per cent), it was highest in the IC.2  $\times$  IR.3 cross (7.31 per cent.) The dressing percentage ranged from 71.93 per cent in the IC.2  $\times$  IR.2 cross to 74.14 per cent in the IC.3  $\times$  IR.3 cross. Overall, the results indicated that for improvement of 8 week body weight IC.3 strain was marginally better suited as the male line, while IR was useful as the female line.

#### 2.6.2.5. *Performance of experimental strains*

An attempt was made to improve the already existing strain of Chandigarh and strain crosses of Cornish. For this purpose, females of Chandigarh strain which were crossed with a strain of Cornish male during 1981-82 were evaluated. Similarly, single crosses of C.24 and C.34 were mated with C.3 strain of Cornish and C.2 strain of Cornish, respectively in a reciprocal fashion. The resultant three way crosses of Cornish have been evaluated in order to assess

their combining ability (as male lines) with some other female strains for production of crossbred progeny.

Fertility was least in the C.2.34 strain (80.69 per cent) and highest in Chandigarh (CDC) strain which had 94.15 per cent. Hatchability (fertile-egg set) ranged from a low value of 76.1 per cent in the C.34-2 strain to 91.26 per cent in its reciprocal crosses (C.2.34). The day old body weight was almost similar in all the strains, while eight week body weight was least in the CDC strain (926.69g) and highest in the C 24.3 (1011 g.)

#### 2.6.2.6 *Metabolic trials and subabul research*

True metabolizable energy content of commonly used feed ingredients like rice polish, maize, groundnut cake, subabul leaf meal, fish meal and deoiled rice polish were determined using White Plymouth Rock cockerels. The effect of age and sex on true metabolizable energy values on feed ingredients were also studied, using broilers of different sexes and age groups. It was found that age and sex has no effect on true metabolizable energy values.

Incorporation of subabul leaf meal at different levels on the performance of broilers were studied. It was found that subabul leaf meal can be included up to 5 per cent level in the diet without affecting the performance of the broilers, which is of great economical advantage to the farmers.

#### 2.6.3. *Leaf protein research*

An experiment was conducted to replace groundnut cake by lucerne leaf protein concentrate (LPC) in laying birds as well as in broilers. In layers, egg production, egg weight and hatchability were unaffected by inclusion of LPC. The egg yolk colour was better when fed the diet containing LPC.

In broilers LPC can be included up to 8 per cent of the diet by replacing traditionally used groundnut cake. Inclusion of LPC in the diet resulted in better growth rate than the control.

The residual product after preparing LPC which is called as lucerne residue was fed to the dairy animals. The body weight and milk production of dairy animals fed with diet containing lucerne residue were comparable to that of animals fed with control diet.

### 3. Home Science

The protein efficiency ratio of the three Nutri-mixes containing blends of malted ragi, full-fat soybean flour, dehydrated carrot and carrot leaf powder

as compared with skim milk powder was determined using young Albino rats. The PERs of these Nutri-mixes (A, B and C) were 3.3, 3.4 and 3.1 respectively as compared with 3.0 for skim milk powder. The study showed that Nutri-mixes based on blends of ragi malt (or substituted partially with carrot or carrot leaf powder) with soybean flour, peanut flour and milk powder containing proteins of high nutritive value can be used as weaning foods in developing countries.

Two hundred consumers living in rural and urban situation were highly pleased to get acquainted with the thirteen (13) products introduced to them in this study. Among the products tested for acceptability oriental flavoured milk, soy butter milk, tofu burfi, tofu curry and *idli sambar* and *payasa* got "very good" scoring by majority of the consumers compared with others. The villagers were more willing to taste the products and adopt them. Urbanites were rather reluctant but more knowledgeable regarding soybean as a pulse. The overall acceptability was significantly higher for butter milk, tofu curry, tofu burfi and milk with pineapple flavour.

Seventeen varieties of soybeans were studied for their cooking characters and eating quality. Significant differences were observed among the varieties for aroma, flavour and overall acceptability and in cooking quality. P. K. 406, JS-76-204, JS-75-207, Jupiter were found to be recommendable for consumers. Similarly for the production of milk with yield rate and acceptability was tested. Higher yield of milk for JS-76-239, Hardee, JS-76-808, PK-342 and JS-75-207 and were preferentially accepted for milk. Black soybean (Kulti) from Sankeshwar showed that this could be dehusked into well shaped dhal much more easily than other varieties. Recovery rate being 85 per cent dhal, 13 per cent husk and 2 per cent undersized whole seeds which were unable to be dehusked. Proximate nutrient content of Kulti showed 25 per cent fat, 33.4 per cent protein and 4.8 per cent ash content. Sensory evaluation of milk prepared from Kulti was discouraging when compared to white variety but the yield was same as others.

It was found that a small scale industry can be started for the production of tempeh culture and tempeh preparation at a reasonably low cost and with simple appropriate technology. The villages can adopt this processing methods for self-employment and serve nutritious tempeh with the use of soybean, groundnut and sunflower seed combinations. The tempeh culture can be supplied at 15 paise per packet for the housewife to use in the production of 1½ kg tempeh at home level and tempeh costs about less than Rs 6. This gives them a high density, high protein and caloric food stuff which is a speciality in food preparation. This Indonesian food can become popular in Indian curries with or without meat.

Under the project, research-cum-training on soybean cultivation and utilization to generate employment besides enhancing nutrition of diet, has been

taken up. To begin with 10 cultivators were given training on soybean cultivation and their produce was purchased at a prefixed price of Rs. 410 per quintal by the Self Employment at a Council, Karnataka. Under the second phase of this programme involving training on Soybean utilization and marketing, certain equipments to give training and to produce sterilized, bottled milk are being set up at UAS Dairy. Very soon 2000 bottles per day will be produced to begin with. Simultaneously training on preparation of various food items from soybean will be given to enable the trainees to set up snacketarias in Bangalore. Gradually, this will be extended to other places in Karnataka.

In the Coordinated Projecton Home Science the work was carried out on the released varieties of cereals, pulses and oilseeds which were subjected to physico-chemical, cooking and sensory evaluation. More than twenty two varieties of rice and bajra were analysed for the protein content. Basumathi and IR-20 were found to contain 8.6 and 8.3 per cent of protein. Bajra variety BJ-560 contained 14.3 per cent water absorption and 3.6 per cent total solids in the water leached out after cooking were recorded. Jaya had highest gain in weight, Sona had the lowest (253). Basumathi had the highest L/B ratio, Mandya Vani had 21.0 per cent amylase, Hydrolysable starch content of the varieties studied ranged between 61.6 and 71.4 per cent.

Malting of cereals and pulses and their use in cooking preparation, malts were prepared with greengram, horsegram, redgram, peas, bengalgram, cowpea, *Kabuli* Channa and blackgram, and cereals-ragi and wheat, for yield sensory evaluation the recovery rate and for pulses evaluation individually in combinations pulse malts, recovery rate was highest for blackgram, bengalgram. Among the individuals pulse malts bengalgram, pea malt, *Kabuli* channa showed highest rating appearance, flavour and eating quality, respectively. Among pulse malts in combination with wheat malt; bengalgram malt, pea malt and cowpea malt scored highest in appearance, flavour and eating quality respectively. Pulse malts in combination with ragi malt scored higher than ragi-malt itself for all the sensory characters. With the view of finding out the acceptability of malis themselves for cookies no vanilla flavour was added in the testing recipes. Results showed that cookies prepared from bengalgram and *Kabuli* channa malt with wheat malt scored the biggest for acceptability. However in combination with ragi, bengalgram and greengram malt cookies scored highest.

Convalia was tested for its growth supporting value on Albino rats. Untreated bean flour was found to be at 100 per cent level. Steamed flour at 80 per cent level also showed negative growth. Extrusion cooked product of convalia in combination with wheat at 70:30 ratio was tested for PER on Albino rats. There was a marked improvement in PER because of extrusion cooking.

Development of methodology for determining cooking qualities, sensory evaluation and consumer preferred characteristics has been completed for future use in all the centres of CRP of Home Science.

Five villages in and around Dharwad have been selected to identify the target group in upper caste, O.L.C. scheduled caste and tribe. A total of 1,189 children between 3 and 6 years old and 68 pregnant mothers have been selected for measuring various developmental aspects among them. Test materials, schedules and scales for this have been developed.

For the above selected village families, questionnaire has been developed to collect information about their suitability for implementation of several economic, social and developmental programs.

## 4. Fisheries Science

### 4.1 Fishery Biology

Samples of silver pomfrets *Pampus argentius* caught predominantly by trawl nets were collected from fish market and fish landing centres off Mangalore at fortnightly intervals for age and growth analysis. The sizes varied from 182 mm to 334 mm. Examination of stomach contents revealed that they were mainly plankton feeders. Fully matured fishes were common in January.

Observations on the rate of growth and age structure of the clams, *Katelysia opima* and *Merttrix casta* indicated the dominance of zero year class in the population. Distribution, survival and spawning intensity in *K. opima* was closely related to the higher salinity values in the habitat in contrast to the more euryhaline ecophysiological responses of *M. casta*. Reproductive potential and recruitment were high in both the species. Size at first maturity and critical length were low in both species.

Oysters, *Crassostrea madrasensis* were induced to spawn under laboratory conditions by manipulating environmental parameters. Development of fertilised eggs under laboratory conditions was normal and 'D' stage veliger larvae appeared within 24 hours from the time of fertilization. Settlement was

poor on artificial clutch. Settled spat could be maintained in the laboratory up to 8 weeks with the help of artificial feeding.

Preliminary observations were made on the trends in trawl fisheries and also on the species composition of trawl catches at Bunder and Malpae. *Nemipterus japonicus*, *Tachysurus* sp, *Trichiurus* sp. and *Cynoglossus* sp. were observed to be dominant in the landings. Among the prawns, *Parapenaeopsis stylifera* and *Matapenaeus dobsoni* were more abundant.

The total landings of mullets were high during December-January. By and large, *Valamugil seheli* dominated the catch throughout, followed by *V. speigleri*, *Liza tade* and *L. parsia*. *Mugil cephalus* and *L. dussumieri* did not appear regularly and their catches were insignificant. Fairly good catches of *M. cephalus* were recorded from December onwards.

### Aquaculture

The composite fish culture experiment, in which catla-rohu and catla-mrigal hybrids were introduced in place of rohu and mrigal respectively, was terminated after a rearing period of 8 months. The growth and meat yield in the case of catla-rohu was found to be better than that of rohu, whereas catla-mrigal proved inferior to mrigal. The result indicated the possibility of using catla-rohu hybrid in composite fish culture in place of rohu, with economic advantage.

Tilapia fry were fed on pellets containing 40 ppm 17 methyl testosterone over a period of 35 days, in order to study the effect of the hormone on sex differentiation. After 105 days of post-treatment period 80 per cent of the treated fry turned out to be males, while the rest 20 per cent were females.

Chopped *Eichhornia* leaves were given as feed to grass carp and the growth of the fishes were compared with fishes on *Hydrilla*. It was observed that some quantity of *Eichhornia* leaves were constantly left unconsumed in cisterns. This indicated the disliking of the chopped *Eichhornia* leaves in raw condition by the fishes compared to *Hydrilla*. In order to improve the palatability and digestability of *Eichhornia* leaves, they were cooked and given as feed to the grass carp. These leaves were accepted by the grass carp thereby registering encouraging growth.

Growth performance of silver carp fry in cisterns fertilised with inorganic fertilisers and organic manures is being carried out. The growth of the fishes was better in cisterns fertilised with ammonium sulphate when compared to the

fishes stocked in cisterns fertilised with a mixture of ammonium sulphate and single superphosphate and cowdung, because of the production of sufficient quantity of algae in the former than the latter.

The fingerlings of *Puntius pulchellus* fed on lucerne and hydrilla separately indicated that fishes fed with lucerne accorded better growth than those fed with *Hydrilla*. This indicated that lucerne is better than *Hydrilla* due to its high protein content.

Overnight water-soaked and unsoaked subabul leaves were given to grass carp to see the effect on the growth of grass carp. The results indicated that in three fortnights, the fish developed black pigmentation and turned dark in colour due to the presence of minosine. Retardation of growth was observed in both the feeding schedules. This indicated that subabul leaves are not suitable to grass carp when given as a whole ration.

The comparative growth performance of the *Labeo fimbriatus* is being studied, by feeding the fishes with the formulated feed at the rate of 5 per cent and 10 per cent of their body weight. The net average weight gained during the first fortnight was higher (35.78 g) in case of fishes fed at the rate of 10 per cent than those fed with 5 per cent of the body weight of the fishes (29.00 g). The experiment is in progress.

The common carp fry stocked at the rate of 3,000/plot in two paddy plots gained an average net weight of 7.03 g and the total weight of 18,216.00 g which was approximately 8 times more than the initial weight of the fry. The average percentage of survival was 71.5.

### 4.3 Fishery Oceanography

Studies on circulation in the Arabian Sea near Mangalore revealed that surface current direction was generally towards south in April, May and September. Northerly from November to March in the region of study, while bottom current direction varied from month to month.

Regular observation of currents and other observation revealed that the general direction of current as derived from observations at the nearshore stations was southerly from April to September and northerly from October till first fortnight of February. While the surface layers in the nearshore stations followed the general circulations. On many occasions the subsurface layers appeared to be influenced by tidal force. During the monsoon and early post-monsoon seasons, the flow inside the estuary was almost axial with reference to the orientation of the rivers, while wide fluctuations were observed during other

seasons when the river discharge is minimum or less. The tidal influence is felt upto a depth of 10 m which is about 2 km off the coast of Mangalore.

Studies on the behaviour of certain inorganic nutrients during the process of mixing in the estuarine and coastal waters off Mangalore, revealed that the concentration of dissolved inorganic phosphorus was noticed to be maximum during May and minimum during October in the surface waters. There was an inverse relation between the organic and inorganic forms of phosphorus indicated. The higher values at subsurface levels during pre-monsoon months are thought to be due to decomposition of organic matter. There is clear indication of desorption of phosphorus into the overlaying waters during post-monsoon months due to variation of ionic strength of water.

#### 4.4 Aquatic Biology

Studies on rocky shore communities of Dakshina Kannada indicated that the bulk of the fauna was mainly contributed by barnacle, oyster and *Perna*, on all the rocky intertidal areas, during the pre-monsoon and post-monsoon seasons. However, other organisms like, *Patella*, *Chiton* and *Littorina* were present in abundance during post-monsoon season. When compared to Someshwara and Kapu, Surathkal rocks supported maximum number of polychaets, which is mainly composed of *Sabellaria* sp. The other polychaets, like *Pomatoceros* sp and *Hydroides* sp. appeared in bulk during the post-monsoon season. *Ulva* sp, *Gracillaria* and *Ceramium* were present on all the shores and their abundance was noticed during the month of November, December and January.

#### 4.5 Fishery Microbiology

The results indicate that some strains of *V. parahaemolyticus* can multiply in prawns preserved at temperatures 10°C and attain dangerous levels. This information is very important in as much as the temperatures in domestic refrigerators are known to fluctuate from about 2°C to 12.8°C. These organisms are highly sensitive to temperatures 5°C. around 9°C. Some strains were observed to adsorb on to chitin and survive better than in its absence. At 37°C also adsorption to chitin and better survival could be demonstrated.

Experiments conducted to study the occurrence of *V. parahaemolyticus* in market sea foods suggest that this organism occurs even in dry fish. When white baits were artificially contaminated and sundried under commercial conditions, it was observed that *V. parahaemolyticus* does not survive, though it was present at initial levels such as 10<sup>3</sup>/g.



On the use of chilled sea water in handling and processing of prawns indicated that the preservation of prawns in chilled sea water (CSW) for 28 hours encouraged the retention of most of the gram positive flora originally present though in reduced numbers. In iced prawns on the other hand, all gram positive flora except *Micrococcus* were completely eliminated. CSW also suppressed *Pseudomonas* which is considered to be the most active shrimp spoiler. The organoleptic quality of frozen prawns derived from chilled sea water batch was better than that of iced lot. Thus the results suggest that the prawn processing industry stand to gain by handling and preserving prawns in chilled sea water while they are processed.

Studies on effect of naturally occurring protease inhibitors on fish spoilage bacteria were made. Preliminary results suggest that the fishes given a drop treatment in a solution of protease inhibitors extracted from *Adenanthora* seeds have reduced trimethylamine and volatile base nitrogen as compared to controls. This indicates better biochemical quality of the treated fishes.

Hydrocarbon degrading bacteria were isolated from both oil polluted and non-polluted areas around Mangalore and the nutrient status *in situ* for hydrocarbon degradation is being presently studied.

#### 4.6 Fish Processing Technology

The suitability of Pink Perch for 'Kamaboka' preparation has been studied. It was found that fresh as compared to frozen forms will yield better quality product, frozen fish yielded better quality product as compared to the picked and frozen meat. Three types of sausages and pastes were prepared from pink perch (*Nemipterus japonicus*) meat with 9 per cent of different fillers such as corn flour (corn maida), wheat flour (wheat maida) and corn starch. It was found there was no significant difference in quality among the three types of sausages mentioned above. However, sausages with corn flour scored high values in organoleptic tests.

The frozen mackerel were stored in three different cold storages. The temperatures of the cold storages were recorded and it was found that there was a wide temperature fluctuation ranging from 20°C to 8°C in the commercial cold storages. From biochemical and organoleptic tests it was found that the sample stored at commercial storages was unacceptable after 3 months whereas the sample stored at control storage was acceptable up to 5 months.

The peeled and deveined prawns were given dip treatment with sodium bicarbonate solution with following concentrations *i. e.*, 0.0 per cent, 0.1 per

cent, 0.2 per cent, 0.3 per cent, 0.4 per cent, 0.5 per cent and 1.0 per cent. The treated and frozen prawns were stored at 20°C. Samples were analysed for driploss and organoleptic tests. Among various concentrations of  $\text{NaHCO}_3$ , a treatment with 1 per cent  $\text{NaHCO}_3$  was found to be more effective in preventing driploss. The driploss was minimum when the sample was treated with 1 per cent bicarbonate as glaze solution.

Studies on semi-commercial trials on the use of paraben-ice for the preservation of fresh fish indicated that the shelf-life of the fish preserved in paraben-ice could be extended by more than a week, as compared to storage of fish in ordinary ice.

A new method of anaesthetization of frogs using chemicals has been worked out after screening several chemicals. It has been found that frogs get anaesthetized in 5-10 minutes when immersed in 3 per cent sodium carbonate solution. They can then easily be subjected to cutting of legs without regaining consciousness. Total fish catches of the UAS purse seine boat for the period from September '82 to end of November '82 were as follows: Mackerel (4.75 m tons), sardine (28.25 m, tons) and others (5.60 m. tons). Total boat side value of catch was Rs. 40,478.

During the year under report batches of Massmin were prepared with variation in salting method, salting time and drying condition. Concentration of brine and duration of brining were standardised including the time of steaming.

Standardisation of soaking time and temperature of fish maws in water was done. Hydrated fish maws were cleaned and dip treatment with potassium metabisulphate solution was given. Fining agent was prepared. Fining proportions were good for the fining agent but the beer had slight off flavour. Dip treatment of hydrated fish maws in potassium metabisulphate solution was not sufficient. Hence, potassium metabisulphate was incorporated into fining agent and proportion of ising glass, tartaric acid and potassium metabisulphate to be incorporated for preparing fining agent was standardised.

#### 4.7 Fishery Engineering

The assembling of various parts fabricated for continuous smoke generator and smoke chamber was completed and kept ready for final testing. The electrical wiring work has been completed and the equipment is being tested.

#### 4.8 Fishery Statistics

Biometry of mackerel populations along the coast of Karnataka were made through the sampling study based on commercial catches of purse seine

boats. The purse seine catches of Karnataka coast is mainly comprised of mackerels of 2+ age group ranging from 20 cm to 24 cm in total length. There exists at least 3 broods of mackerel populations off Karnataka coast which differ morphometrically with regard to total length, standard length, head length and jaw length.

#### 4.9 Fishery Biochemistry

Raw material characteristics and biochemical parameters namely, total protein, total lipids, moisture content, water soluble proteins, salt soluble proteins, phospholipins and neutral lipid contents—amino nitrogen, volatile base nitrogen, trimethylamino nitrogen, peroxide and the free fatty acid content were determined immediately after freezing and at monthly intervals over a period of one year in *Tachysurus dussumierii*. There was decrease in the sarcoplasmic and myofibrillar proteins while the peroxide value and FFA were increasing during the period of storage. A fluctuation in the amino nitrogen content was observed VBN was increasing slowly while TWA value found to be more or less constant during period of study.

## **PART IV**

### **EXTENSION**

The special features of work during the year included : 1) Starting the new Extension Education Unit at Mudigere and 2) Organising Masons Training Programme in all the 19 districts of the State to support the State Biogas Promotion Programme.

#### ***Extension Education Council***

24th meeting of the Extension Education Council was held on 10-3-83 at Bangalore. The important suggestions/recommendations are :

1. In addition to the existing Extension Guides, one post of Extension Guide in Home Science to be added to the Extension Education Units at Mudigere and Mangalore.
2. Reporting the activities in Kannada was accepted.
3. A training programme in farm management has to be organised for Farm Superintendents and Field Assistants.
4. A proposal for new Extension Education Unit has to be developed around NARP, Bijapur for implementation.

#### ***Agricultural Information***

The University in collaboration with the State Department of Agriculture has brought out the following publications :

1. Package of practices for high yields-1982 (English)
2. Package of practices for high yields-1982 (Kannada)

Twelve new leaflets were printed during this period for the benefit of State Department and farmers.

Publication of fortnightly hints to farmers both in the field of agriculture and horticulture have been continued during the period and 26 fortnightly releases in each area have been published during the year. Similarly 52 sets of question and answer columns in *Prajavani* and *Kannada Prabha* have been published.

Monthly tips to farmers were issued through *Krishi Vignana* and *Mysore Vyavasaya Patrike*.

The University has organised the following exhibitions :

1. University pavilion was arranged at AHARA 82 during May 1982.
2. An exhibition was arranged at KASSIA 82 during May 1982.
3. Exhibition at Lalbagh during Independence Day celebrations from 8th to 15th August 1982.
4. An exhibition in connection with All India Wheat Workshop was organised at Hebbal from 27th to 29th August 1982.
5. Exhibition was organised on the eve of Krishi Mela at Hebbal from 12th to 14th November 1982.
6. An exhibition was arranged at Lalbagh in connection with Republic Day during January 1983.

#### **Farm Advisory Service**

Scientists of the University have replied 2,355 queries of farmers in the State. Further they have made 411 consultancy visits to the farmers field to advice them on various farming problems. Details are as under :

Unit/Department	No. of replies given on queries of farmers	No. of farm visits made
Extension Education Units	1099	157
Farmers Training Institute	316	120
Agricultural College, Hebbal	50	10
Agricultural College, Dharwad	32	17
Basic Science College, GKVK	4	4
Veterinary College, Hebbal	371	88
Research Stations	487	15
Total	2359	411

#### **Correspondence Course for Farmers**

The second correspondence course on paddy was organised during the year with a participation of 148 farmers.

**Field Days at Research Stations**

During the period under report, 26 University Research Stations conducted Field Days and Krishi Melas as detailed below in which more than 20,000 farmers participated.

Month	Research Station	No. of days	Approx. No. of farmers participated
1	2	3	4
September	RRS, Dharwad	3	6000
September	Arabhavi	1	100
September	Hanumanamatti	1	200
September	Gulbarga	1	200
September	Kathalgere	1	200
October	Gangavati	1	100
October	Sirsi (Paddy & Pepper)	1	150
November	RRS, Mandya	3	1800
November	Hebbal and GKVK	4	4500
November	Mudigere	1	300
November	Madenur	1	100
November	Nagenahalli	1	200
November	Chintamani	1	150
December	Madikeri	1	500
December	Dharwad	2	2510
December	Hagari	1	150
December	Gulbarga	1	150
December	Bagalkot	1	120
December	Bijapur	1	350
January	Nippani	1	250
January	RRS, Raichur	1	600
January	Annigeri	1	100
January	Bidar	1	200
January	Bheemarayanagudi	1	300
January	Belavatgi farm	1	465
February	Arsikere	1	250
Total			19945

**Farmers Training**

i) *Training of farmers by Farmers Training Institute, Hebbal*: The Farmers Training Institute, Hebbal conducted institutional and peripatetic

training programmes for farm men, women and convenors of Charchamandals. The details are as under :

Type of training programme	No. of training programmes	No. of persons trained
a) <i>Institutional training</i>		
i) For farm men	8	236
ii) For farm women	8	205
iii) Convenors of Charchamandals :		
For men	2	35
For women	1	12
b) <i>Peripatetic training programmes</i>		
i) Farm men	50	2,561
ii) Farm women	50	1,994

c) *Other training programmes*: The Farmers Training Institute, Hebbal hosted the following other training programmes :

1. Three biogas technology training programmes of 21 days duration.
2. Two one-day training programmes and one 3-day training programme for the masons, Agricultural Officers, University Scientists and IFFCO Volunteers as a part of special component training programmes.
3. Six 3-days training programme for SC and ST farmers was organised in agriculture and allied subjects involving 197 farmers.

Three new Charchamandals were organised by enrolling 109 members and 316 queries of farmers were replied during the period.

Under the lab-to-land programme, the Institute is working in one village M. Dasarahalli with 50 small and marginal farmers.

ii) *Training of farmers by Krishi Vigyan Kendra, Hanumanamatti*: The Krishi Vigyan Kendra, Hanumanamatti has organised 140 on-campus training

programmes and 96 off-campus training programmes involving 3,644 and 3,373 persons, respectively. The details are as under :

Discipline	On-campus training programmes	No. of persons trained	Off-campus training programmes	No. of persons trained
Agril. Engineering	32	586	42	434
Soil and Water Management	39	1,123	25	1,251
Animal Science	25	635	—	—
Home Science	23	637	9	448
Extension, Sericulture and Others	21	663	20	1,240
Total	140	3,644	96	3,373

Twenty one day mason training programme in the construction of Bhagyalakshmi biogas plant was organised from 7th to 27th February 1983 involving 26 village masons, 24 Agricultural Assistants of Dharwad district.

Specialised training for farm youth and school drop-outs on the maintenance and servicing of plant protection equipment was held.

iii) *Training of farmers by Extension Education Units*: The Extension Education Units have organised 1,272 group meetings, 625 training sessions, 267 field days/field visits involving 19,201 ; 9,729 and 8,597 farmers respectively. The details are as under :

Extension Education Unit	Group meetings		Training Sessions		Field days/Field visits	
	No.	Farmers involved	No.	Farmers involved	No.	Farmers involved
Bangalore	424	7,249	148	2,492	28	2,019
Dharwad	331	5,582	195	4,360	205	3,628
Raichur	163	1,899	46	1,249	8	1,828
Mudigere	36	538	9	426	8	475
Mandya	318	3,933	23	632	18	647
Mangalore	—	—	204	620	—	—
Total	1,272	19,201	625	9,779	267	8,597

*Training of Extension Functionaries*: The Staff Training Unit has organised the following training programmes for the benefit of extension workers of the State Departments of Agriculture, Horticulture, Animal Husbandry, Fisheries



and responded to organising of training programmes suggested by the Government of India. The details are as under :

Name of the Department/Institution	No. of courses organised	No. of person trained
i) Department of Agriculture	6	107
ii) Department of Horticulture	5	45
iii) Department of Animal Husbandry and Veterinary Services	1	7
iv) Department of Fisheries	1	12
v) <i>Government of India sponsored training programmes</i>		
a) State level on sericulture, rice, ragi, maize, jowar and wheat	8	233
b) National level on bio-fertilizers, post-harvest technology, vegetables and sericulture	4	94
vi) IAS Probationers training programme	1	6
vii) Other ad-hoc training programmes	9	54

The Unit continued to provide training support to the Subject-matter Specialists of the Department of Agriculture under T & V system by organising monthly training-cum-workshops at research stations for all the 19 districts every month.

#### **Limited Field Extension Work**

(a) *Block Demonstrations*: Details of Block Demonstrations conducted by the Extension Education Units are given below :

Extension Education Unit	Season	Crops involved	No. of Block Demons. organised	No. of farmers involved			Area covered in Acres/g
				Small	Others	Total	
1	2	3	4	5	6	7	8
Bangalore	Kharif-82	Redgram	3	55	18	73	44.00
Dharwad	Kharif-82	Paddy	4	18	27	45	155.20
		Chilli					
		Cotton					
		Jowar					
	Rabi-82	Wheat	1	4	11	15	32.00
Raichur	Kharif-82	Sunflower	2	1	25	26	56.00
	Rabi-82	Safflower	1	8	—	8	11.00

1	2	3	4	5	6	7	8
Mudigere	Kharif-82	Paddy	2	—	26	26	13.00
	Rabi-82	Banana	2	—	2	2	2.00
		Coconut					
	Summer-82	Cabbage	4	—	9	9	4.20
		Brinjal					
		Tomato					
Mandya	Summer-82	Jowar/Paddy	4	45	25	70	57.00
	Kharif-82	Redgram	2	26	12	38	32.00
		Paddy					
Total			25	157	155	312	407.00

In all, 25 Block Demonstrations were conducted by the Extension Education Units on an area of 407 acres involving 312 farmers.

*Agencies involved in Block Demonstrations:* The State Department of Agriculture and State Department of Horticulture and Nationalised Banks were the main agencies involved in organising Block Demonstrations.

(b) *Trials conducted by the Extension Education Units:* The six Extension Education Units have organised 305 trials of which 72 were in summer, 154 in *kharif* and 79 in *rabi*. The details are as follows :

Extension Education Unit	No. of trials conducted			Total
	Summer-82	Kharif-82	Rabi-82	
Bangalore	30	41	11	82
Dharwad	14	67	21	102
Raichur	4	15	15	34
Mandya	24	29	30	83
Mudigere	—	2	—	2
Mangalore	—	—	2	2
Total	72	154	79	305

Important trials conducted by the Extension Education Units were as follows :

(i) **Extension Education Unit, Bangalore**

*Summer 1982*

1. Use of urea super granules on paddy
2. Intan mutant paddy

3. Varietal trial on french bean
4. Paired row technique in tomato
5. Indaf-5, Indaf-9 and HR-911 varieties of ragi
6. Comparing Mandya Vani with Pushpa paddy

*Kharif 1982*

1. Mixed cropping of soybean with redgram
2. Trial on multi-location testing of onion
3. Trial on RG-30, 31 and TTB varieties of bengalgram
4. Indaf-3, Indaf-9 and HR-911 varieties of ragi

*Rabi 1982*

1. Multi-location testing of onion
2. Use of urea super granules

**(ii) Extension Education Unit, Dharwad**

*Summer 1982*

1. Performance of Dh-8 and TG-3 vs recommended variety of groundnut

*Kharif 1982*

1. Performance of SB-516, 296 A × SB-1085 vs Hybrid jowar
2. Performance of Gama 318, IET-5656 vs Anthrasali in paddy
3. Performance of IET-58992 IET-582, vs Intan paddy
4. Performance of BKN paddy vs local paddy
5. Performance of SB-2413, SB-2415 vs SB-1079 jowar
6. Performance of Dh-8, TG-3 vs recommended variety of groundnut
7. Cow-dung treated super phosphate vs super phosphate in paddy
8. Performance of BMG horsegram vs local
9. Performance of BDN 1/ID-8863 vs local redgram
10. Performance of DB-452 and DB-225 vs Jayadhar/Lakshmi cotton
11. Performance of DB-312 vs Jayadhar cotton
12. Early sowing vs Late sowing of rainfed cotton
13. Mixed cropping of hybrid cotton and onion vs entire Hybrid cotton
14. Use of Pyrethroid for control of boll-worm

*Rabi 1982*

1. Performance of KDW-39 vs Keerthi/HD-2189 wheat
2. Performance of A-83 vs A-1 safflower
3. Performance of Hybrid jowar vs wheat after *kharif* groundnut

4. Comparing recommended vs half of the recommended dose of nitrogen to *rabi* jowar
5. Scheduling of irrigation to bengalgram

**(iii) Extension Education Unit, Raichur**

*Summer 1982*

1. KHT-6 vs Pusa Ruby tomato

*Kharif 1982*

1. Skip row cultivation in cotton
2. Use of Pyrethroid to control boll-worm in cotton
3. Fertilizer trial in Pusa Kranti brinjal
4. Use of Planofix in chilli

*Rabi 1982*

1. Varietal trial in rainfed cotton
2. KHT-6 vs Pusa Ruby tomato
3. Varietal trial in jowar
4. Use of Basalin for onion

**(iv) Extension Education Unit, Mudigere**

1. Multi-location trial on cardamum
2. Effect of Formaldehyde treatment for cardamum nursery

**(v) Extension Education Unit, Mangalore**

1. Composite fish culture with different stocking densities

**(vi) Extension Education Unit, Mandya**

*Summer 1982*

1. Varietal trial of paddy - Intan Mutant vs IR-20
2. Varietal trial on paddy - IET 5914 vs IR-20
3. Varietal trial of paddy - KMP-39 vs IR-20
4. Groundnut varieties - Dh-3-30 vs TMV-2
5. Capsicum varieties - S-16 vs Local

*Kharif 1982*

1. Trial on paddy - IET-5914 vs Mahsuri/Prakash
2. -do- - KMP-39 vs IR-20
3. -do- - KMP-242 vs Mangala
4. -do- - KMP-41 vs IR-20
5. Trial on use of Urea Super granules
6. Trial on Ragi varieties HR-911 vs Indaf-5 and Indaf-9

*Rabi 1982*

1. Trial on tomato varieties Sel-4 vs Pusa Ruby
2. Trial on bean varieties Sel-9 vs Contender
3. Onion varieties Sel-11, 12, 14 vs Pusa Red
4. Watermelon varieties—Arka Manik vs Ashayi Yemato
5. Bottle gourd—Sel-4 vs Pusa Summer
6. Radish varieties—Arka Nishant vs Japanese White
7. Introduction of knol-khol at Maddur Taluk
8. Introduction of beet-root in Maddur taluk
9. Cowpea varieties Sel-B-16 vs Local
10. Brinjal varieties Arka Kusumakar vs Yeerangere

(c) *Important results of the trials conducted by the Extension Education Units:* Following are the results of important trials conducted by the Extension Education Units during the year :

Name of the trial	No. estd	Yield (kg/acre)		% increase or decrease over check
		Check plot	Treatment plot	
1	2	3	4	5

**Extension Education Unit, Bangalore***Summer 1982*

Use of urea super granules on paddy	6	2627	2706	3.01
Intan mutant paddy	10	2018	2152	6.64
Varietal trial on french beans	3	4697	6090	29.66
Paired row in tomato compared with local practice	4	4945	4890	-1.11
Comparing Mandya Vani vs Pushpa as check	6	2302	2529	9.86

*Kharif 1982*

Mixed crop of soybean with redgram	10	438	759	73.29
Multi-location testing of onion	6	5195	—	—
Selection-11	—	—	5403	4.00
Selection-13	—	—	5745	10.59
Selection-14	—	—	7673	47.70
Redgram varieties with local	12	276	—	—
Lam-RG 30	—	—	240	-13.04
Lam-RG 36	—	—	212	-23.19

	1	2	3	4	5
Relay cropping of tomato with redgram		6	2555	—	—
Tomato		—	—	2555	—
Redgram		—	—	258	—
Varietal trial of ragi		7	597	—	—
Indaf-9		—	—	617	3.35
HR-911		—	—	673	12.73
Multi-location testing of onion		10	5400	—	—
Sel. 11		—	—	5950	1.81
Sel. 13		—	—	6100	12.96
Sel. 14		—	—	5800	7.41

*Rabi 1982*

Use of urea super granules	1	1800	2000	11.11
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**Extension Education Unit, Dharwad***Summer 1982*

Performance of Dh-8, TG-3 vs recommended groundnut variety	14	680	—	—
TG-3	—	—	749	10.14
Dh-8	—	—	752	10.59

*Kharif 1982*

Performance of Dh-8, TG-3 vs rainfed groundnut	5	432	—	—
TG-3	—	—	395	-8.56
Dh-8	—	—	565	30.79
Performance of SB-516 and BSH-1 vs recommended hybrid jowar	9	1206	—	—
SB-516	—	—	774	-32.82
BSH-1	—	—	1361	12.85
Response of paddy to cowdung treated super phosphate vs super phosphate	1	1190	1220	2.52
Performance of IET-5656 and IET-318 vs Local paddy	6	460	—	—
IET-5656	—	—	1006	118.70
IET-318	—	—	956	107.83

	1	2	3	4	5
<b>Performance of IET-5899 and</b>					
IET-5882 vs Intan paddy (check)	3	884	—	—	
IET-5899	—	—	995	12.56	
IET-5882	—	—	1106	25.00	
<b>Performance of BKN-6986-146-2 vs</b>					
Intan paddy (check)	2	850	1000	18.00	
<b>Performance of SB-2413, SB-2415 vs</b>					
SB-1079 hybrid jowar (check)	3	990	—	—	
SB-2413	—	—	960	-3.03	
SB-2415	—	—	980	-1.01	
<b>Wilt response of BDN-1/JD-88-63 vs</b>					
Local redgram	6	180	—	—	
BDN-1	—	—	190	5.56	
ID-88-63	—	—	188	4.44	

*Rabi 1982*

<b>Response of <i>rabi</i> jowar to half</b>					
<b>recommended nitrogen level vs</b>					
<b>full recommended nitrogen level</b>					
	3	330	286	-13.33	
<b>Performance of <i>rabi</i> jowar vs wheat</b>					
<b>after <i>kharif</i> groundnut (wheat as</b>					
<b>check)</b>					
	2	225	352	56.44	
<b>Control of Aphids on safflower by</b>					
<b>test formulation</b>					
	6	313	383	22.68	

**Extension Education Unit, Mandya***Summer 1982*

Intan Mutant vs IR-20 (check)	6	2521	2759	9.44	
Dh-3-30 vs TMV-2 groundnut (check)	5	627	736	17.38	
IET-5914 paddy vs IR-20 (check)	6	2677	2903	8.44	
KMP-39 paddy vs IR-20 (check)	5	2485	2660	7.04	

*Kharif 1982*

KMP-39 paddy vs IR-20 (check)	4	2434	2402	1.31	
KMP-242 paddy vs Mangala (check)	4	2004	2082	3.89	
KMP-41 paddy vs IR-20 (check)	4	2490	2450	-1.61	
KMS 5914-4-6 vs Mahsuri/Prakash (check)	5	2576	3045	18.21	

1	2	3	4	5
HR-911 ragi vs Indaf-5 (check)	3	1197	1252	4.59
Indaf-9 (check)	3	1153	1252	8.59
Use of urea super granules in paddy vs prilled urea (check)	5	2252	2474	9.86
<i>Rabi 1982</i>				
Indaf-9 ragi vs Indaf-7 (check)	5	1493	1412	—5.43
Arka Manik vs Ashayi Yamato (check)	4	16426	16424	—
Arka Nishant radish vs Japanese White (check)	3	3520	6027	71.22

(d) *Demonstrations conducted by the Extension Education Units:* The six Extension Education Units have organised 289 demonstrations during the year of which 106 were in summer, 135 in *kharif* and 48 in *rabi*. The details are as under :

Extension Education Unit	No. of demonstrations conducted			Total
	Summer '82	Kharif '82	Rabi '82	
Bangalore	51	31	10	92
Dharwad	21	35	17	73
Raichur	5	39	15	59
Mandya	27	22	6	55
Mudigere	2	8	—	10
Total	106	135	48	289

Following are the titles of important demonstrations conducted by the various Units :

#### **Extension Education Unit, Bangalore**

##### *Summer 1982*

Sheep units  
Establishment of dairy units  
Establishment of fodder plots  
Demonstration on cultivation of mushroom

##### *Kharif 1982*

Establishment of sheep units  
Establishment of fodder demonstrations



Introduction of fish culture  
 Demonstration of mushroom recipes

*Rabi 1982*

Demonstration of mushroom cultivation  
 Demonstration of apiary  
 Demonstration of Universal hoe

**Extension Education Unit, Dharwad**

*Summer 1982*

Response of groundnut to gypsum application vs no application

*Kharif 1982*

Comparing SB-1079 vs hybrid jowar  
 Performance of maize in comparison with potato  
 BSH-1 sunflower compared with Morden sunflower  
 Spacing of hybrid cotton at  $3 \times 2$  vs  $4 \times 2$  spacing  
 Control of Murda disease in chilli  
 Pest control in hybrid cotton

*Rabi 1982*

Comparing Keerthi wheat with HD-2189  
 Kiran wheat compared with Bijaga Yellow wheat  
 Entire safflower vs wheat + safflower  
 Improving cultivation of garlic  
 Pest control in safflower using chemicals

**Extension Education Unit, Raichur**

*Summer 1982*

Water management in paddy

*kharif 1982*

Popularising Pusa Kranti brinjal  
 Popularising BSH-1 sunflower  
 Performance of DCH-32 cotton in Upper Krishna Project  
 Use of Sword bean  
 Composite fish culture in farm ponds  
 Control of insect pests of redgram by using Endosulfan

*Rabi 1982*

Popularising HD-2189 wheat  
 Pest control in rainfed cotton

Control of safflower aphids  
Pest management in cabbage  
Growing of entire safflower

**Extension Education Unit, Mudigere**

*Summer 1982*

Effect of fertilizer application on Intan paddy

*Kharif 1982*

Use of recommended dose of fertilizer followed by timely plant protection method in paddy cultivation

*Rabi 1982*

Use of recommended dose of fertilizers and timely plant protection of ratooning in Intan paddy  
Line planting of Intan paddy  
Introduction of common carp in irrigation ponds  
Zinc sulphate treatment of paddy

**Extension Education Unit, Mandya**

*Summer 1982*

Improved method of ragi cultivation  
Improved method of cowpea cultivation using Mussorie phosphate  
Use of Mussorie phosphate on groundnut  
Use of Mussorie phosphate on paddy  
Use of weedicide in sugarcane

*Kharif 1982*

Use of weedicide in sugarcane  
Use of zinc sulphate and azolla on paddy  
Ragi cultivation  
Sugarcane cultivation

*Rabi 1982*

Cultivation of cabbage

e) *Results of important demonstrations conducted by the Extension Education Units:* Following are the results of some important demonstrations conducted by the Extension Education Units :

Title of the demonstration	No. conducted	Av. yield in kg/acre		% increase over check
		Check	Demonstration	
1	2	3	4	5

**Extension Education Unit, Dharwad**

*Rabi 1982*

Chemical control of safflower insect pests	9	247	318	28.74
60 kg wheat seed rate compared with farmer's seed rate (check)	3	972	1116	14.81
KDW-16 wheat compared with HD-2189 wheat (check)	9	862	1065	23.55
Performance of entire safflower vs wheat and safflower	3	375		
Wheat + safflower			300 + 60	- 4.00
Net return in Rs.		664	516	

*Summer 1982*

Gypsum application to groundnut compared with no application	21	725	808	11.45
SB-1079 jowar compared with hybrid jowar CSH-1 (check)	7	885	652	- 26.00
Cultivation of maize (check) in comparison with potato	2	1150	3100	170.00
Net returns in Rs.		928	2861	
Performance of BSH-1 vs Morden (check) sunflower	6	197	331	68.00

**Extension Education Unit, Raichur**

*Kharif 1982*

Comparing BSH-1 sunflower with Morden as check	5	375	490	30.67
Control of tur pod borers by endosulfan	3	387	416	7.49

1	2	3	4	5
<b>Extension Education Unit, Mandya</b>				
<i>Summer 1982</i>				
Demonstration on cultivation of ragi	6	1503	1709	13.71
Use of Mussorie phosphate on cowpea	5	459	489	6.54
Use of Mussorie phosphate on groundnut	5	680	778	14.41
Use of Mussorie phosphate on paddy	7	2459	2601	5.77
<i>Kharif 1982</i>				
Use of Mussorie phosphate and Azolla on paddy	7	2549	2746	7.73
Drill sowing of ragi compared with local	7	256	360	40.63

f) *Whole Farm Demonstrations*: During the year under report 66 whole farm demonstrations have been organised by the Extension Education Units. The details are given below :

Extension Education Unit	No. of whole farm demonstrations		
	Completed 3 years	Completed 1 year	Total
Bangalore	—	21	21
Dharwad	25	12	37
Mudigere	—	2	2
Mandya	2	4	6
Total	27	39	66

Some of the results of the whole farm demonstrations are as follows :

In ragi crop grown by whole farm demonstrators, the percentage increase in yields were observed from 25 to 90.

Yield increased from 10 to 150 per cent in paddy crop grown by whole farm demonstrators.

In rainfed wheat cultivation undertaken by whole farm demonstrators, the yield increase varied from 33 to 124 per cent. 40 to 60 per cent increased yields in irrigated wheat were also reported.

g) *Working with Youth Clubs*: The Extension Education Units continued to involve voluntary agencies like Youth Clubs in their work. During the period, 39 clubs were involved in the extension activities organising 42 demonstrations, 58 lecture sessions, 48 training sessions and 6 film shows. The details are given below.

Extension Education Unit	Working with No. of youth clubs	Demonstrations	Lectures	Training sessions	Film shows
Bangalore	4	17	24	6	3
Dharwad	19	21	5	39	3
Raichur	7	2	8	1	—
Mudigere	2	2	2	—	—
Mandya	2	—	17	2	—
Mangalore	5	—	2	—	—

h) *Working with High Schools*: The Extension Education Units worked with 20 high schools to provide lessons on agriculture and to encourage students to develop a better attitude towards agriculture. They have provided 93 lesson plans to the schools. The staff of the Units made 130 visits to the schools. The details are as follows:

Extension Education Unit	Working with No. of schools	No. of visits made	No. of lesson plans provided
Bangalore	4	75	57
Dharwad	4	5	5
Raichur	3	9	—
Mudigere	2	5	—
Mandya	5	31	31
Mangalore	2	5	—
Total	20	130	93

#### **National Demonstrations**

During the period, the three National Demonstration Units continued to be in operation in the districts of Bellary, Bijapur and Dakshina Kannada with their head quarters at Siruguppa, Bijapur and Ullal, respectively.

The Units have organised 72 demonstrations and conducted 60 field days on the demonstration plots involving 1,790 farmers. The details are as under :

Unit	No. of Specialists working	No. of demonstrations conducted						No. of field days	Farmers participated
		One crop	Two crop	Three crop	Spl. Demon	EFS	Total		
Bellary	3	7	11	1	1	5	25	10	328
Bijapur	3	6	16	—	—	3	25	18	787
Dakshina Kannada	3	4	12	1	—	5	22	32	675
Total	9	17	39	2	1	13	72	60	1,790

Some of the interesting results obtained in these National Demonstrations can be highlighted as follows :

1. In Dakshina Kannada district, demonstrations by using paddy varieties Shakti in *kharif* and Palguna in *rabi* and Jaya in summer, farmer has obtained a net income of Rs. 13,445 per hectare.
2. A farmer in Bellary district has obtained 37.5 quintals per hectare using Hybrid Varalakshmi cotton. The net income was Rs. 14,495.
3. In two crop sequence demonstrations in Bijapur district, a farmer has obtained 60 quintals of Hybrid jowar CSH-5 and 35 quintals of Spanish Improved groundnut which fetched a net income of Rs. 18,893 per hectare.

#### Pilot Bakery Project

The Pilot Bakery Project during the year has continued to organise 20-week' long term training programme, 3-week specialised short term training programme and popular 3-day short courses. The special feature of the year is that the 3-day popular courses were continued throughout the year. The details are as follows :

Type of course	No. of batches	No. of participants
1	2	3
1. Long term training programme (20-week course)	1	20
2. Short term training programme (1-week course for ladies)	3	74

	1	2	3
3. 3-day short course for ladies : Bangalore	52	2,111	
4. 3-day short course for ladies : Dharwad	14	253	
5. Ad-hoc training programmes :			
a) At the request of Voluntary Organisations outside Bangalore	4	100	
b) At villages	3	50	

The Bakers Training Unit participated in KASSIA 82 exhibition from 10-5-82 to 22-5-82 by displaying special dishes prepared at Bakers Training Institute at a cheaper cost. Similarly from 23-5-82 to 31-5-82, it participated in AHARA Exhibition.

#### **Extension work carried out by College Departments**

The scientists of the college departments assisted in extension work by participating in Krishi Melas, providing lectures, participating in radio talks, associating in conducting training programmes, developing literature and providing assistance in replying to farmers queries. Details furnished by some College Departments are as under :

College Departments	Trials/ Demos	Extension literature	Radio talks	Training programmes
1	2	3	4	5
<b>Agricultural College, Hebbal</b>				
Plant Pathology	2	1	—	1
Agril. Economics	—	—	—	15
Agril. Microbiology	—	—	—	4
Agril. Production	—	1	1	2
<b>Agricultural College, Dharwad</b>				
Home Science	5	7	2	2
Agril. Microbiology	—	—	—	2
Agril. Botany	2	3	1	5
Soil Science	—	—	—	5
Seed Technology	—	—	—	5
Entomology	7	2	—	7
<b>Veterinary College, Hebbal</b>				
Physiology	1	—	—	—
ANMPT	—	27	—	—
Medicine	—	1	—	1

1	2	3	4	5
Gynaecology & Obstetrics	—	2	—	2
Vety. Microbiology	—	2	—	1
Animal Genetics	—	4	3	—
Pathology	—	1	2	—

### ***Village Adoption by Research Stations***

Under the 20-point programme of the Prime Minister of India, the University has implemented the village adoption programme with reference to promotion of technology in agriculture and allied aspects. The details are as under :

Unit/Research Station	No. of villages adopted	Farmers involved in			
		Dryland agri.	Pulse prodn.	Oilseed prodn.	Others
I. <i>Extension Education Units</i>					
Bangalore	15	200	15	—	61
Mandya	14	39	10	10	26
Raichur	7	13	16	39	34
Dharwad	8	58	49	71	184
Mangalore	5	87	37	18	214
Mudigere	1	—	9	—	170
II. <i>Agricultural Research Stations</i>					
	15	56	123	20	628
Total	65	453	259	158	1,317

### ***Lab to Land Programme***

The first phase of the lab to land programme started 3 years ago came to close on 31-5-1982. Under this programme 2,000 families of small farmers/landless labourers were enrolled.

After the first phase was completed the second phase of the lab to land programme has now been taken up starting from June 1982 under the ICAR assistance. In the second phase 30 centres have been established by the University, with a total enrollment of 3,000 families of small farmers/agricultural labourers. The details of the number of families allotted and adopted by these 30 centres by the end of March 1983 are given below :



Name of the centre	No. of families		No. of farmers involved in crop demon.
	Allotted	Adopted	
1	2	3	4

*Unit-I : Centres under the direct supervision of the Director of Extension*

1. Extension Education Unit, Hebbal	700	837	—
2. Farmers Training Institute, Hebbal	50	50	50
3. Extension Education Unit, Dharwad	350	287	287
4. National Demonstration Unit, Bijapur	50	32	32
5. Extension Education Unit, Raichur	150	75	75
6. Extension Education Unit, Mandya	300	291	244
7. Krishi Vigyan Kendra, Hanumanamatti	100	65	65
8. National Demonstration Unit, Siruguppa	50	30	—
9. Extension Education Unit, Mangalore	200	74	50
10. National Demonstration Unit, Ullal (Mangalore)	48	40	—

*Unit-II : Centres under the direct supervision of the ICAR Coordinated Schemes under the administrative control of the University*

11. Dry Farming Scheme, GKVK	50	50	50
12. Sr. Sunflower Breeder, Elite Scheme, UAS, GKVK	50	49	15
13. AICRP (Pulses), GKVK	50	50	32
14. AICRP (Millets), GKVK	50	49	—
15. AICRP (Sorghum), Dharwad	50	50	—
16. AICRP (Cotton), Dharwad	50	28	28
17. Officer-incharge Scheme on Water Management (ICAR), Dharwad	50	50	—
18. AICRP on Paddy, Mandya	50	46	—
19. AICRP on Pulses, Gulbarga	50	50	—
20. AICRP on Tobacco, Shimoga	50	33	—
21. Buffalo Project, Dharwad	50	50	50

	1	2	3	4
<i>Unit-III : Centres under the direct supervision of the Campus Heads and Regional Research Stations</i>				
22. Hebbal/GKVK Campus	50	50	—	
23. Dept. of Home Science, Hebbal	50	50	—	
24. Director of Instruction (PGS) Dharwad	50	50	—	
25. Director of Instruction (H.Sc.) Dharwad	50	50	—	
26. Chief Scientific Officer, RRS, Mandya	50	50	—	
27. Chief Scientific Officer, RRS, Mudigere	50	49	49	
28. Chief Scientific Officer, RRS, Raichur	50	50	—	
29. Director of Instruction (Fish.), Mangalore	50	50	—	
30. Prof. of Agronomy, NARP & Campus Head, Bijapur	50	31	31	
Total	3,000	2,724	1,141	

***Extension Programme to Promote Bhagyalakshmi Bio-Gas Plants in the Karnataka State***

During the year, the University Extension Service was involved in three extension activities relating to promotional programme of the Bhagyalakshmi Biogas Plants in the State of Karnataka viz.

1. Training masons in different districts of the State to support the other agencies involved in the programme.
2. Training extension workers in operation and maintenance of Bhagyalakshmi Biogas Plant ; and
3. Encouraging farmers through University Extension Education Units to construct Bhagyalakshmi Biogas Plants in different regions.

***Training Masons :*** The University Agricultural Engineers entrusted with responsibilities of providing technical guidance to biogas promotion programme conducted 22 training programmes for masons covering all the districts of the State, in which 421 masons were trained. This helped the State Government agencies to take up the promotional programme of Bhagyalakshmi biogas plants on an intensive scale.

*Training Extension workers:* Based on the decision taken by the State Level Coordination Committee on Biogas Programme, the University organised eight 2-day training programmes in the operation and maintenance of Bhagyalakshmi biogas plants for the benefit of Asst. Directors of Agriculture of all the taluks of the State. In January and February 1983, these training programmes were conducted in 8 locations of different regions of the State.

*Construction of Bhagyalakshmi Biogas plants by the Extension Education Units:* The University Extension Education Units gave priority to the biogas plant promotion programme during the year and 116 plants were completed and another 310 plants were under various stages of construction by the end of March 1983. The details are as follows :

Extension Education Unit	No. of biogas plants completed	No. of biogas plants under construction
Bangalore	66	161
Dharwad	20	31
Raichur	14	87
Mangalore	—	20
Mudigere	1	3
Mandya	15	8
Total	116	310

K. A. JALIHAL  
Director of Extension

## **PART V**

### **COMMUNICATION CENTRE**

Sri Jade Sreenivasamurthy, Professor of Extension, Development Education continued to be in additional charge as Editor till 6-1-1983. He was relieved of his assignment as Professor of Extension (Development Education) and is discharging duties as full time Editor since 6-1-1983.

The Editor was assisted by the Professor of Agric. Extension, Hebbal in respect of Mysore Journal of Agricultural Sciences and Current Research, and by the Assistant Editor in respect of these periodicals as well as Technical Series and Annual Report. Senior Information Specialist assisted in respect of the UAS Dairy and the Krishi Vijnana.

The Board of Regents at its meeting held on 24-4-82 created the posts in the Composing, Printing and Binding Units of the UAS Press, besides the post of a Superintendent of the Press.

#### **Periodicals**

*Annual Report* : The 192 page Crown Quarto report for the year 1981-82 was published.

*UAS Dairy* : During the year issues 4 to 12 of Volume XVII and issues 1 to 3 of Volume XVIII were published. This publication covers important Board decisions, University Circulars and appointments besides news about functions organised and important visitors to the University.

*Research Journal* : The Mysore Journal of Agricultural Sciences, Volume XV issue No. 2 was published.

*Current Research* : Volume X issues 6 to 12 were published. 5 feature articles ; 24 research news articles and 35 short research reports were included.

*Krishi Vijnana* : Volume VIII, No. 2 of the Kannada Quarterly was published.

#### **Series Publications :**

##### **A. Technical Series**

1. Economics of Farm Product Innovation (A Study on Soybean in Karnataka)—No. 40 pp : 76.

**B. Research Review Series**

1. Progress of Research on Diplopoda in India—No. 7 pp : 41

**C. Extension Series**

1. Technology for Small Farmers—No. 10 pp : 88
2. Methodology of Micro-level Employment Planning—No. 12 pp : 94
3. Evaluation of Two Rural Development Designs—No. 13 pp : 67

**D. Miscellaneous Series**

1. Evaluation of the Postgraduate Agricultural Education—No. 30 pp : 145

The University broughtout a Wall Calendar for 1982 in Kannada. This contained interesting photographs and useful information.

**Books Published under Govt. of India Text Book Project :**

(Dept. of Kannada Studies)

**1. Original**

- (i) Reshme Vyvasaya (Sericulture)
- (ii) Krishi Prasara (Agricultural Communication)
- (iii) Bile Kasa (Striga)
- (iv) Menasu – Kappu Honnu (Pepper–Black Gold)
- (v) Mannu Sookshma Jeevi Shastra (Soil Microbiology)
- (vi) Lavanga (Clove)
- (vii) Koli Sakane Kaipidi (Hand book of Poultry)

**2. Translation**

- (i) Vyvasaya Munnade (Getting Agriculture Moving)
- (ii) Sookshma Jeevigala Utparivartane Hagu Anuvamsheeya Gunagala Punar Samyojane (Work of Microorganisms – Part 4)
- (iii) Sookshma Jeevigala Parisara Shastra Mattu Sonku Rakshana Shastra (World of Microbiology – Part 6)
- (iv) Manava Kalyanakkagi Sookshma Jeevigala Balake (World of Microbiology – Part 7)

**UAS Printing Press**

Important Printing works executed in the press during the year include 'Mysore Journal of Agricultural Sciences', 'Current Research' and 'Krishi Vijnana' mentioned earlier and other items such as Annual Reports, Budget and Convocation material. Vyvasayada Munnade and Sachitra Battada Bele were the Kannada Text books printed.

Total number of works completed during the year was 206, valued at Rs. 1,09,542-25 (labour charges only). Total number of pages composed was 3770 in Demy Octavo size. 27,324 books with wrapper turning; 470 books with half-calico and 250 books with full calico were bound.

During the year, Neelakanteswara Cylinder Printing Machine which was not commissioned for several years was commissioned. HMT Cylinder Machine and 'Grafo' Printing Machine operated below capacity since they needed repairs which was attended to during the year. This resulted in slow printing.

During the period 188 BATs as mentioned below were preferred :

<i>Relating to the year</i>	<i>Number of BATs</i>	<i>Amount</i>
1980-81	9	Rs. 22,054-10
1981-82	58	Rs. 84,084-90
1982-83	121	Rs. 1,00,520-21
Total	188	Rs. 2,06,659-21

The value of accepted BATs was Rs. 1,15,261-00.

Also the reconciliation of issue of articles from the store to the press was undertaken.

**Photographic Unit :**

This Unit continued to serve the needs of teaching and research staff of University as mentioned below :

1. Photographs taken	1,139
2. Film Developed (Rolls)	37
3. Slides Prepared	629
4. Enlargements (Assorted size)	1,694
5. Photo Micrographs	49
6. Specimen Photographs	28
7. Hospital Photographs	13
8. Recopied	885

Twenty seven University functions were covered and a total of 930 photographs were taken. A movie of 400 ft. was exposed at the time of inauguration of Dairy Science College.

**Others :**

A film catalogue listing 273 titles available with the different departments at Hebbal and GKVK Campuses was prepared. This catalogue helps the staff members to find the source from which they could borrow movie films (16mm) for their educational activities.

Efforts are being made to acquire a close circuit TV for which ICAR grants have been received.

J. SRINIVASAMURTHY  
*Editor*

## **PART VI**

### **CAMPUS DEVELOPMENT**

The developmental activities of the University during the year recorded a good progress. A sum of Rs. 110.60 lakhs was spent under the Developmental Grants and other sanctioned projects in addition to a sum of Rs. 22.00 lakhs spent under 8-University Works Expenditure during the year. The developmental activities campuswise is as follows :

#### **GKVK**

The construction of I and II floors over the 7th and 8th Blocks of BS&H College was completed and the same has been handed over for occupation. Twenty residential quarters (C, D, E and F type) were also completed during the year and are under occupation. The University constructed a Health Centre for the medical care of the Campus residents at a cost of Rs 2.6 lakhs with the ICAR assistance. The construction of a Sericulture Building with Laboratory, Rearing halls and Reeling Sheds was initiated during the year with the assistance of World Bank and the works are nearing completion. Preliminary works for the construction of a U.G. Hostel at a cost of Rs. 35 lakhs and the College of Agriculture at a cost of Rs. 98.00 lakhs with the assistance from ICAR and State Government has been taken up. Chip carpetting the main approach to the NAIK BHAVAN has been initiated at a cost of Rs. 4.5 lakhs. Arrangements have also been made to get protected water supply from BWSSB by providing pipe lines and raising mains at a cost of Rs. 4.20 lakhs during the year under report.

#### **Hebbal Campus**

The construction of the Laboratory Animal House costing Rs. 7 lakhs under the UAS-KDDC Animal Health Coverage Programme was completed and the same has been handed over to the Users' Department. The construction of an addition to the Girls' Hostel at a cost of Rs. 4.00 lakhs has been completed and the same is in occupation. Construction of I floor over the Veterinary Hospital at a cost of Rs. 7.5 lakhs with the assistance from ICAR and KDDC has been completed and the same is in occupation. Construction of Diagnostic Laboratory Buildings under UAS-KDDC Animal Health Coverage Programme has been taken up at Bangalore, Mysore, Tumkur and Hassan at a total cost of Rs. 30.00 lakhs and the works are in good progress. Construction of a I floor



over the F.T.I. Building under the State Government Scheme-Training of Rural Youth for Self-Employment has been completed and handed over to the Users' Department. A Raitha Bhavan costing Rs. 4 lakhs was also constructed during the year with the assistance of M/s Mangalore Chemicals & Fertilisers. The construction of Noukarara Bhavana for the Employees Association at a cost of Rs. 4.00 lakhs was also taken up for execution. An addition to the Nursery School building at a cost of Rs. 25 lakhs was initiated to meet the growing needs of schooling facilities and the work is under good progress. Extensions to Piggery and Poultry Sheds were initiated for execution and are nearing completion. The laying of raising main and construction of sump tank to draw water from BWSSB for domestic consumption which was initiated during the last year at a cost of Rs. 4.00 lakhs was completed.

#### ***Dharwad Campus***

The construction of Home Science College Building at a cost of Rs. 30.00 lakhs has been completed and is in use. The construction of a library building costing Rs. 20 lakhs has been completed. The P.G. Hostel at a cost of Rs. 15 lakhs and an addition to the Administrative Building at a cost of Rs. 8.00 lakhs have been completed and are in occupation. A bullock shed costing Rs. 1.00 lakh, Sericulture building costing Rs. 3.8 lakhs, Office-cum-Laboratory for ICRISAT costing Rs. 1.6 lakhs, Animal Science Laboratory Building costing Rs. 5.00 lakhs, Field Laboratory for Horticulture and Botany costing Rs. 1.6 lakhs each, a Glass House for P.G. studies costing Rs. 2.5 lakhs were taken up for execution and completed during the year under report.

Apart from the above, planning was initiated for the construction of six 'D' type quarters, I floor over the Raitha Bhavan and TRYSEM, U.G. Hostel costing Rs. 15 lakhs and I floor over the existing Ladies Hostel costing Rs. 3 lakhs during the year.

#### ***Mangalore Campus***

Construction of Masonry Ponds costing Rs. 5 lakhs under ICAR Grants has been taken up for execution and is nearing completion. Planning was initiated for the construction of a P.G. Hostel building costing Rs. 2 lakhs and for the By-products Laboratory at the Technology Wing at a cost of Rs. 5 lakhs. The Swimming Pool Complex with the Indoor Games Hall which was completed during the year was handed over for the Users' Department.

#### ***Raichur Campus***

Additions and improvements were undertaken to one of the staff quarters to provide hostel facilities to trainees under the TRYSEM Scheme at a cost of

Rs. 30,000. Deepening of the open well including steining costing Rs. 50,000 was also taken up and completed.

***Bijapur Campus***

The construction of residential quarters costing Rs. 9 lakhs were initiated under NARP and the works are under good progress. The construction of the Laboratory Building and Trainees Hostel also under NARP at a total cost of Rs. 20 lakhs was initiated and will be taken up for execution during 1983-84.

To augment the irrigational facilities at various Research Stations drilling of borewells, lift irrigation were initiated and a sum of Rs. 5.00 lakhs was spent during the year.

With regard to acquisition of lands, an extent of 140 acres of Government land at Bramhavara, 100 acres at Juttanahalli and Sankanahalli in Nagamangala Taluk, 100 acres at Baligigapade village in Chikkaballapur Taluk and 7.24 acres at Nagenahalli were got transferred to the University during the year. Acquisition of private lands at Bijapur, Bidar, Gulbarga, Mudigere and Bagalkot are under final stages of acquisition.

Under the National Seed Project-II Programme, the University acquired 3 Ford Tractors in addition to 2 Jeeps and one Standard-20 Mini Bus and two Motor Cycles to the existing fleet of vehicles.

In conclusion, I wish to express my sincere appreciation to all the officers in general and my staff in particular, for their full cooperation and assistance extended to me in discharging the duties.

**B. VENKATA SWAMY**  
*Estate Officer*

## PART VII

### RESOURCES AND FINANCIAL ESTIMATES

The non-lapsable lump sum Block grant payable to the University under section 35 of the UAS Act has been increased from Rs. 450 lakhs during the year 1981-82 to Rs. 460 lakhs during the year 1982-83. The request of the University was for increasing Block grants of Rs. 575 lakhs to cover the payments arising out of the issue of Government Orders increasing D.A., H.R.A., C.C.A., etc., This request is still pending with the Government. The State Government is being requested to modify the formula for fixation of Block grants to the University by giving an increase in the annual rate of growth from  $3\frac{1}{2}$  per cent to 5 per cent and to deduct only to the extent of 5 to 10 years average of internal receipts to arrive at the net expenditure to calculate the Block grants and to enhance the grants for annual maintenance of buildings of the University from  $1\frac{1}{2}$  to  $3\frac{1}{2}$  per cent. If the State Government accepts the request of the University and release grants accordingly, the University will have less financial problem. It is expected that Government would consider the request favourably. However at present the expenditure of the University is curtailed to certain extent by staggering the filling up of vacant posts as well as allocating lower amounts under recurring and non-recurring items of expenditure.

The Development grants released to the University for the year 1982-83 is Rs. 125 lakhs. Out of this Rs. 30 lakhs is ear-marked towards 25 per cent share of the State Government, for ICAR Co-ordinated Research Projects. The remaining Rs. 95 lakhs is set apart for items of development which also includes the amount required for National Agricultural Research (NARP) Project. The amount that is ear-marked for the VI plan (1980-85) is Rs. 85 lakhs and the amount released to end of 1982-83 is Rs. 312.55 lakhs only. This leaves a balance of Rs. 537.45 lakhs. The amount that is being released by the State Government is not in proportion to the development programmes chalked out by the University based on the VI Plan allocation. But in spite of the request made by the University to the State Government, the amount released during the year 1983-84 is again Rs. 150 lakhs only. The State Government is again requested to step up allocation at least to Rs. 250 lakhs during the year 1983-84 and the balance to be released during 1984-85, so that entire amount ear-marked for the University in the VI Plan proposals of the State Government could be utilised in full.

The allocation of funds for the year 1982-83 (Rev. Budget) over the expenditure for the year 1981-82 is detailed below :

Particulars	Actuals of expenditure during 1981-82	Revised Budget provision for 1982-83
	(Rupees in lakhs)	
Direction	152.87	209.28
Teaching	202.10	257.33
Research	167.52	201.53
Extension	23.94	34.82
Schemes sponsored by other agencies	38.48	101.66
Total	584.91	804.62
<i>Five Year Plan Schemes of the University</i>		
Development Expenditure	92.30	156.39
ICAR/IBRD/NARP Project	24.20	81.08
University Seed Production Programme	0.65	2.00
ICAR Co-ordinated Res. Projects	141.92	202.36
Government of India Schemes	6.89	17.93
State Plan Schemes (Ad-hoc schemes)	6.06	19.56
Second National Seed Project	2.60	12.09
Total	274.62	491.41

The reasons for increase in expenditure under items 1 to 4 of under Non-plan expenditure is mostly due to enhancement of allowances, revision of pay scales of university employees, increase in wages of agricultural labourers and increase in prices of laboratory requirements like chemicals, glass-ware and other essential commodities.

In respect of development expenditure, the amount proposed to be spent during 1982-83 is Rs. 156.39 lakhs as against a sum of Rs. 92.30 lakhs spent during 1981-82. The major developmental activities taken up during 1982-83 is starting of Dairy Science College at Hebbal, completion of 7th and 8th blocks of BS & H College at GKVK, construction of additional class rooms adjacent to the Administrative Office building at Dharwad, Construction of building for Household Industries for Home Science College at Dharwad, providing underground cables from electrical sub-station for providing external electrification to Sericulture building and Hostel Block at GKVK Campuses, Construction of Postmortem Room at Hebbal campus, construction of Bull Centre at Hebbal, Construction of Animal Science Laboratory at Dharwad, construction of Field Laboratory at Dharwad and construction of RCC overhead tank at Dairy Science College at Hebbal etc.

Besides, several works were taken up for providing irrigation facilities to the Research Stations at Hebbal, RTRS, Shimoga, Gangavathi, Chintamani Nippani, Gulbarga, Arabhavi, Sirsi, Kandli Farm at Hassan, and Prabhunagar at Dharwad. The works taken up for improving farm facilities are providing threshing yards at GKVK, barbed wire fencing at Siruguppa, construction of laboratory building at Pulse Research Station, Madenur including electrification, street lights at V.C. Farm, Mandya and providing water bound macadam Road at GKVK.

In order to improve the livestock facilities, the construction of bullock shed at Dharwad, extension to Piggery Unit at Hebbal, conversion of existing building into P.G. Laboratory at Hebbal were taken up during the year 1982-83. In respect of Hostel facilities the construction of Undergraduate Hostel at Dharwad, construction of P.G. Hostel at Dharwad Campus, Hostel at Hebbal, construction of U.G. Hostel at GKVK and providing additional bath rooms to the existing hostel blocks at Dharwad were taken up.

As regards staff quarters at Research Stations, the construction of C, D and E type quarters at GKVK and construction of D type quarters at Hebbal, have secured good progress during the year. The construction of over-head tank for the staff quarters at Kathalagere was completed during the year 1982-83.

In addition to the above, construction of masonry ponds at Fisheries College, Mangalore, construction of field laboratories at Dharwad, construction of glass-house for P.G. Laboratory at Dharwad, construction of workshop building at Dharwad, construction of Health Centre at GKVK and providing earthen ponds at Fisheries Research Station, Hessarghatta and desilting of earthen pots at A.R.S., Madenur were also taken up during the year.

In addition to the above, several items of works were taken up under NARP, out of funds released by the ICAR. The works taken up at Bijapur are construction of hostel, laboratory and workshop buildings, digging of bore-well, staff quarters, providing barbed wire fencing etc.

The works taken up at NARP, Naville are construction of staff quarters, construction of Hostel and Laboratory building.

The work taken up at NARP, Bidar is erection of a temporary shed in NARP land.

The work taken up at NARP, Brahmavar are construction of Laboratory Building and Hostel Buildings.

The number of all India Co-ordinated Research Projects assigned to the University during the year 1982-83. is 103 involving a total sum of Rs. 202.36

lakhs as against the total sum of Rs. 141.92 lakhs provided during 1981-82. Out of these 103 schemes - 35 are on 100 per cent basis and 68 are on 75 per cent basis. The expenditure towards 25 per cent is met out of State Government Development grants and the balance will be met out of ICAR funds.

The number of schemes that have been sanctioned by the Government of India during the year 1982-83 are 14, the number of ad-hoc schemes sanctioned by the State Government is six, the number of schemes sanctioned by other agencies such as PL-480, KDDG, Mangalore Fertilizers and Chemicals world Bank on Sericulture are 38. In addition seven schemes have been operated during 1982-83. Under NARP, under University Seed Production Programmes it is 6, and three under National Seed Project.

A statement showing the summary of the revised budget estimate of receipts and expenditure for the year 1982-83 and Budget estimates for 1983-84 is given below. The abstract of receipts and expenditure is given vide Appendix III.

Head of Account	Original estimates for 1982-83	Revised estimates for 1982-83	Budget estimates for 1983-84
1	2	3	4
(Rupees in lakhs)			
<i>Receipts</i>			
1. Grants from State Government	735.10	599.56	675.71
2. ICAR, Government of India and other Agencies	362.26	363.08	404.56
3. Income from fees	7.00	6.93	7.18
4. Income from Univ. Property, Farms, Rent and other Misc. Receipts	140.53	138.75	142.26
5. Other Misc. Income	20.05	21.00	20.05
Total Receipts	1264.94	1129.32	1249.76

*Expenditure : (A) Non-plan Expenditure*

1. University Administration	200.33	209.28	259.51
2. Resident Teaching	273.25	257.34	292.96
3. Research	207.18	201.53	206.49
4. Extension	38.75	34.82	38.22

1	2	2	4
5. Other Misc. Items	14.13	—	—
6. Schemes sponsored by other agencies	40.61	101.65	40.83
Total 'A'	774.25	804.62	838.01
<b>(B) Five year plan schemes</b>			
1. Development schemes financed by ICAR and State Govt.	185.00	156.39	246.59
2. NARP Project financed by World Bank thro' ICAR and State Govt.	104.14	81.08	95.75
3. University seed production programme	4.00	2.00	4.50
4. ICAR Co-Ordinated Research Project	175.68	202.36	201.54
5. Govt. of India Schemes	9.79	17.93	11.16
6. State Plan Schemes (Ad-hoc Schemes)	20.10	19.56	22.46
7. Second National Seed Project	26.43	12.09	82.06
Total 'B'	525.14	491.41	664.06
Total 'A' + 'B'	1299.39	1296.03	1502.07
Anticipated Savings (—)	20.00	8.85	55.10
Grand Total	1279.39	1287.18	1446.97

The assistance received from the State Government, ICAR, KDDC and other agencies towards the development schemes during the year 1982-83 are furnished below :

	(Rupees in lakhs)
State Government (Development Grant)	125.00
State Government, Adhoc Schemes	3.50
Government of India	11.49
ICAR Co-Ordinated Research Project	178.65
ICAR Centrally Sponsored Schemes	20.97
National Agricultural Research Project financed by World Bank thro' ICAR	48.51

	(Rupees in lakhs)
Second National Seed Project financed by World Bank thro' ICAR	0.92
Dept. of Atomic Energy	1.29
Karnataka Dairy Development Corporation	54.06
World Bank for Sericulture Project	19.90
UNICEF	0.40
Mangalore Chemicals and Fertilizers	0.54
Karnataka State Silk Marketing Board	2.50
Karnataka State Council for Science and Technology	0.54
Harihar Polyfibres	1.10
ASPEE Agriculture Research, Bombay	0.03
Centre for Rural Development Studies	0.10
Science Research, New Delhi	0.34
Total	<hr/> 469.84 <hr/>

The University gratefully acknowledges the assistance received from these agencies.

H. M. NAGABHUSHANA  
*Comptroller*



## APPENDICES

## APPENDIX I

### LIST OF PERSONS APPOINTED IN THE UNIVERSITY DURING 1982—83

<i>Sl. No.</i>	<i>Name</i>	<i>Designation and Subject</i>	<i>with effect from</i>
1	2	3	4
<b>Teaching</b>			
PROFESSORS			
1.	Dr. S. Abdul Rahman	Parasitology	21-5-1982 AN
2.	Dr. P. Shivarama Rai	Entomology	26-7-1982
3.	Dr. S. L. Shanbhogue	Fishery Biology	14-7-1982
4.	Dr. S. R. Parvathikar	Sr. Sorghum Physiologist	21-10-1982
5.	Dr. S. Bisalaiah	Extension (Development Education)	26-11-1982
6.	Dr. M. B. Channe Gowda	Agril. Extension	27-11-1982
7.	Dr. K. M. Jayaramaiah	Extension (Development Education)	6-1-1983
ASSOCIATE PROFESSORS			
1.	Mrs. S. J. Suhasini Rao	Home Management, H.Sc. College, Dharwad	5-7-1982 AN
2.	Mrs. Venkamma Ganokar	Child Development & Family Relation, Dharwad	5-7-1982 AN
3.	Mr. K. G. Hiremath	Agril. Botany, Dharwad	27-5-1982
4.	Dr. I. Karuna Sagar	Fishery Micorbiology, Mangalore	14-7-1982
5.	Mr. C. V. Kanchan	Skipper	10-8-1982
6.	Dr. R. Narendranath	Physiology	16-6-1982
7.	Mr. G. Francis Xavier	Cooperation	10-7-1982
ASSISTANT PROFESSORS			
1.	Dr. B. N. Ranganath	Surgery, Hebbal	28-4-1982
2.	Dr. M. Sathyanarayana	Microbiology, Hebbal	21-4-1982
3.	Dr. G. L. Panduranga	Medicine, Hebbal	21-4-1982
4.	Dr. T. Ganesh	—do—	29-4-1982
5.	Dr. V. Srinivas	Gynaecology & Obst., Hebbal	5-5-1982
6.	Dr. B. L. Pradeep	—do—	5-5-1982
7.	Dr. B. Puttabyatappa	Microbiology, Hebbal	25-5-1982
8.	Dr. M. R. Jayashankar	Anim. Genetics & Breeding, Hebbal	28-5-1982
9.	Dr. A. H. Shuaib	Pharmacology, Hebbal	29-6-1982 AN
10.	Dr. P. Nagarajachar	Medicine, Hebbal	21-7-1982
11.	Dr. Shafi Ahmad Mecci	Anim. Husbandry, Hebbal	3-9-1982

1	2	3	4
12.	Dr. K. Virupakshappa	Botany	3-6-1982 AN
13.	Mr. M. A. Shankar	Sericulture (Agro)	26-6-1982
14.	Dr. V. C. Patil	Agronomy	26-7-1982
15.	Mr. Abdul Khalaq	—do—	1-7-1982
16.	Mr. N. Nagaraj	Agril. Extn.	2-9-1982
17.	Mr. T. H. Ashok	Horticulture	10-9-1982
18.	Mr. K. Narayana Gowda	Agril. Extn.	13-9-1982
19.	Mr. T. G. Nandakishore	Sericulture (Micro)	27-9-1982
20.	Mr. E. Eswarappa	Agri. Extension	29-9-1982
21.	Miss Sunanda Koshy	Phycial Edn., Agril. College, Dharwad	22-4-1982
22.	T.J. Vidyapathi	Chem. (Org.) BSH College, GKVK	1-7-1982
23.	M.B. Raje Gowda	Physics, Agril. College, Dharwad	5-7-1982
24.	H. Gopalaswamy	Physics, BSH College, GKVK	7-7-1982
25.	P.K. Mandanna	Economics, Agril. College, Dharwad	23-6-1982
26.	P. Vincent Monterio	Bio-Chem., BSH College, GKVK	9-7-1982
27.	Mrs. Uma Sunil Poddar	Bio-Chem., BSH College, GKVK	9-8-1982
28.	Dr. S. Mallikarjunappa	Dairy Science, Agril. College, Dharwad	20-8-1982
29.	Mrs. Indrani Karunasagar	Micro., Fisheries College, Mangalore	7-10-1982
30.	M. Srikantaiah	Micro., Fisheries College, Mangalore	27-9-1982
31.	S. Dhananjaya	Freezing, Fisheries College, Mangalore	30-9-1982 AN
32.	B.A. Shamsundar	Fish Paste Products. Fisheries College, Mangalore	30-9-1982 AN
33.	M.M. Maragal	Canning, Fisheries College, Mangalore	30-9-1982 AN
34.	M. Haridas Bhandary	Fishery By Products, Fisheries College, Mangalore	30-9-1982 AN
35.	C.V. Mohan	Crustacean Biology, Fisheries College, Mangalore	22-12-1982
36.	Chandra Mohan, K.	Capture Fisheries, Fisheries College, Mangalore	22-12-1982
37.	K.V. Radha Krishnan	Molluscan Biology, Fisheries College, Mangalore	22-12-1982
38.	P. Konda Reddy	Fish Genetics, Fisheries College, Mangalore	21-12-82
39.	Joseph K. Manniserry	Fish Culture, Fisheries College, Mangalore	3-2-1983

1	2	3	4
40.	P.G. Kulakarni	Agril. Engg., Agril. College, Dharwad	24-12-82
41.	G.R. Hunashikatti	Agril. Engg., Agril. College, Dharwad	24-12-82
42.	N.R. Gangadharappa	Agril. Extn., Agril., College, Dharwad	11-9-82
43.	L. Manjunath	Agril. Extn., Agril. College, Dharwad	22-9-82
44.	Smt. K. Saroja	Home Eco. and Extn., RHSc., Dharwad	1-12-82
45.	Chayadevi L. Badiger	Home Science (Extn), RHSc., Dharwad	7-7-1982

## INSTRUCTORS

1.	Mr. H. Somashekhara	Agril. Entomology, Agril. College, Hebbal	9-11-1982
2.	Mr. K. Nagabhushanam	Extension, Agril. College, Hebbal	16-7-1982
3.	Mr. B. N. Sathyanarayana	Horticulture, —do—	7-7-1982
4.	Mr. Nagaraju	Agronomy, —do—	15-7-1982
5.	Mr. K. N. Ganeshaiah	Farm Forestry, —do—	28-6-1982
6.	Mr. S. K. S. Nadaf	Crop Physiology, Agril. College, Dharwad	9-8-1982
7.	Mr. H. N. Sattagi	Agril. Entomology, Agril. College, Dharwad	13-7-1982
8.	Mr. V. Chikkasubbanna	Horti., Agril. College, Hebbal	3-7-1982
9.	Mr. S. T. Kajjidoni	Agril. Botany, Agril. College, Dharwad	30-6-1982
10.	Mr. N. Punnia Murthy	Microbiology, Agril. College Dharwad	12-7-1982
11.	Mr. H. Shivanna	Horti., Agril. College, Hebbal	26-6-1982
12.	Mr. S. T. Naik	Plant Pathology, —do—	19-7-1982
13.	Mr. A. Chandran	Agril. Economics, Agril. College, Hebbal	24-7-1982
14.	Mr. S. Hattappa	Crop Physiology, Agril. College, Hebbal	21-7-1982
15.	Mr. P. Narayana Swamy	Horti., Agril. College, Dharwad	20-8-1982
16.	Mr. C. S. Hunshal	Agronomy, —do—	23-9-1982
17.	Mr. L. B. Hugar	Agril. Econ. —do—	1-7-1982
18.	Mr. B. S. Janagoudar	Crop Physiology —do—	1-7-1982
19.	Mr. L. Sudarshana	Bio-Chemistry, GKVK	24-9-1982
20.	Mr. P. K. Ananda Rao	Agril. Bot., Agril. College, Hebbal	21-10-1982
21.	Mr. C. S. Wesley	Entomology, —do—	21-7-1982
22.	Mr. A. N. S. Gowda	Crop Physiology, —do—	20-8-1982
23.	Mr. Y. B. Palled	Agronomy, Agril. College, Dharwad	3-11-1982

1	2	3	4
24.	Mr. Javarayi Gowda	Phy. Culture, Agril. College, Dharwad	1-10-1982
25.	Mr. T. M. Venkata Reddy	Fishery Economics, Fisheries College, Mangalore	1-6-1982
26.	Mr. H. N. Satyanarayana Rao	Aquaculture —do—	15-5-1982
27.	Mr. Kalendar Sabi	Fish. Biology —do—	27-5-1982
28.	Mr. H. S. Pradeep	—do— —do—	24-5-1982
29.	Mr. C. V. Mohan	—do— —do—	27-5-1982
30.	Mr. H. Shivananda Murthy	Fish. Hydrography —do—	14-5-1982
31.	Mr. V. R. Joshi	Fish. Processing Tech.—do—	10-5-1982
32.	Mr. Reji Marthew	Fish. Hydrography —do—	14-5-1982
33.	Mrs. B. M. Geetha	Home Science, H.Sc. College, Dharwad	3-8-1982
34.	Mrs. Anasuya. M. Chandargi	—do— —do—	4-8-1982
35.	Miss, T. V. Yamuna	—do— —do—	3-8-1982
36.	Mrs. Venkavva. B. Patil	—do— —do—	30-7-1982
37.	Mrs. P. R. Sumangala	—do— —do—	22-11-1982
38.	Mrs. J. Vijayakumari	—do— Hebbal	30-7-1982
39.	Mrs. D. Vijayalakshmi	—do— —do—	30-7-1982
40.	Mr. Somanna	Phy. Culture, Vety. College, Hebbal	24-4-1982
41.	Mr. H. K. Raghavendra Rao	Gyn. & Obstetrics, —do—	6-7-1982
42.	Mr. T. Mune Gowda	Poultry Science, —do—	27-8-1982
43.	Mr. G. Pampapathi	Surgery, —do—	9-8-1982
44.	Mr. A. Muralidhara	Medicine, —do—	2-7-1982
45.	Mrs. C. R. Jayashree	Vety. Microbiology, —do—	8-7-1982
46.	Mr. B. M. Kumar	Medicine, —do—	19-7-1982
47.	Mr. Markandaya Jois	ANMPT, —do—	2-7-1982
48.	Mr. K. G. Ravi Kumar	Vety. Microbiology, —do—	2-7-1982
49.	Mr. Gireesh	ANMPT. —do—	16-7-1982
50.	Mr. T. G. Honnappa	Gyn. & Obstetrics —do—	13-11-1982
51.	Mrs. B. Geetha	Vety. Microbiology —do—	3-7-1982
52.	Mr. Nayeemulla Beig	Poultry Science, —do—	16-7-1982
53.	Mrs. Y. B. Rajeshwari	Pharmacology, —do—	9-8-1982
54.	Mr. R. V. Prasad	Vety. Anatomy, —do—	2-7-1982
55.	Mr. S. Yatiraj	Vety. Medicine, —do—	2-7-1982
56.	Mr. J. P. Ravindra	Vety. Physiology, —do—	5-7-1982
57.	Mr. Placid. E. D'souza	Parasitology, —do—	5-7-1982
58.	Mr. M. L. Sathyanarayana	Vety. Pathology, —do—	2-7-1982
59.	Mr. V. Chandrashekhara Murthy	Gyn. & Obstetrics, —do—	15-9-1982
60.	Mr. Mohamad Nadeen Fairoze	Gyn. & Obstetrics, —do—	2-7-1982
61.	Mr. H. A. Upendra	Vety. Medicine, —do—	2-7-1982
62.	Mr. C. S. Haveri	Vety. Medicine, Agril. College, Dharwad	12-7-1982
63.	Mr. G. N. Mohan Kumar	Horticulture, —do—	18-11-1982
64.	Mr. L. V. Hirevenkanna Gowdar	Agril. Extn. —do—	23-3-1983
65.	Mr. M. Anantachar	Farm M., AEI, Raichur —do—	9-12-1982
66.	Mr. S. Sudeendra Gadakar	Statistic, Fisheries College, M'lore	1-2-1983

1	2	3	4
67.	Mr. M. D. Rajanna	Botany, BS&H College, GKVK	6-12-1982 AN
68.	Mr. G. C. Vijayakumar	—do— —do—	17-12-1982
69.	Mr. Shashidhara Virakthamath	Zoology, AEI, Raichur	13-12-1982
70.	Mr. M. K. Shivaprakasha	Microbiology, BS&H College GKVK	6-12-1982
71.	Mr. A. G. Bandi	Agronomy, Agril. College, Dharwad	3-1-1983
72.	Mr. H. E. Shashidar	Agril. Botany, Agril. College, Hebbal	13-1-1983
73.	Mr. K. V. Natikar	Agril. Extension, —do—	11-1-1983
74.	Mr. R. Devaraja	Chem. & Soils, AEI, Raichur	13-1-1983
75.	Mr. V. T. Sannaveerappanavar	Entomology, Agril. College, Hebbal	8-1-1983
76.	Mr. M. Vijayendra	Sericulture, —do—	11-1-1983
77.	Mr. Rajashekhara Gowda	—do— Dharwad	21-12-1982
78.	Mr. S. V. Jahagirdar	Agril. Engg., Agril. College Dharwad	1-1-1983
79.	Mr. P. Chandrashekhara Reddy	Farm Forestry, Agril. College, Hebbal	1-3-1983
80.	Mr. B. V. Chinnappa Reddy	Agronomy, —do—	9-4-1983
81.	Mr. D. P. Kumar	Pl. Pathology, Agril. College, Dharwad	9-4-1983

### Research

#### ASSOCIATE PROFESSORS

1.	Mr. N. Srinatha Reddy	Soil Scientist, Saline Water Scheme Dharwad	28-6-1982
2.	Dr. (Mrs.) Suseela Devi	Soil Chemist, AICRP on Agronomy, GKVK	23-6-1982
3.	Mr. S. A. Patil	Plant Breeding, NARP, Bijapur	30-6-1982
4.	Dr. S. J. Patil	Maize Breeder, Maize Scheme, RRS, Dharwad	28-6-1982
5.	Dr. S. K. Gumasthe	Agronomy, NARP (Agrostologist), Fodder Scheme, Dharwad	17-8-1982
6.	Dr. M. N. Sheelavanthar	Agronomist, Black Cotton Soils Scheme, Dharwad	17-8-1982
7.	V. S. Gidnavar	Agronomy NARP, Bidar	20-8-1982
8.	Dr. T. B. Anilkumar	Plant Pathologist (Pulses)	2-9-1982
9.	Mrs. K. A. Lucy Channamma	Plant Pathologist, NARP, Brahmavar	13-10-1982
10.	Mr. M. P. Shivanandaiah	Sr. Farm Superintendent, RRS, Dharwad	4-8-1982
11.	Mr. N. Parameshwarappa	Sr. Farm Superintendent, RRS, Mandya	6-8-1982
12.	Mr. S. Suryaprakash	Econ., NARP, Raichur	30-8-1982

1	2	3	4
13.	Mr. B. Jagannath	Sr. Farm Superintendent, RRS, Mudigere (NARP)	7-8-1982
14.	Mr. B. Gopalakrishna Hebbal	Agril. Economics, NARP, Bijapur	11-8-1982

## ASSISTANT PROFESSORS

1.	Dr. V. P. Badanur	(Soil Physics) NARP, Bijapur	15-6-1982
2.	Dr. P. S. Kavi	Asst. Meteorologist, MRS, Hebbal	28-6-1982
3.	A. Manjunath	Asst. Microbiologist, MRS, Hebbal	28-7-1982
4.	D. Radhakrishna	Jr. Microbiologist, Organic Matter Decomposition Scheme, Dept. of Microbiology, GKVK	6-8-1982
5.	Desai Sunil Appasaheb	Plant Pathology, NARP, Bijapur	16-8-1982
6.	Dr. R. R. Hanchinal	Plant Breeding, NARP, Bijapur	24-8-1982
7.	Jaweed Iqbal Mulla	Jr. Nutritionist, AICRP on Buffaloes, Dharwad	28-8-1982
8.	S. Lingaraju	Plant Pathology, NARP, Bidar	30-8-1982
9.	D. Thirtha Prasad	Jr. Bio-Chemist, AICRPO (Sunflower), GKVK	30-8-1982
10.	A. R. Alagawadi	Agril. Micro, NARP, Bijapur	31-8-1982
11.	K. Basavana Gowda	Entomology, NARP, Bidar	1-9-1982
12.	Dr. K. G. Parameshwarappa	Plant. Breeding, NARP, Brahmavar	11-9-1982
13.	P. Sridhara Merle	Statistics NARP, Brahmavar	11-9-1982
14.	K. P. Viswanath	Agrostology, NARP, RRS, Raichur	11-9-1982
15.	Bale Murugi Swamy	Jr. Agri. Chemist (Bio. Chem) Biogas Technology, Dharwad	22-9-1982
16.	S. C. Chandrashekaraiah	Plant Pathology, NARP, RRS, Mudigere	30-9-1982
17.	B. Mallik	Asst. Entomologist, ARS, Ullal	21-10-1982
18.	Dr. Basavaraj V. Patil	Entomology, NARP, Bijapur	21-10-1982
19.	Dr. B. L. Krishna Murthy	Vety. Officer, UAS Dairy Project, Hebbal	22-10-1982
20.	L. B. Kunnal	Economics, NARP, Bidar	23-10-1982
21.	Dr. Uppoor Krishna Murthy	Jr. Nutritionist, Vety. College, Hebbal	23-12-1982

## RESEARCH ASSISTANTS

## Messrs

1.	Nagaraju (Chamalapura)	R. R. S., Mudigere	30-6-1982
2.	C. S. Jagadeeshbabu	Pulses, GKVK	23-8-1982 AN
3.	G. C. Sajjan	ARS, Bidar	17-7-1982

1	2	3	4
4.	H. S. Haralappa	ARS, Hagari	5-7-1982
5.	B. Mallana Gowda	ARS, Bijapur	24-7-1982
6.	B. Basavaraj	N & F, Raichur	7-7-1982
7.	C. M. Thippannavar	ARS, Arabhavi	1-7-1982
8.	Bhimasha T. Pujari	Pulses, Gulbarga	19-8-1982
9.	V. Jagannath	ARS, Hagari	1-7-1982
10.	Anand T. Yaragattigar	Pulses, Gulbarga	21-7-1982
11.	D. H. Mudkavi	Sorghum, Bijapur	24-7-1982
12.	Gangadharaiah	Elite (Sun), GKVK	7-7-1982
13.	N. Vijayamohana Reddy	White Grubs, Hebbal	1-7-1982
14.	B. V. Jayakumar	MRS, Hebbal	26-6-1982
15.	N. S. Suresh	—do—	30-6-1982
16.	A. N. Balakrishna	OMD, Hebbal	28-6-1982 AN
17.	C. Somasekhar	Potato, GKVK	30-6-1982
18.	E. G. Ashok	Millet, GKVK	26-6-1982
19.	Hebbar Chandrakanth Thimmanna	RRS, Sirsi (Pepper)	9-8-1982
20.	Mahabaleswara Hegde	Tuber Crops, Mangalore	21-8-1982
21.	Syed Sadaqath	RRS, Dharwad	30-6-1982
22.	P. C. Balakrishna Reddy	Pulses, GKVK	26-6-1982
23.	S. Abdul Munaf Byadgi	ARS, Nippani	23-8-1982
24.	D. S. Raikar	Saline Water, DWD	30-6-1982 AN
25.	M. Jayarama Reddy	DF, GKVK	26-6-1982
26.	N. A. Janardhana Gowda	RRS, Mandya	6-8-1982
27.	V. B. Hullatti	Cotton, Dharwad	1-7-1982
28.	S. V. Ravi	RRS, Mudigere	30-6-1982 AN
29.	V. Shankaranarayana	Cashew, Chintamani	28-6-1982
30.	N. C. Narase Gowda	HPHT, Hebbal	28-6-1982
31.	Rame Gowda	NSP II, GKVK	21-7-1982
32.	D. P. Jagannatha	RRS, Mandya	28-6-1982
33.	T. C. Narayanaswamy	RRS, Mudigere	24-7-1982
34.	P. N. Narasimha Reddy	Soyabean, GKVK	15-7-1982
35.	P. Chandrasekhara Reddy	RRS, Mudigere	3-7-1982
36.	Syed Abbas Hussain	RRS, Raichur	5-7-1982
37.	S. Janarjuna	MRS, Hebbal	26-6-1982
38.	S. L. Mohan	RRS, Mandya	28-6-1982
39.	T. K. Narayanaswamy	Sericulture Silkworm, Diseases Hebbal	23-8-1982 AN
40.	M. Vasundhara	Sericulture Crop Production, Hebbal	8-7-1982
41.	T. Shivashankar	—do—	24-7-1982
42.	R. Anbarasan	Saline Water, DWD	24-7-1982
43.	M. L. Kantharaju	DF, GKVK	5-7-1982 AN
44.	S. Puttaswamy	RRS, Mandya	3-7-1982
45.	Nagappa (Roppa)	Tobacco, Nippani	23-8-1982
46.	S. Gangadharaiah	ARS, Gulbarga	24-7-1982
47.	P. N. Nagarajaswamy	NSP II, GKVK	5-7-1982
48.	V. Shivayya	N & F, Siruguppa	19-7-1982



1	2	3	4
49.	B. G. Krishnappa	Cotton Imp., Siruguppa	24-7-1982
50.	R. Krishnamurthy	—do—	9-7-1982
51.	Shivanagappa	RRS, Mandya	14-7-1982
52.	S. Krishnanaik	N & F, Bagalkot	23-8-1982
53.	N. Janakiraman	Tobacco, Navile	21-8-1982
54.	N. Guruswamy	N & F, Honnavile	20-8-1982
55.	D. Krishnamurthy	ARS, Hagari	18-8-1982
56.	M. Krishnappa	Potato, Madenur	24-7-1982
57.	N. Kanikannan	Wheat, Hebbal	14-8-1982
58.	T. S. Kumaraswamy	Cotton, Dharwad	17-7-1982
59.	M. S. Nataraju	Oilseeds, Chintamani	8-7-1982
60.	C. R. Ravishakar	RRS, Dharwad	12-7-1982
61.	C. M. Chandrasekhar	Cotton Seed Prodn., Dharwad	21-7-1982
62.	Malasiddappa	Oilseeds, Raichur	12-7-1982
63.	M. Daniel Babu	RRS, Mandya	21-7-1982
64.	G. G. Gulaganji	RRS, Raichur	8-7-1982
65.	C. Kare Gowda	NARP, Shimoga	15-7-1982
66.	B. A. Seetharam	RRS, Mandya	6-7-1982
67.	S. Shivanna	ARS, Gangavathi	19-7-1982 AN
68.	M. Abdul Jabbar	RRS, Mandya	8-7-1982
69.	Narayan Siddappa Kambar	ARS, Bailhongal	1-7-1982
70.	G. Nanjundappa	RRS, GKVK	26-6-1982
71.	H. Mallikarjunaiah	Tobacco, Navile	29-6-1982
72.	Malakaja Gowda P. Patil	Soybean, Dharwad	10-7-1982
73.	S. G. Bhuthi	Sorghum, Dharwad	30-6-1982
74.	M. Jayanna	RRS, Dharwad	1-7-1982
75.	D. S. Hanchinamani	RRS, Dharwad	28-6-1982 AN
76.	B. K. Ramachandrappa	Maize, Dharwad	19-7-1982
77.	R. M. Radhakrishna	RRS, Mandya	9-7-1982
78.	T. N. Krishnappa	Sunflower, GKVK	26-6-1982
79.	Vijayendra B. Nargund	Wheat, Dharwad	5-7-1982
80.	Shekharappa I. Halikatti	RRS, Dharwad	11-8-1982
81.	M. K. Basavaraja	Cotton, Dharwad	30-6-1982
82.	Y. Sudheendra	RRS, Raichur	2-8-1982
83.	Ramachandrareddy	BBP, Dharwad	21-7-1982
84.	R. Krishna	D. Sc. Col., Hebbal	16-7-1982
85.	B. R. Motaiah	RRS, Dharwad	2-8-1982
86.	D. Seenappa	RRS, Mandya	14-6-1982
87.	K. V. Mohire	FRS, Hessaraghatta	14-6-1982
88.	K. Manjappa	RRS, Mudigere	28-6-1982
89.	M. C. Nandeesh	RRS, Dharwad	2-8-1982
90.	K. S. Seshagiri	ARS, Honnavile	18-9-1982
91.	Thippeswamy	ARS, Honnavile	18-9-1982
92.	Ravi C. Deshamukh	DF, GKVK	14-10-1982
93.	N. M. Poonacha	ARS, Ponnampet	25-10-1982
94.	Basavaraj S. Javargikar	NARP, Bijapur	11-10-1982 AN

1	2	3	4
95.	T. C. Patil	ARS, Annigeri	22-9-1982
96.	D. P. Kumar	ARS, Kathalgere	13-10-1982
97.	Umakanth V. Dolle	Oilseeds, Raichur	27-9-1982
98.	V. Ravishankara Tuppada	BCSR, Dharwad	30-9-1982
99.	S. G. Yelamali	Sorghum, Dharwad	25-9-1982
100.	Mannur Durdhandappa	Oilseeds, Raichur	7-10-1982
101.	K. R. Viswanathappa	Potato, Madenur	16-9-1982
102.	G. V. Narayanaswamy	Sugarcane, Mandya	20-9-1982
103.	N. E. Thyagaraj	Potato, Madenur	24-9-1982
104.	N. Govindappa	BCSR, Dharwad	30-9-1982
105.	K. B. Munishamanna	Pulses, GKVK	20-9-1982
106.	Honne Gowda	Sugarcane, Mandya	9-11-1982
107.	Mohammed K. Shaik	Oilseeds, Dharwad	6-10-1982
108.	M. Harishkumar	RRS, GKVK	20-9-1982
109.	M. Chandregowda	MRS, Hebbal	20-9-1982
110.	K. N. Srinivas	Seri. Crop. Prod. Hebbal,	10-11-1982
111.	S. V. Dasareddy	ARS, Sirsi (Paddy)	23-9-1982
112.	G. Y. Keshavappa	MRS, Hebbal	16-9-1982
113.	G. V. Lokeshreddy	RRS, Dharwad	3-12-1982
114.	Shankar	RRS, Mudigere	26-11-1982
115.	Ramanagowda H. Patil	Pulses, Gulbarga	4-12-1982
116.	M. N. Merwade	Elite & Super Elite (Sun), GKVK	17-1-1983 AN
117.	M. D. Ramachandra	ARS, Madenur	23-11-1982
118.	R. Jayanthi	MRS, Hebbal	18-11-1982
119.	J. Premakumar	RRS, Raichur	3-12-1982
120.	S. D. Rangaswamy	ARS, Prabhunagar	6-12-1982
121.	K. P. Chinnaswamy	Forest, Dharwad	10-11-1982
122.	T. Tirumaliah	Wheat, Dharwad	6-12-1982
123.	Sreeramaiah	Seri. Silkworm Disease, Hebbal	4-1-1983
124.	S. J. Patil	RRS, Dharwad	10-11-1982
125.	B. Mahantesh	Areanut Impro., Arsikere	30-12-1982
126.	Shivaputrappa Adiver	Pulses, Gulbarga	30-12-1982
127.	M. R. Magadum (Ag. Engg)	HPHT, Hebbal	3-1-1983
128.	Miss Neelu Nangia	Millets, GKVK	31-1-1983
129.	K. Shailendra	NARP, Bidar	1-2-1983
130.	S. Srinivas	ARS, Navile	9-2-1983
131.	H. Sumathikumar	ARS, Hagari	10-2-1983
132.	C. R. Netradhaniraj	Oilseeds, Dharwad	7-2-1983
133.	K. P. Subramaniam	Tobacco, Navile	12-2-1983
134.	Narasimha D. Bhat	Weed Control, GKVK.	1-1-1983
135.	B. B. Channappagowder	Safflower, Annigeri	8-2-1983
136.	B. Shivayogeswara	Cottonseed Prod., Dharwad	5-7-1982
137.	B. M. Devaiah	Potato, Madenur	9-2-1983
138.	A. Naganagowda	ARS, Madenur	14-2-1983
139.	Honnaiah	Asst. Field Supervisor	16-2-1983 AN
140.	T. B. Puttaraju	Seri. Crop. Prod. Hebbal	15-2-1983

1	2	3	4
141.	Mohanraju	Cottonseed Prodn., Dharwad	17-2-1983
142.	C. R. Channakeshava Reddy	Cotton Improvement, Dharwad	16-2-1983
143.	D. S. Ravikumar	Pulses, Kathalgere	9-2-1983
144.	B. C. Patil	Cotton Seed Prodn. Tech., Dharwad	17-2-1983
145.	S. N. Upperi	RRS, Raichur	1-2-1983
146.	Chandrasekhar M. Poleshi	Dryland, Bijapur	17-2-1983
147.	M. K. Krishnamurthy	—do—	17-2-1983
148.	Shivashankar M. Hiremath	Sorghum, Dharwad	17-2-1983
149.	Chandar Shetty Konda	Pulses, Gulbarga	16-2-1983
150.	S. G. Ameengad	Pulses, Gulbarga	17-2-1983
151.	K. Gopya Naik	Jowar Midge Sch., Dharwad	17-2-1983
152.	M. Lakshman	Sorghum, Dharwad	17-2-1983
153.	K. Jagadeeshwara	Water Management, Dharwad	17-2-1983
154.	H. Chandrappa (Bagewadi)	Soybean, Dharwad	17-2-1983
155.	K. Krishnamurthy	RRS, Raichur	26-2-1983
156.	K. T. Rangaswamy	Bio-gas Tech, Dharwad	4-3-1983
157.	Ananda (Mysore)	Pulses, Mandya	4-3-1983 AN
158.	H. Hanuma Naik	STCR, ARS, Siruguppa	17-3-1983
159.	A. Sathyanarayana Reddy	ARS, Siruguppa	15-3-1983
160.	S. Chandrasekhara	RRS, Dharwad	16-3-1983
161.	Mallappa H. Hosamani	Pulses, Gulbarga	26-3-1983
162.	C. Anjinappa	Bheemarayanagudi	5-4-1983
163.	A. K. Jothyappa	—do—	21-3-1983

## EXTENSION

### ASSISTANT PROFESSORS

#### M/s

1.	Dr. N. A. Prakash	Asst. Hort. Specialist, EEU, Hebbal	30-6-1982
2.	Chikkapapanna	Asst. Hort. Specialist, EEU, Mandya	1-7-1982
3.	K. Kempe Gowda	Asst. Hort. Specialist, EEU, Dharwad	10-9-1982
4.	M. R. Anasari	Information Specialist, Directorate of Extension, Hebbal	11-9-1982
5.	A. S. Nagaraj	Fish Processing Technology (Extn.) EEU, Mangalore	7-10-1982
6.	Suresh S. Patil	Audio Visual Specialist, Directorate of Extension, Hebbal	9-10-1982
7.	Y. Basavaraju	Aquaculture (Extn), EEU, Mandya	10-1-1983
8.	C. Vasudevappa	Aquaculture (Extn), EEU, Raichur	9-2-1983
9.	B. M. Manoharram	Aquaculture (Extn), EEU, Bangalore	11-3-1983

1	2	3	4
10.	S. Benakappa	Fish Prod. and Management (Extn), EEU, Mangalore	10-2-1983
11.	H. G. Ramachandra Rao	Diary (Extn) EEU, Hebbal	13-8-1982

## EXTENSION GUIDES

M/s

1.	T. N. Ananda	EEU, Hebbal	24-6-1982
2.	H. V. Vijayakumaraswamy	—do—	1-7-1982
3.	Usha Desai	—do—	19-6-1982
4.	G. N. Nagaraja	EEU, Mangalore	29-6-1982
5.	K. T. Rajendra Prasad	—do—	5-7-1982
6.	H. M. Chidananda Sastry	—do—	5-7-1982
7.	Usha G. Paiwajana	EEU, Dharwad	13-7-1982
8.	S. K. Menasinahal	EEU, Raichur	5-7-1982
9.	S. Chandrasekhara	EEU, Hebbal	14-7-1982
10.	Naganath Holinge	EEU, Raichur	15-7-1982
11.	K. M. Devaraju	EEU, Mandya	22-6-1982
12.	Anil, K.	—do—	14-7-1982
13.	Sreedevi H. Baichwal	EEU, Dharwad	10-7-1982
14.	M. Shivamurthy	EEU, Mudigere	28-6-1982
15.	M. Rajasekhar	—do—	14-7-1982
17.	G. K. Mukunda	—do—	21-10-1982
18.	K. M. Inderesha	—do—	18-10-1982
19.	B. K. Shashikanth	EEU, Mandya	18-11-1982
20.	Umadevi S. Hiremath	EEU, Raichur	13-12-1982
21.	D. G. Gurumurthy	EEU, Mandya	31-1-1983
22.	G. N. Achutha	EEU, Dharwad	14-3-1983
23.	N. S. Shivalinge Gowda	EEU, Mudigere	21-3-1983 AN

## Service Personnel

1.	Mr. B.M. Venkatachala Raju	Dy. Administrative Officer	20-5-1982 AN
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## JUNIOR ENGINEERS (CIVIL)

M/s

1.	M. Mahesh	GKVK	9-6-1982
2.	Gopikrishna	GKVK	6-8-1982
3.	L. Munivenkata Reddy	Bijapur	10-6-1982
4.	Tukaram Hirasu Miskin	Bijapur	30-6-1982
5.	K. K. Balachandra	Hebbal	17-6-1982

## ASSISTANT ENGINEERS (CIVIL)

M/s

1.	M. V. Aswathanarayana	Hebbal	4-6-1982
2.	N. Ganapathy Gowda	GKVK	9-6-1982
3.	Gopalappa	Bijapur	28-6-1982
4.	Syed Afam Raza	GKVK	4-6-1982

1	2	3	4
JUNIOR ENGINEERS (AGRI.)			
M/s			
1. Bahabali Hardar	Raichur	14-7-1982	
2. H. R. Mukunda Rao	Mudigere	15-7-1982	
3. G. Neelakantaiah	Mangalore	9-8-1982	
4. Abdul Mujeeb	Mudigere	31-7-1982	
5. N. Indra Kumar	Mandya	1-7-1982	
6. K. R. Mahadevaiah	Mandya	5-7-1982	
7. S. K. Mulimani	Dharwad	21-6-1982	
8. S. Guruswamy	Hebbal	12-7-1982	
9. K. V. Reddy	Dharwad	1-7-1982	
10. V. H. Joshi	Raichur	4-11-1982	
TYPISTS			
M/s			
1. Srinivasa Murthy	R.R.S., Mandya	3-5-1982	
2. Kuppaswamy	-do-	26-5-1982	
3. R. Saroja	KDDC. (Vety), Tumkur	21-4-1982	
4. V.S. Pushparaj	Dy. D.S.W., Dharwad	8-7-1982	
5. K. R. Mohan	F.C., Mangalore	14-6-1982	
LABORATORY ASSISTANTS			
6. S. V. Joshi	A.C., Dharwad	28-4-82 A.N.	
7. G. Rangaswamy	Entomology, A.C., Hebbal	24-4-1982	
8. M. Lakshmaiah	II NSP, Hebbal	4-2-1982	
9. R. Muralidhara	R.R.S., Mudigere	28-1-1982	
10. Seethamma	A.C., Hebbal	4-6-1982	
FIELD ASSISTANTS			
11. M.F. Utalenavar	Black Cotton Soil, RRS, Dharwad	23-3-82 A.N.	
12. H. R. Nadaf	Entomology, A. C, Dharwad	20-12-1982	
BUS HELPERS			
13. T. Krishnappa	E.O., GKVK	4-6-1982	
14. Marilingaiah	-do-	4-6-1982	
15. N. Narasimhaiah	-do-	4-6-1982	
16. H. Mariyappa	-do-	4-6-1982	
17. Basavaraju	-do-	4-6-1982	
18. A. V. Rajanna	-do-	4-6-1982	
19. K. Narasimhappa	-do-	4-6-1982	
20. B. N. Thimmegowda	-do-	4-6-1982	
21. R. Sanjeevaiah	-do-	4-6-1982	
22. Bajjgowda	-do-	4-6-1982	
23. Hanumanthappa	-do-	4-6-1982	
24. Y. G. Gante	Estate Br., Dharwad	8-6-82 A.N.	
25. K. B. Gouder	-do-	8-6-1982	
26. R. B. Nigadi	-do-	8-6-1982	
27. Rama Reddy	AEI, Raichur	16-6-1982	
28. S. Anjaneya	-do-	8-6-1982	
29. Girimada	R.R.S., Mandya	7-6-1982	

1	2	3	4
WORKSHOP HELPERS			
30.	P. Chandrashekara	Estate Br., Hebbal	4-6-1982
31.	R. Krishna	—do—	9-6-1982
32.	L. Somasundaraiah	—do—	9-6-1982
33.	C. Ramakrishna	—do—	4-6-1982
34.	J. D. Channasetty	—do—	5-6-1982
35.	Stonewell	—do—	4-6-1982
36.	M. Eswara Reddy	—do—	4-6-1982
37.	G. T. Hiremat	—do—	23-6-1982
38.	L. Shivareddy	—do—	4-6-1982
BAKERY HELPERS			
39.	M. E. Mamadapur	P.B.P., Hebbal	3-7-1982
40.	Hanumanthappa	—do—	8-7-1982
41.	Balakrishna	—do—	3-7-1982
42.	B. K. Kantharaju	—do—	9-7-1982
43.	A. B. Bennur	—do—	15-7-1982
44.	T. S. Venkatarama Rao	—do—	3-7-1982
45.	G. Ranganatha	—do—	3-7-1982
46.	K. S. Prabhakara	—do—	12-7-1982
PLUMBING HELPER			
47.	Y. B. Kumarakoppa	Ag. Col., Dharwad	30-7-1982
PUMP ATTENDERS			
48.	Papanna	R.R.S., Mandya	5-7-1982
49.	S. A. Nanjundaswamy	GKVK Farm	30-6-1982
50.	Narayanaswamy	—do—	28-6-1982
51.	V. Narayanaswamy	—do—	28-6-1982
52.	Channappa	—do—	28-6-1982
53.	K. Channegowda	—do—	28-6-1982
54.	Shanthaveerappa	—do—	1-7-1982
55.	G. S. Gundaiah	—do—	1-7-1982
56.	V. Shrinivasa Gowda	Estate Br., Hebbal	1-7-1982
57.	K. Mallappa	—do—	28-6-1982
58.	H. S. Sadashivappa	Dairy Sc. Col., Hebbal	2-7-1982
59.	N. Kumar	GKVK Farm	11-8-1982
60.	O. Murthy	Estate Br., Hebbal	1-7-1982
61.	Shrinivasa Gowda	—do—	28-6-1982
62.	Mallasetty	A.R.S., Madenur	1-7-1982
63.	H. N. Doriaiah	—do—	1-7-1982
64.	Jambanna	A.R.S., Honnavile, Shimoga	5-7-1982
65.	Guruswamy	—do—	2-7-1982 AN

1	2	3	4
ANIMAL ATTENDERS			
66.	Krishna Thimmanna Waddar	AICRP on Buffalo, Dharwad	1-2-1983
67.	Govindaiah	—do—	1-2-1983
68.	P. K. Chikkanna	—do—	4-2-1983
69.	S. Munianjanappa	—do—	1-2-1983
70.	Gangappa Bhimappa Uppar	—do—	1-2-1983
71.	P. D. Gullappanavar	—do—	1-2-1983
72.	V. Krishnappa	Dairy Sc. Col., Hebbal	29-1-1983
73.	J. Channappa	Dairy Sc. Col., Hebbal	29-1-83 A.N.
74.	N. Channappa	—do—	29-1-83 A.N.
75.	Narasimaiah	—do—	29-1-83 A.N.
76.	Muninanappa	—do—	29-1-83 A.N.
77.	H. R. Krishnappa	—do—	29-1-83 A.N.
78.	Lingamma	—do—	29-1-83 A.N.
79.	Hanumaiah	—do—	29-1-83 A.N.
80.	Smt. Mallamma	—do—	29-1-83 A.N.
81.	Gangarudraiah	—do—	29-1-83 A.N.
82.	Poojaiah	—do—	29-1-83 A.N.
83.	K. Thippaiah	—do—	29-1-83 A.N.
APIARYMAN			
84.	H. A. Bomme Gowda	A. C. Hebbal	5-5-82
WARDBOYS			
85.	Narayana Rao	Raichur	26-7-82
86.	Ananda Veerabhasappa Kaykad	Hebbal	26-7-82
PROOF READERS			
87.	Krishna Rao	C.C., Hebbal	2-4-82
88.	M. Ramesh	B.S. & H., College	3-4-82
BOREWELL HELPERS			
89.	N. Srinivasa Murthy	Hebbal	21-6-82
90.	I. S. Hiremath	—do—	30-6-82
91.	R. B. Savanur	—do—	7-7-82
BULDOZER HELPERS			
92.	H. B. Muniyappa	Hebbal	9-8-82
BRADMA OPERATORS			
93.	H. B. Channabasavappa	GKVK	25-11-82
94.	K. Venkataravanappa	GKVK	25-11-82
SR. TECHNICIAN			
95.	Md. Hussain	Raichur	3-12-82

1	2	3	4
DRIVERS (L. V.)			
96.	Muneer Shareef	Hebbal	5-3-83
97.	J. D. Channa Shetty	—do—	7-3-83
98.	M. Basavaraj	Mudigere	9-3-83
99.	N. Udayashankar	Hebbal	8-3-83
100.	N. Shashidhar	—do—	not reported
101.	H. M. Raju	Mangalore	28-3-83
102.	J. S. Mohan	—do—	17-3-83
103.	Syed Jamsheed	Dharwad	not reported
WATCHMEN			
104.	Kamdara Naik	ARS, Hiriya	5-8-82
105.	Leela Panditharadhiya	ARS, Gadag	9-8-82
106.	Modin Sab Nadaf	ARS, Kathalagere	4-8-82
107.	Ramakrishnappa	—do—	4-8-82
108.	Sirajuddin	—do—	4-8-82
109.	Kalaiah	AICRP on Maize Improvement Mandya	11-8-82
110.	Gangaramaiah	E. O., Hebbal	29-7-82
111.	T. Muniyappa	—do—	29-7-82
112.	Fakeersab Peersab Nadaf	R. H. Sc. College, Dharwad	2-8-82
113.	Sheshappa	A. R. S., Ullal	2-8-82
114.	G. M. Mariyappa	E. O., Hebbal	29-7-82
115.	C. Shivanna	—do—	29-7-82
116.	S. Krishnappa	—do—	29-7-82
117.	K. Kempaiah	ECT, Chintamani	9-8-82
118.	N. Malleshappa	ARS, Kathalagere	4-8-82
119.	H. Siddaraju	ARS, Mangalore	12-8-82
120.	Doddaiiah	FRS, Hessaraghatta	11-8-82
121.	Linganna	E. O., Hebbal	29-7-82
122.	Narayanappa	—do—	29-7-82
123.	Munivenkatappa	—do—	29-7-82
124.	Harakababdur	—do—	29-7-82
125.	Madaiah	MRS, Hebbal	11-8-82
126.	Mune Gowda	ARS, Chintamani	30-7-82
127.	Prahlad Samboji Thorat	ARS, Bijapur	2-8-82
128.	Puttaramaiah	E.O., Hebbal	29-7-82
129.	Rangaiah	ARS, Honnavile, Shimoga	24-8-82
130.	Gundappa	NARPSub Project, Navile, Shimoga	1-9-82
131.	Nagappa	AICRP on Tobacco, Shimoga	27-8-82
132.	A. K. Janardhana	NARP, Brahmavar	13-8-82
133.	Bheemappa Ullavappa Kagi	ARS, Dharwad	5-8-82
134.	Chikkamuniyappa	E. O., Hebbal	29-7-82
135.	Toachin D'souza	NARP, Brahmavar	12-8-82
136.	K. Muniyappa	ARS, Mudigere	3-8-82
137.	Venkataswamy Ramadas	RRS, Mudigere	3-8-82



1	2	3	4
138.	Nanjappa	E. O., Hebbal	29-7-82
139.	Channarayappa	MRS, Hebbal	29-7-82
140.	Ramakrishna	E. O., Hebbal	29-7-82
141.	Gangadhar	F. T. L., Hebbal	29-7-82
142.	Gangaiiah	E. O., Hebbal	29-7-82
143.	S. K. Guranna Goudar	ARS, Chintamani	6-8-82
TRACER			
144.	B. L. Venkatesh	E. O., Hebbal	1-9-82
JANITORS			
145.	Rajamma	Dairy Sci. Col., Hebbal	30-6-82
146.	Gowramma	RRS, Raichur	21-8-82
147.	C. Venkatappa	BSH College, GKVK	6-8-82
MESSENGERS			
148.	Mrs. Devamma	RRS, Mandya	31-5-82
149.	Mrs. V. Suryavamshi	A. C., Dharwad	31-3-83

## APPENDIX II

### LIST OF PUBLICATIONS BY THE STAFF OF THE UNIVERSITY

<i>Name of Author(s)</i>	<i>Title of the paper with the details of publication</i>
<b>Agricultural Economics</b>	
Chengappa, P. G., Ramanna, R. and Ananth, G. S. (1982)	"Co-operative marketing of fruits and vegetables - A case study." Presented at the III training cum workshop on rural development jointly organised by UAS and FICCI.
Chengappa, P. G. and Muralidharan, M. A. (1982)	"Spectral analysis of time series" Presented at the seminar on changing structure of Agricultural Marketing in India with special reference to Karnatrka. Institute of Development Studies, Mysore.
Chengappa, P.G., Muralidharan, M.A. and Kumar Mahesh (1983)	"The nature of price movements during pool sales auctions of coffee." <i>Agril. Marketing</i> , 25.
<b>Agricultural Engineering</b>	
Belgami, M. I., Channabasavaiah, H. S. M. and Achar, H. P. (1983)	"Effect of tile drainage system on water table, soil salinity and crop growth." <i>Symposium on water management and land reclamation in the command area with particular reference to black soils</i> , held at Central Soil and Water Conservation Research and Training Centre, Bellary, Jan. 20-23.
Batagurki, S. B. (1982)	"Bullock drawn seed cum fertilizer drill for ragi." Presented at the <i>seminar on fertilizer cum seed drills</i> , Central Instt. of Agril. Engg., Bhopal, Sept. 17-18.
Batagurki, S. B. (1982)	" <i>Khushki Besayada Sudharit Upakaranagalu</i> ." Published by Department of Agriculture, Karnataka.
Chowdegowda, M., Kavalappa, B. N. and Ganapathy, K. R. (1983)	"Development of fertilizer device to the manually metering bullock drawn seed-cum-fertilizer drill." <i>Paper Presented at XX Annual Convention of Indian Society of Agricultural Engineers</i> held at Pantnagar (M.P) during March 1983
Guruswamy, T. (1983)	"A new implement for ridging, furrowing (seedling)-cum-seeding." <i>Agril. Engineering To-day</i> , 7; 51-52.

<i>Name of Author(s)</i>	<i>Title of the paper with the details of publication</i>
Guruswamy, T. and Belgami, M. I. (1983)	"Evaluation of sweep and blade hoe - A case study." <i>20th Annual Convention of ISAE, G.B. Pant University of Agril. and Technology, Pantnagar, March 5-7.</i>
Guruswamy, T., Devadattam, D. S. K. and Naravani, N. B. (1982)	"A survey of agricultural implements in dry tracts of Bellary district and irrigated tracts of Tungabhadra Project." <i>Curr. Res.</i> , <b>11</b> : 5-9.
Maurya, N. L. and Devadattam, D. S. K. (1981)	"Evaluation of tillage methods." <i>Mysore J. agric. Sci.</i> , <b>15</b> : 286-289.
Maurya, N. L. and Guruswamy, T. (1981)	"Comparative study of improved types of country seed drills." <i>Mysore J. agric. Sci.</i> , <b>15</b> : 399-412.
Maurya, N. L. and Devadattam, D. S. K. (1982)	"Response of some physiological parameters of cross bred bullocks to different draft and ambient conditions," <i>Ind. J. Dairy Sci.</i> , <b>35</b> : 18-26.
Maurya, N. L. and Devadattam, D. S. K. (1982)	"Work performance of cross bred bullocks." <i>Ind. J. Dairy Sci.</i> , <b>35</b> : 27-31.
Maurya, N. L. and Guruswamy, T. (1983)	"Draftability of cross bred and local bullocks - A case study." <i>20th annual convention of ISAE, G. B. Pant Uni. of Agril. Engg. and Tech. Pantnagar, March 5-7.</i>
Naravani, N. B. and Sirohi, B. S. (1981)	"Effect of different tillage implements on soil moisture under rainfed conditions of Delhi." <i>Mysore J. agric. Sci.</i> , <b>15</b> : 424-428.
Naravani, N. B. and Sirohi, B. S. (1982)	"Effect of tillage tools energy required for seed-bed preparation under dry land agriculture in Delhi." <i>J. Agril. Engg.</i> , <b>19</b> : 45-53.
Narayana, H. C. and Itnal, C.J. (1983)	"Effect of land shaping on moisture conservation and yield of sorghum in vertisols." <i>National symposium on watershed management for higher productivity in red and black soils, Soil and Water Conservation Research Institute (ICAR), Bellary, Feb. 7-9.</i>

### Agricultural Entomology

Govindan, R. and Thontadarya, T. S. (1981)	"Studies on the parasitoids of the field bean pod borer, <i>Adisura atkinsoni</i> (Lepidoptera: Noctuidae). <i>Mysore J. agric Sci.</i> , <b>15</b> : 421-423.
Kumar, N.G., Thontadarya, T.S. and Kulkarni, K.A. (1981)	"Seasonal incidence of the podborer, <i>Cydia ptychora</i> Meyrick (Lepidoptera: Tortricidae) on soybean crop at Dharwad." <i>Mysore J. agric. Sci.</i> <b>15</b> : 277-279.
Rajagopal, D. and Veeresh, G. K. (1981)	"Termitophiles and Termiterriophiles of <i>Odontotermes wallonensis</i> (Isoptera; Termitidae) in Karnataka, India." <i>Colemania</i> , <b>1</b> : 129-130.

Name of Author(s)	Title of the paper with the details of publication
Rajagopal, D., Veeresh, G. K. and Rajanna, C. (1981)	"Bagworm <i>Acomthosyche</i> (pteroma) Plagiophaleps Hampson (Lepidoptera: Psychidae), a pest of Pomegranate in Karnataka" <i>The Lal-Baugh</i> , 26: 451-455.
Rajgopal, D. and Veeresh, G.K. (1981)	"Foraging activity of the Mound Building termites ( <i>Odontotermes wallonensis</i> )." <i>J. Soil Biol. Ecology</i> , 1: 56-64.
Rajgopal, D. and Veeresh, G.K. (1980)	"Anti termite treatment in the establishment of eucalyptus seedling." <i>Myfores</i> , 127-130.
Rai, P. S. (1981)	"The long-horned grasshopper-A pest of cashew" <i>Cashew Bulletin</i> , 18: 5-7.
Rai, P. S. (1981)	"Seasonal distribution of cashew pests in coastal Karnataka." <i>Indian Cashew J.</i> , 13: 17-19.
Rai, P. S. (1981)	"Bionomics of the rice leaf-feeding hairy caterpillar, <i>Nisaga simplex</i> Walker. (Lepidoptera: Eupterotidae)." <i>J. Maharashtra Agric. Univ.</i> , 6: 213-215.
Rai, P. S. (1981)	"Life cycle of rice earhead bug, <i>Leptocoris acuta</i> (Thunber) (Coreidae: Hemiptera)." <i>J. Maharashtra Agric. Univ.</i> , 6: 252-253.
Rai, P. S. (1981)	"A Bagworm damaging cashew foliage: <i>Dappula tertia</i> Temption." <i>Cashew Bull.</i> , 18: 7-8.
Rai, P. S. (1981)	"A leaf beetle damaging curry leaf, <i>Murrayia koenigii</i> Spreng (Rutaceae)." <i>The Lal-Baugh</i> , 26: 49-50.
Rai, P. S. (1981)	"Biology and control of <i>Pongamia defoliator</i> , <i>Parata alexis</i> F. (Hesperiidae: Lepidoptera)." <i>The Lal-Baugh</i> , 26: 44-48.
Rai, P.S. (1981)	"Preliminary studies on the control of the rice mealy bug. <i>Heterococcus rehi</i> (Ldgr.) (Hemiptera: Pseudococcidae)." <i>Curr. Res.</i> , 10: 88-89.
Rai, P. S. (1981)	"A pyralid caterpillar damaging the ornamental plant <i>Tabernemontana</i> sp." <i>The Lal-baugh</i> , 26: 30-32.
Rai, P.S., Chandrashekar, H.T. and Vidyachandra, B. (1981)	"Evaluation of some insecticidal sprays for the control of rice insect pest." <i>Curr. Res.</i> , 10: 24-26.
Rai, P.S. and Vidyachandra, B. (1981)	"Review of work done on cashew." <i>U.A.S. Research Review Services</i> No. 6. 33 pp.
Veeresh, G. K. and Patil Kulkarni, B.G. (1981)	"Role of plant protection in meeting the demand or food for 2000 A.D." <i>Pesticides</i> , 15: 3-5.
Vidyachandra, B., Hanumantharaju, B. L., Naidu, B. S. and Rai, P.S. (1981)	"Gall midge resistant red rice cultures for coastal Karnataka." <i>Curr. Res.</i> , 10: 137-139.

<i>Name of Author(s)</i>	<i>Title of the paper with the details of publication</i>
Thimmaiah, G., Thippeswamy, C. and Kumar, N. G. (1981)	"Chemical control of bollworms on rainfed cotton by dust application." <i>Pesticides</i> <b>15</b> : 28-31.
Thimmaiah, G., Kumar, N. G. (1981)	"Oviposition behaviour of the pod borer <i>cydia pythora</i> Meyrick on cowpea <i>vigna unguiculata</i> (L) Walp." <i>Curr. Res.</i> ( <b>11-12</b> ): 176-177.
Devaraj Urs, K. C. (1981)	"Pidugu nashakagala balake. Haagu Kadiyada dravakagalannu nashapadisuvike Kshemakara vidhanagalu." <i>Krishiloka Spl.</i> <b>1</b> : 187.
Devaraj Urs, K. C. (1981)	"An Integrated afference for the control of sugar-cane pests " Eien. Conf. Sugar. Res. of Devlp. Workshop, UAS, Dharwad.
Devaraj Urs, K. C. (1981)	"State Level Minikit Training (Booklet Summer, 1981)." Directorate of Rice Develop. Government of India & UAS, RRS, Mandya.
Devaraj Urs, K. C. (1981)	"Central Sector Rice Minikit Training Booklet (Kharif, 1981)." Director of Rice Develop. Government of India & UAS, RRS, Mandya.
Puttaswamy, Reddy, D. N. R. and Krishna Naik, L. (1981)	"Redgram bug weevil <i>Ceuthorhynchus asperulus</i> Faust (Coleoptera: Curculionidae) a pest on <i>Amaranthus</i> ." <i>Curr. Res.</i> , <b>10</b> : 33-55.
Puttaswamy and Reddy, D.N.R. (1981)	"Record of some new pests infesting French bean ( <i>Phaseolus vulgaris</i> L.) a popular vegetable." <i>Curr. Res.</i> , <b>10</b> : 39-41.
Puttaswamy, Reddy, D. N. R. and Krishna Naik, L. (1981)	"Occurrence of <i>Cryptozona semirugata</i> (Beck) (Ariophantidae: Stylammatophora) on cultivated plants." <i>Curr. Res.</i> , <b>10</b> : 61.
Puttaswamy and Reddy, D. N. R. (1981)	" <i>Spodoptera litura</i> F. (Lepidoptera: Noctuidae) a pest on leafy vegetables." <i>Curr. Res.</i> , <b>10</b> : 62.
Puttaswamy, Reddy, D. N. R. and Thippeswamy, C. (1981)	"A note on the hosts of <i>Hymenia recurvalis</i> (F.) (Lepidoptera: Pyraustidae)." <i>Curr. Res.</i> , <b>10</b> : 122.
Reddy, D. N. R. and Puttaswamy (1981)	"Record of pests infesting <i>Impom</i> : the ornamental creepers." <i>Curr. Res.</i> , <b>10</b> : 136.
Reddy, D. N. R. and Puttaswamy (1981)	"Occurrence of <i>Ceuthorrhynchus asperulus</i> Faust (Coleoptera: Curculionidae) as a pest." <i>The Lalbaugh</i> , <b>26</b> : 27-30.
Viswanath, B.N., Reddy, D.N.R. and Belavadi (1981)	" <i>Celama</i> sp. (Lepidoptera : Nolidae) a new pest on <i>Clerodendron inermae</i> Gaetn." <i>The Lal Baugh</i> <b>26</b> : 31-32.
Reddy, D. N. R., Puttaswamy and Hegde, N. S. (1981)	"Pests infesting <i>Catharanthus roseus</i> (L.) a medicinal plant and their control." <i>The Lal Baugh</i> , <b>26</b> : 49-51.

Name of Author(s)	Title of the paper with the details of publication
Reddy, D. N. R. and Puttaswamy (1981)	"Studies on the Biology and control of <i>Catonsilia pyranthe</i> L. (Lepidoptera : Pieridae) as pest of <i>Cassia alata</i> L." <i>The Lal Baugh</i> , 27 : 54-58.
Puttaswamy and Reddy, D. N. R. (1981)	" <i>Tetranychus neocaledonicus</i> (Andre : Tetranychidae), a new pest on Cardamom." <i>Acar. Newsletter</i> , 10 : 6.
Reddy, Gurunath, Viswanath, B. N. and Reddy, D. N. R. (1981)	"Ant. Fauna (Hymenoptera : Formicidae) of Dharwad (Karnataka)." <i>Paper Presented in National Symposium on Ecology a Management of Social Insects</i> . Bangalore July 28-29.
Kulkarni, K. A., Kumar, N. G. and Bhuti, S. G. (1981)	"Efficacy of different insecticide dusts in grass-hopper control." <i>Curr. Res.</i> , 10 : 119-120.
Narayan Reddy, P., Kumar, N. G., Sreeramu, B. S. and Desai, S. A. (1981)	"A note on the occurrence of <i>Mylabris pustulata</i> Thonb. on <i>Canavalia ensiformis</i> DC. in India." <i>Curr. Res.</i> , 10 : 157-158.
Patil, B. V. and Thontadarya, T. S. (1982)	"Studies on the acceptance and biology of different <i>Trichogramma</i> spp on the teak skeletonizer, <i>Pyrausta machaeralis</i> Walker." <i>Indian Forester</i> 109 : 292-297.
Sangappa, H. K., Basavanna Gowda, K. and Patil, B. V. (1981)	"Record of Castor Semilooper <i>Achea janata</i> Linn. infesting blackgram." <i>Curr. Res.</i> , 10 : 133.
Sangappa, H. K. (1981)	"Evaluation of some insecticides for the control of Bengalgram pod borer ( <i>Heliothis armigera</i> (Hubner))." <i>Curr. Res.</i> , 10 : 152-153.
Thimmaiah, G., Kumar, N. G. and Tippeswamy, C. (1981)	"Ovipositional preference of <i>Earias vittella</i> (Fabricius) and <i>Heliothis armigera</i> (Hubner) on okra ( <i>Abelmoschus esculentus</i> (L) Moench." <i>Curr. Res.</i> , 10 : 65-66.
Thontadarya, T. S., Seshu Reddy, K. V. and Govindan. R. (1982)	"A new pod borer, <i>Adirura marginalis</i> (Walker), (Lepidoptera : Noctuidae) on Redgram ( <i>Cajanus cajan</i> (L))." <i>J. Bombay Nat. Hist. Soc.</i> , 79.
Rajagopal, D. Subanarayana and Veeresh, G.K. (1982)	"Physical and chemical properties of termites." <i>J. Soil Biol. Ecol.</i> 2 : 18-31.
Veenakumari K. and Veeresh G. K. (1982)	"Evaluation of different methods of inoculation for the production of Milky white disease caused by the Bacterium <i>Bacillus popillidae</i> Dutky on the white grub <i>H. serraera</i> ." <i>J. Soil Biol. Eco.</i> , 2 : 1-7.
Veeresh, G. K., Wesley, C. S. and Mallik, B. (1982)	"Termites and fertility status of soil" VIII International Colloquium of Soil Zoology 30th August 2nd September 1982. Lourain L La-Neuve Belgium.

Name of Author(s)	Title of the paper with the details of publication
Veeresh, G. K., Vijayendra. Vijaya-mohan Reddy, M. N. and Rajanna, C. (1982)	"Bioecology and management of areca White grubs ( <i>Leuopholis</i> spp., Coleoptera Scrasacidae, Helolithinae)." <i>J. Soil Biol. Ecol.</i> 2: 78-86.
Veeresh, G. K. and Viswanath, B. N. (1982)	"Crop losses due to white grubs." <i>All India Seminar on Crop losses due to insect pests</i> held at APAU-Hydrabad., Jan. 83.
Jayaramaiah, M. and Veeresh, G. K. (1982)	"Influence of media and temperature-humidity combination on germination of spores of the Entomopathogenic fungus <i>Beauveria brongniartii</i> (Saco.)" <i>J. Soil Biol. Ecol.</i> , 2: 53-57.
Rai, P. S. (1982)	"A Gryllid causing damage to rice seedlings." <i>Science and Culture</i> , 48: 113-114.
Rai, P. S. (1982)	"Fruit thrips attacking cashew apple." <i>Cashew causerie</i> , 4: 10.
Rai, P. S. (1982)	"The shield-bug <i>Menida histrio</i> (Fabr) (Pentatomidae) damage to rice crop in Karnataka." <i>Science and Culture</i> , 48: 139.
Rai, P. S. (1982)	"The cashew leaf-folder, <i>Macalla albifusa</i> Hamps. (Lepidoptera : Pyralidae)" <i>Cashew Bulletin</i> , 19: 9-10.
Rai, P. S. (1982)	"Some insects visiting cashew flowers" <i>Cashew Bulletin</i> , 19: 11-12.
Rai, P. S. (1982)	"A Chrysomelid beetle ( <i>Mimastra alternata</i> Jac). damaging rose flowers in Karnataka" <i>The Lal-Baugh</i> , 27: 38-40.
Rai, P. S. (1982)	"Studies on the longevity of <i>Sternochetus magiferae</i> (Fabr) (Coleoptera : Curculionidae)" <i>The Lal-Baugh</i> , 27: 19-21.
Rai, P. S. (1982)	"Field activity of cashew stem and root borer, <i>Plocaderus ferrugineus</i> L. (Coleoptera: Cerambycidae)" <i>Cashew Bulletin</i> , 19: 9-11.
Devaraj Urs, K.C. (1982)	"V.C. Farm - contribution to the development of Agriculture in Karnataka." <i>A Bulletin</i> , UAS, RRS, Mandya.
Devaraj Urs, K.C. (1982)	"State Level Minikrit Training Booklet (Summer, 1982)." Directorate Rice Develop. Govt. of India, UAS, RRS, Mandya.
Nageshchandra, B. K. and Channa-Basavanna, G.P. (1982)	"Development and ecology of <i>Raoiella indica</i> Hirst (Aari: Tenuipolpidae) on coconut." <i>Presented in V International Congress of Acaroogy</i> , Edinburgh, Scotland (Abstract.).
Panchabhavi, K. S. (1982)	"Record of <i>Cydia</i> ( <i>Lasperyeadia ptychora</i> Meyrick (Lepidoptera : Tortricidae) infesting groundnut

<i>Name of Author(s)</i>	<i>Title of the paper with the details of publication</i>
	Pods in the field" <i>Indian J. Agric. Sci.</i> , <b>53</b> : 84-85.
Panchabhavi, K. S. (1982)	"Leaf area consumption of <i>Spodoptera litura</i> (Fabricius) on groundnut ( <i>Arachis hypogea</i> Linn). <i>Curr. Res.</i> , <b>10</b> : 175.

### Agricultural Extension

Geetha Kutty, P. S. and Sethu Rao, M. K. (1983)	"Consequences of new technology." <i>Int. Rice Res. Newsl.</i> , <b>8</b> : 23.
Jalihal, K. A., Kattappa, Y., Siddaramaiah, B. S. and Eswarappa, G. (1982)	"An appraisal of Krishimela at the University Camps." <i>Curr. Res.</i> , <b>11</b> : 69-70.
Jalihal, K. A., Siddaramaiah, B. S., Kattappa, Y. and Eswarappa, G. (1982)	"Research needs as expressed by the participant of Krishi Mela." <i>Curr. Res.</i> , <b>11</b> : p. 89-91.
Jayaramaiah, K. M. and Sethu Rao, M.K. (1982)	"Transmission of Research knowledge through demonstration" <i>Youth Karnataka</i> , April-July 1982 pp 35-36.
Narasimha, M. and Sethu Rao, M. K. (1982)	"Impact of training on knowledge and adoption." <i>Indian J. Adv. Edu.</i> , <b>43</b> : 15-18.
Sethu Rao, M. K. and Venkata-ramaiah, P. (1982)	"Impact of radio communication on farmers of Karnataka State." <i>Curr. Res.</i> , <b>11</b> : 18-20.
Siddaramaiah, B.S. and Jalihal, K. A. (1982)	"An experimental study of one-sided and two-sided presentation of messages with advance organizers." <i>Indian J. Extn. Edu.</i> , <b>18</b> : 45-50.
Siddaramaiah, B. S. and Jalihal, K. A. (1982)	The effects of oral advance organizers in learning of agricultural technology by farmers." <i>Indian J. appl. Psy.</i> , <b>19</b> : 63-67.

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Bagyaraj, D. J. and Rangaswami, G. (1982)	"Rhizosphere microflora of <i>Eleusine coracana</i> as influenced by foliar chemical sprays in the presence and absence of the pathogen <i>Helminthosporium nodulosum</i> ." <i>Indian Phytopath.</i> , <b>35</b> : 388-392.
Edwards, J.C., Sharma, N.N. and Jayasheela, N. (1982)	"A soil inhabiting plant parasitic nematode parasitized by a fungus." <i>J. Soil Biol Ecol.</i> , <b>2</b> : 92-94.
Hegde, S. V. (1982)	"Field responses to <i>Rhizobium</i> inoculation in <i>Arachis hypogea</i> , <i>Vigna</i> spp. and <i>Dolichos</i> spp. in India." In <i>Biological nitrogen fixation technology for tropical agriculture</i> . Eds. P. H. Graham and S. C. Harris, 257-264 pp.



<i>Name of Author(s)</i>	<i>Title of the paper with the details of publication</i>
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Nagaraju, H. C., Shivappa Shetty and Raj, J. (1982)	"Response of rice to the application of azolla and different manures." <i>Phycos.</i> , <b>21</b> : 52-55.
Narayana, Y. D., Radhakrishna, D. and Rai, P. V. (1982)	"Effect of certain fungicides on nodulation of cowpea." <i>Curr. Res.</i> , <b>10</b> : 47-48.
Powell, C. Ll. and Bagyaraj, D. J. (1982)	"VA mycorrhizal inoculation of field crops." <i>Proc. N. Z. Agron. Soc.</i> , <b>12</b> : 85-88.
Krishna, K.R., Balakrishna, A.N. and Bagyaraj, D. J. (1982)	"Interaction between VA mycorrhiza and <i>Streptomyces cinnamomeus</i> and their effects on finger millet." <i>New Phytol.</i> <b>92</b> : 401-405.
Krishna, K. R. and Bagyaraj, D.J. (1982)	"Effect of vesicular arbuscular mycorrhiza and soluble phosphate on <i>Abelmoscus esculentus</i> (L.) Moench." <i>Plant and Soil</i> . <b>64</b> : 209-213.
Krishna, K. R. and Bagyaraj, D. J. (1983)	"Changes in free amino nitrogen and protein fractions of groundnut caused by inoculation with VA mycorrhiza." <i>Ann. Bot.</i> <b>51</b> : 399-401.
Krishna, K. R. and Bagyaraj, D. J. (1983)	"Acid and alkaline phosphatase activities in mycorrhizal and uninfected roots of <i>Arachis hypogea</i> ." <i>Ann. Bot.</i> , <b>51</b> : 551-553.
Manjunath, A. and Bagyaraj, D. J. (1982)	"Occurrence of VA mycorrhiza in three plantation crops and cultivars of field bean". <i>Curr. Sci.</i> , <b>51</b> : 707-708.
Wani, S.P., Rai, P. V. and Joshi, S. (1982)	"Histochemical changes in pearl millet plants grown from sg. toxin treated seeds." <i>Indian Phytopath.</i> , <b>34</b> : 187-190.

### Agronomy

Devaranavadi, S. B., Venkatachala, S. T., Krishna Murthy, K. C. and Mune Gowda, M. K. (1981)	"Cold water treatment improves germination in Koo-babul ( <i>Leucaena leucocephala</i> L. de Wit)." <i>Curr.Res.</i> , <b>10</b> : 83-84.
Gidnavar, V. S. (1982)	"Influence of growth hormones and acid on seed germination and seedling vigour in Varalaxmi hybrid Cotton." <i>Dev. J.</i> , <b>12</b> : 73-74.
Gidnavar, V. S. (1982)	"Agronomic research work on hybrid cotton in Karnataka." <i>Proc. National Seminar on cotton held at Hissar.</i> , Nov-82.
Gidnavar, V. S. (1982)	"Studies on residual toxicity of the herbicides sprayed to rice plant on succeeding <i>Rabi</i> crops." <i>Proc. Sym. on weed control held at Hissar on Dec 1982.</i>
Gidnavar, V. S., Goudreddy, B. S., Khot, A.B., and Sajjan, G.C. (1982)	"Importance of Sugarcane seed" (in Kannada) <i>Proc. crop seminar on Sugarcane at Bidar.</i> <b>1</b> : 18.

<i>Name of Author(s)</i>	<i>Title of the paper with the details of publication</i>
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### Contribution to Kannada Subject Encyclopaedia-Karnataka

“ಕನ್ನಡ ವಿಷಯ ವಿಶ್ವಕೋಶ-ಕರ್ನಾಟಕ”

University of Mysore

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**APPENDIX****(A) Revised Estimates**

RECEIPTS		
Head of Account	Revised Estimates for 1982-83	Amount Accounts for 1982-83
1	2	3
(Rupees in lakhs)		
<b>A. General Funds :</b>		
<b>I. (a) STATUTORY GRANTS FROM THE STATE GOVERNMENT UNDER SECTION 35 OF THE ACT :</b>		
i) Block Grant	460.00	460.00
ii) Development Grants	125.00	125.00
iii) Adhoc Schemes	14.55	599.55
<b>(b) Grants from ICAR &amp; GOI.</b>		
i) ICAR	269.03	249.05
ii) GOI	15.87	284.90
<b>Total I</b>	<b>884.45</b>	<b>849.04</b>
<b>II GRANTS FROM OTHER SOURCES UNDER SECTION 30 (iii) OF THE ACT :</b>		
1) P.L-480 - U.S.A.	1.22	—
2) Wheat Associates	—	—
3) Dept. of Atomic Energy	1.28	1.30
4) Karnataka State Council for Science & Technology	0.54	0.54
5) University Grants Commission	—	—
6) K.D.D.C.	52.06	54.06
7) State Bank of India	—	—
8) Harihar Poly Fibres	1.10	1.10
9) ASPEE Research Department	0.25	0.03
10) World Bank Aided Projects (Sericulture)	19.90	19.90
11) UNICEF	0.23	0.40
12) M/s Mangalore Chemicals & Fertilizers	0.54	0.54
13) Indian Council of Social Science Research	0.28	0.34
14) Indian Council of Medical Research	0.62	(—)0.69
15) Dept. of Agriculture, Ferro American Embassy, New Delhi	—	—
16) F.A.O.	0.12	—
17) Centre for Rural Development Studies	0.05	0.10
18) Karnataka State Silk Marketing Board		2.50
<b>Total II</b>	<b>78.19</b>	<b>80.12</b>

## III

for 1982-83

EXPENDITURE		
Head of Account	Revised Estimates for 1982-83	Amount Accounts for 1982-83
1	2	3
(Rupees in lakhs)		
<b>A. General Funds</b>		
<b>I GENERAL</b>		
1. University General Administration	98.50	95.06
2. University General Expenses	51.74	53.62
3. University Library	14.40	16.11
4. University Museum	0.10	(—)0.01
5. University Press & Publication Division	5.99	4.31
6. University Workshop, Hebbal Campus	2.52	2.06
7. University Workshop, Dharwad Campus	0.50	0.12
8. University Examinations	0.95	0.94
9. University Works Expenditure	24.60	22.79
10. University Central Stores	7.51	2.83
11. Maintenance of University Dispensary at Hebbal	2.47	2.08
<b>Total I</b>	<b>209.28</b>	<b>199.91</b>
<b>II RESIDENT TEACHING</b>		
1. Agricultural College, Hebbal	58.88	59.51
2. College of Agriculture, Dharwad	47.52	49.49
3. Veterinary College, Hebbal	59.21	59.06
4. College of Basic Sciences & Humanities	32.73	26.70
5. College for Postgraduate Studies, Hebbal	—	—
6. College of Fisheries, Mangalore	36.73	32.44
7. Agril. Engg. Institute, Raichur	15.74	14.32
8. P. G. Courses at Dharwad	—	—
9. P. G. Courses at Mangalore	—	—
10. College of Rural Home Science, Dharwad	6.52	5.11
<b>Total II</b>	<b>257.33</b>	<b>246.63</b>

**APPENDIX**

RECEIPTS		
Head of Account	Amount	
1	2	3
	(Rupees in lakhs)	
III. INCOME FROM FEES ETC.	6.93	7.31
IV. INCOME FROM UNIVERSITY PROPERTY	138.75	140.40
V. OTHER MISCELLANEOUS INCOME	21.00	33.71
Total A	1,129.32	1,110.58
1. Foundation Fund		—
2. Debt and Suspense Accounts		
1. Advances	2.01	2.25
2. Loans	47.12	36.11
3. Deposits	302.37	27.26
4. Suspense	0.20	0.07
5. Revolving Fund Account	0.56	0.10
6. Second National Seed Project	7.50	8.47
Total C	359.76	74.26
TOTAL RECEIPTS A + B + C	1,489.08	1,184.84
Add: Opening Balance	(—) 31.05	(—)31.05
Grand Total	1,458.03	1,153.79

## III Contd.

EXPENDITURE			
Head of Account		Amount	
		(Rupees in lakhs)	
III. RESEARCH			
1. Direction		4.18	3.54
2. Regional Research Stations		107.76	104.68
3. Agril. Research Stations		89.59	84.39
Total	III	201.53	192.61
IV. (a) EXTENSION			
		34.82	28.56
(b) MISCELLANEOUS			
		—	—
Total	IV	34.82	28.56
Total	I to IV	702.96	667.71
V. SCHEMES SPONSORED BY OTHER AGENCIES			
		101.66	80.16
VI. FIVE YEAR PLAN SCHEMES OF THE UNIVERSITY			
Anticipated savings under LTC Vacant		491.41	384.99
Posts and other items due to economy measures	(—) 8.85		—
Total	A	1,287.18	1,132.86
B. Foundation Fund			
C. Debt and Suspense Accounts			
1. Advances		4.50	4.21
2. Loans		57.18	56.94
3. Deposits		88.67	(—) 108.23
4. Suspense		—	—
5. Revolving Fund Account		0.50	1.04
6. Purchase of Steel, Cement and Other Building Materials		20.00	9.75
Total	C	170.85	36.29(—)
TOTAL EXPENDITURE A + B + C		1,458.03	1,096.57
Add: CLOSING BALANCE		—	57.22
Grand Total		1,458.03	1,153.79

**APPENDIX****(b) Budget Estimates****Abstract Estimates of**

RECEIPTS	
Head of Accounts	Amount
(Rupees in lakhs)	
<b>A. General Funds</b>	
I. (a) STUTUTORY GRANTS FROM THE STATE GOVERNMENT UNDER SECTION 35 (2) OF THE ACT Block Grant. Development Grant and Grants for Adhoc Schemes	675.71
(b) Grants from ICAR & G.O.I	363.38
<b>Total I</b>	<b>1,039.09</b>
<b>II. GRANTS FROM OTHER SOURCES :</b>	
a) PL-480	4.03
b) Wheat Associates, USA	0.12
c) Dept. of Atomic Energy	1.89
d) ASPEE Research Dept., Foundation Fund, Bombay	1.97
e) Karnataka Dairy Development Corporation	31.63
f) Mangalore Chemicals & Fertilizers	0.35
g) Indian Council of Medical Research	0.85
h) Food & Agricultural Organisation	0.34
<b>Total II</b>	<b>41.18</b>



## IV

for 1983-84

## Receipts and Expenditure

EXPENDITURE	
Head of Account	Amount
	(Rupees in lakhs)
<b>A. General Fund</b>	
I. UNIVERSITY GENERAL ADMINISTRATION	
1. University Administration	123.23
2. University General Expenses	50.45
3. University Library	14.32
4. University Museum	0.15
5. University Press & Publication Division	6.28
6. University Workshop	3.77
7. University Examinations	1.05
8. University Works Expenditure	50.10
9. University Central Stores	7.54
10. Maintenance of Uni. Dispensary at Hebbal Campus	2.62
	<hr/>
	Total I 259.51
	<hr/>
II. RESIDENT TEACHING	
1. Agricultural College, Hebbal	74.00
2. Agricultural College, Dharwad	61.25
3. Veterinary College, Hebbal	62.21
4. College of Basic Sciences & Humanities, GKVK	25.65
5. College of Basic Sciences & Humanities, Dharwad	8.27
6. College of Fisheries Sciences, Mangalore	36.71
7. Agril. Engineering Institute, Raichur	16.99
8. College of Rural Home Science, Dharwad	7.88
	<hr/>
	Total II 292.96

**APPENDIX**

<b>RECEIPTS</b>	
<b>Head of Account</b>	<b>Amount</b>
	(Rupees in lakhs)
III. INCOME FROM FEES ETC.	7.18
IV. INCOME FROM UNIVERSITY PROPERTY	142.26
V. OTHER MISCELLANEOUS INCOME	20.05
Total III, IV & V	169.49
Total A	1249.76
<b>B. Foundation Fund</b>	1.00
<b>C. Debt and Suspense Account</b>	210.36
Total Receipts A + B + C	1461.12
Add: Opening Balance	—
Grand Total	1461.12

**IV Contd.**

EXPENDITURE	
Head of Account	Amount
	(Rupees in lakhs)
III. RESEARCH	206.49
IV. EXTENSION	38.22
V. SCHEMES SPONSORED BY OTHER AGENCIES	40.83
VI. FIVE YEAR PLAN SCHEMES OF THE UNIVERSITY	664.06
Anticipated savings under LTC, Vacant posts and other items	(—) 55.10
Total A	1,446.97
B. Foundation Fund	1.00
C. Debt and Suspense Accounts	
a. Advances	2.00
b. Loans	41.78
c. Deposits	22.37
d. Revolving Fund Account	0.50
e. Purchase of Steel, Cement and other Building Materials	6.50
Total C	73.15
Total Expenditure A + B + C	1,521.12
Add Closing Balance	(—) 60.00
Grand Total	1,461.12

## **APPENDIX V**

*(Excerpts from the Addressess on the occasion of the XVII Convocation of the UAS, on March 2, 1983).*

### **Welcome Address by Dr. N. G. Perur, Vice-Chancellor, UAS**

We are singularly fortunate that our respected Chancellor and His Excellency the Governor of Karnataka, has been able to find time to preside over the Convocation this evening, in spite of his very busy numerous engagements. His sustained interest in the wellbeing of this University has always been a source of inspiration and motivation for better performance. I extend a very cordial welcome to him.

We feel greatly honoured by the presence of the Honourable Minister for Agriculture, who also happens to be the Pro-Chancellor of this University. In spite of his busy schedule, he has been able to find time to participate in this Convocation. I extend a very warm welcome to Honourable Minister for Agriculture and Pro-Chancellor.

Our today's Chief Guest Dr. L. D. Swindale is the Director General of the International Crops Research Institute for Semi-Arid Tropics, Hyderabad. He is an experienced Agricultural Scientist of International repute and his contributions in the field of Soil Science and Dryland Agriculture are wellknown. Now as the Director General of the International Crops Research Institute for Semi-Arid Tropics, he is stewarding the most important Agricultural Research Programme concerning the millions of farmers in the Semi-Arid Tropics. We are extremely happy that Dr. Swindale has accepted our invitation to be the Chief Guest of the Seventeenth Convocation of this University and to address the Graduating Students. I extend a cordial welcome to him.

Today, UAS has eight degree programmes and one Diploma in Agricultural Engineering. There are at present five teaching campuses – two at Bangalore, and one each at Dharwad, Mangalore and Raichur. The University has made pioneering efforts to diversify the undergraduate and postgraduate degree programmes in agricultural sciences to provide the technical manpower to meet the developmental needs. In 1969, a degree programme in Fishery Sciences for the first time in the country was started by the University. So also,

in 1972 degree programme in Horticulture Science and in 1974 degree programme in Rural-based Home Science for lady students were started. Again in 1976, degree programme in Agricultural Marketing and Cooperation was introduced. Last year, degree programme in Dairy Technology and this year in Sericulture have been started. The University is offering Master's degree programme in 36 disciplines including new areas like Seed Technology, Sericulture, Floriculture, Olericulture, Plantation Crops, Poultry Science, etc. Ph.D. programme is offered in 15 disciplines.

As a result of qualitative improvement in our teaching process, it is gratifying to note that the graduates of this University have been consistently doing well in All India Competitive examinations, whether it is for ICAR Postgraduate Fellowships or for employment in All India Services. This year, out of 10 selected for ICAR Agricultural Research Service at all India level in Horticulture, 6 persons are from this University. During 1982, 5 from this University got selected for Indian Forest Service.

Integration of teaching, research and extension education has been the cherished objective of this University. The research work at the University covers areas of Crop Production, Horticulture, Animal Husbandry and Veterinary Sciences, Dairy Science, Fisheries, Sericulture, Rural Home Science, Agricultural Marketing and Cooperation and Farm Forestry. The University has 40 Agricultural Research Stations spread over ten agro-climatic zones of Karnataka. Concerted efforts are being made to strengthen the research work with the financial support from ICAR for Coordinated and Adhoc Research Projects and under NARP through World Bank assistance. A new research station at Bramhavar in South Kanara District has been started to take up the research work on the problems of coastal region.....

During 1982 several improved crop varieties were released. Indaf-8 (Chethana) ragi was released for cultivation in *kharif*. It is more tolerant to drought, blast disease and lodging. It gives higher grain yield than other Indaf varieties under rainfed conditions. For transition tract, a *kharif* sorghum variety KDS-1 (SB 905) has been released. It has better grain quality and fodder yield. It is more resistant to rust, tolerant to charcoal rot and is easy to thresh. It has yield potential of about 50 quintals/ha under rainfed conditions.

A few promising hybrid *rabi* sorghum developed are now in the final stage of testing.

It has been possible to establish all the 10 linkage groups, adding two new linkage groups to the earlier 8 groups in sorghum.

In case of rice KMP-1 (Mandya Vani) has been released for cultivation in *kharif* and summer under irrigation. It is semi-dwarf, short duration (130-135 days) with high yield potential and has fine grain with better cooking quality. KMP-41 is another promising variety of rice that has been developed. It has superfine grain quality and better straw yield than Jaya. Under a collaborative project with CFTRI, a simple instrument has been developed to screen the rice varieties for sun-crack resistance. In red rice, KMP-246 variety suitable for par-boiling has been developed. Pusha 150, a scented rice variety has been recently identified which is suitable for cultivation in tank-fed areas.

In case of wheat, DWR 39 has been identified as one of the high yielding wheat. It is highly resistant to both black and brown rust diseases. It has got bold and attractive grain with better *chapati* and bread making quality. As a result of cytogenetic work on durum wheat it has been possible to build 9 of the possible 14 monosomic lines, besides developing 7 D genome addition lines in Bijaga Yellow wheat.

In case of groundnut, Dh-8 variety which gives higher yield than Dh-3-30 is found to be highly tolerant to *tikka* disease and the leaves remain green for longer duration. In case of tobacco, PL-5 is found to produce nearly 20 per cent more yield than NPN-190 and has better quality as that of S-20. A good collection of winged bean germ plasm has been made. This plant has drawn world-wide attention because the seeds contain 38 to 40 per cent protein and 20 per cent oil. Breeding work on this crop has been initiated. A few bushy and early maturing genotypes have been developed and further breeding work has been taken up to evolve bushy types suitable for large scale cultivation.

Ragi genotypes with low plant conductances with high dry matter production are found to be suitable for rainfed conditions. Polyols accumulate under moisture stress in groundnut, sorghum, ragi and paddy. Enhancement of Polyol content resulted in less transpiration and maintenance of high leaf water potential.

The inhibitory effect on growth by paper mill effluent is not merely due to the presence of sodium but predominantly due to the presence of other dissolved organic substances in the effluent. Application of Fe, Zn and higher doses of potassium and also seed hardening treatments resulted in higher productivity when irrigated with paper mill effluent.

The yellow leaf disease of arecanut with unknown etiology was tackled from a plant nutrition, plant protection and cultural management points of

view. It was found that treatment with lime, NPK and Zn were ameliorative. Besides, application of neem cake also helped.

Use of urea super granules placed at 10-12 cm depth gave better results as compared to prilled urea for paddy. Seed treatment of bengalgram by smearing the seeds with 2.5 g of ammonium molybdate per kg of seed has improved the yield.

Application of gypsum at the rate of 100 per cent calcium saturation was found to be effective in reducing sodium hazard due to use of paper mill effluent water for irrigation. Paper mill effluent treated with potash alum caused precipitation of suspended solids and the germination of ragi seeds was as good as rain water. A community biogas plant to serve the needs of about 200 families has been designed and got constructed near Manvi in Raichur District. In this gas plant, it has been possible to increase the loading rate to 3 kg volatile solids per day as against 0.8 kg per day in other designs.

Research on dry farming areas has been greatly intensified. Sowing of ragi and lucerne in 2 : 1 proportion with a spacing of 20 cm gave about 2 to 4 quintal/ha of lucerne green fodder without reduction in the yield of ragi. Growing of greengram as a catch crop in between redgram spaced 60 cm apart gave higher monetary return as compared to pure crop redgram. Opening up of furrow every 3 m apart against the major slope on gradient of 0.2 to 0.4 per cent slope has increased the yield of ragi by about 10 per cent due to better moisture conservation and removal of excess runoff. A ragi seed drill with furrower attachment on one side has been developed for simultaneous opening of furrow at sowing. Use of a bullock drawn seed-cum-fertilizer drill for line sowing and fertilizer placement gave nearly 36 per cent increase in yield as compared to broadcast application of seed and fertilizer. Providing a narrow perennial vegetation strip like that of Subabul along contour alternated with a wider strip of annual cultivated crop is giving promising results in respect of soil and moisture conservation and increase of total biomass production. This practice is useful in low rainfall black soil areas which are prone to soil erosion.

It is found possible to induce flowering and fruiting in fruited shoots of mango by giving 3 sprays of 100 ppm TIBA + 500 ppm Ethrel with 2 per cent potassium nitrate. High density planting of robusta banana with 1.2 m<sup>2</sup> spacing and growing a cover crop of cowpea and turning it over for green manuring gave a record yield of about 174 ton/ha as against average yield of 100 ton/ha. A pomegranate plant with soft seeds and bright red arils has been developed which is superior to existing soft seeded cultivars. A new cardamom clone identified at Regional Research Station, Mndigere has been found to give

about 1 ton/ha of dry capsules yield. Among the citrus varieties tried at Raichur, Pummelo is performing better. Different combinations of 'Agri-Horti-Silvi' patterns of planting are being tried. *Chiku*, cashewnut and citrus planted with tree species such as casurina, eucalyptus, silver oak, teak and *dulbergia* are showing good performance.

In the cotton bollworm management by integrated approach, the release of 10 lakhs of the egg parasitoid, *Trichogramma* at the rate of 1 lakh females per acre per release at 10 days interval offered more than 80 per cent parasitism. This practice has resulted in reducing the number of sprays to control bollworms.

The use of *neem* kernel extract against pod borer of redgram three times at an interval of 10 days was found to be economical and increased the yield by about 15 to 20 per cent.

It has been found that virus is the cause of *kenchu*—a kind of flacharie infection in silkworm. This causes 30–40 per cent cocoon loss and the pathogen survives in dust and on rearing equipment. The bivoltine NB<sub>4</sub>D<sub>2</sub>, NB<sub>7</sub> and NB<sub>5</sub> were found less sensitive to the infection compared to local strains.

The studies indicated that white muscardine disease of silkworm could be controlled effectively by dusting 2 per cent dithane M-45 or 0.2 per cent bavistin directly on the worms.

Studies on the use of synthetic juvenile hormones for increasing the cocoon yield in silkworm have been taken up.

The survey conducted in chilli growing area of Karnataka revealed that chilli mosaic disease is caused by any of the eight viruses occurring in different intensities. *Murda* disease is carried by any of the six agents. Three are aphid transmitted viruses, one is white fly transmitted virus and other two are thrips and mite themselves causing the disease independently. So, management practices to control these insects will reduce the incidence of chilli mosaic and *murda* syndrome. It was found that combination of covering the nursery with nylon net, spray of 0.1 per cent dimethioate in the nursery and providing straw and yellow polythene mulch in the field was more effective in controlling tomato leaf curl virus transmitted by whiteflies. In the screening trials conducted for redgram against wilt, eight lines have been identified to be more resistant to wilt. So also a few lines have been identified as resistant to sterility mosaic disease of redgram. Witches' broom and phyllody diseases of redgram have been recorded in Karnataka, being the first record in India.

The anti helminth antibiotic KT-199 was found to be effective in controlling root-knot nematodes on vegetables. Further, some varieties of winged bean are identified to be resistant to this nematode.



Micorrhizal inoculation along with phosphate application significantly increased the native nodulation by about 25 per cent in bengalgram.

A *Rhizobium* strain having intrinsic resistance to high concentration of Kanamycin and also having high nitrogen fixing ability was identified for the first time for redgram. The antibiotic resistant strain gave good inoculation response in the field.

Eight new implements developed by the scientists were released by the University. Sunflower thresher is manually operated device, does the threshing work 2-3 times faster than hand threshing. A bullock drawn new seed-cum-fertilizer drill is very useful implement for sowing in lines and for proper fertiliser placement. It can cover about 2 hectares per day. The foot operated winnower is useful for winnowing of threshed produce. It can be used for winnowing to give 20-30 quintals of cleaned grains per day.

In skip furrow irrigation method in black soil for maize crop 15 cm deep furrows are found more suitable.

A new sheep pox vaccine designated as "LT-Vaccine" was developed after extensive laboratory and field trials involving more than 46,000 animals and the same has been now released. The vaccine affords complete protection up to 12 months.

Phosphorous and calcium deficiencies are found to be responsible for suppressing Oestrus cycle in Bannur sheep and that the normal cycle can be restored by maintaining the optimum ratio of calcium and phosphorous in feed.

Studies have proved that deficiency in Vitamin E not only causes infertility in cows, but also abortions in animals.

For the first time in the country, a standard antigen was standardised for rapid microscopic agglutination test (RMAT) against leptospirosis. The antigen has a wide field application for sero-diagnosis of leptospiral infection.

A new strain of broiler chicks called 'IBB-80' has been evolved and released. These have a fast rate of growth up to 8 weeks (1500 g) feed efficiency of 2.5 survivability of 98 per cent and yield of 75 per cent meat on dressing.

In an experiment conducted using a combination of poultry manure and varying dose of urea for pond fertilisation revealed that poultry manure (2000 kg/ha) with 100 kg/ha, of urea yielded best results. Higher dose of urea (3000 or 500 kg/ha) resulted in mortality of cultured carps.

Comparative effects of sewage-effluents, poultry manure, silkworm faecal matter and a combination of poultry manure and silkworm faecal matter on the growth of catla, rohu, common carp and silver carp were investigated. Catla and rohu recorded better growth in silkworm faecal matter treated ponds while the growth of common carp and silver carp was best in the combination treatment.

Use of catla-rohu hybrid in place of rohu in composite fish culture both growth and meat yield, were better than that of rohu. Therefore, the catla-rohu hybrid can replace rohu in composite fish culture.

The effect of chilled sea water preservation on the quality of oil sardine used for production of canned and frozen products has been investigated and the products have been found to be superior to fish handled by traditional methods. Effect of wood smoke on the preservation of oil sardine for about 6 hours duration has indicated that they can be stored for about 5 months without spoilage.

It has been found that fermentation time up to 18 hours was best for the maximum synthesis of thiamine and riboflavin in case of "idli" and 'dosa' whereas in case of 'ragi dosa' fermentation up to 24 hours resulted in best synthesis of these vitamins. With regard to the ratio of cereal-pulse 2 : 1 and 3 : 1 were better ratios than 1 : 1 and 4 : 1 ratios.

A study was conducted on the relationship between socio-economic factors and anthropometric measurements of 300 new born babies, from five different randomly selected maternity hospitals. The study revealed that age of the mother, birth order of the child, better diet, education of parents, family income were directly related to the anthropometric measurements of the newborn.

One more Extension Education Unit was started at Regional Research Station, Mudigere. With this, now there are 6 Extension Education Units of the University operating in different regions.

The University started correspondence course for the farmers for the first time during the year. The first correspondence course on paddy cultivation was completed during early 1982, and the second course has now commenced from August 1982. While only 42 farmers participated in the first course, 147 have enrolled in the second course.

The University has taken up the biogas promotional programme in the State. The University engineers assisted in organising special Masons Training Programme in the construction of Bhagyalakshmi Gobar Gas Plants.

....The second phase of the Lab-to-Land programme sponsored by the ICAR has also been started by the University from June 1982 and a total number of 3000 small farmers including agricultural labourers were enrolled in this programme by the University.

The scientists and teachers of the University participated regularly in monthly workshop-cum-training programmes in all the nineteen districts of the State organised by the Department of Agriculture under Agricultural Extension Programme.

In collaboration with the Government of India, Ministry of Agriculture and also other agencies, the University organised a number of training programmes, seminars and workshops during the year.

.....Under the Animal Health Coverage Programme operated by the financial assistance through Karnataka Dairy Development Corporation aided by the World Bank, four diagnostic laboratories were established at Bangalore, Mysore, Hassan and Tumkur. These laboratories handled about 20,000 clinical materials and provided technical service towards prompt recognition of diseases for corrective and control measures.

The Communication Centre of the University brought out seven technical bulletins during the year. These include bulletins on Subabul, Economics of Farm Product Innovation, Pace and Pattern of Agricultural Output Growth in Karnataka, Technology for Small Farmers and Manual for Training Rural Development Workers. The Department of Kannada Studies brought out 13 books in Kannada during the year. With this the total number of books published in Kannada comes to 120 in number.

.....The University has been making concerted efforts to provide increased facilities for sports and cultural activities of the students. Mr. N. C. Nandeesha, M.Sc. student at Fisheries College secured first prize of Rs. 500 at the State Level Essay Writing Competition on 'Wild Life' conducted by the Department of Forests, Government of Karnataka. Mr. K. T. Prakash and Mr. B. Narayanaswamy of Agricultural College, Hebbal bagged the Rolling Trophy in the Inter-collegiate Kannada Debate conducted by V. V. Puram College, Bangalore. The following students were awarded Gold Medals for meritorious performance in sports : Mr. D. S. Hegde, III Year B.V.Sc., Hebbal - Chess; Mr. Sridhara Murthy, Sr. M.Sc.(Agri), Hebbal - Cricket; Miss K. B. Akkamma, Final Year B.Sc. (Hort), Hebbal - Athletics; Mr. H. C. Anand, Final Year B.F.Sc., Mangalore - Basket Ball.

An Employment Information and Guidance Bureau has been started at the University for the benefit of the students.....

#### **Address by Chief Guest—Dr. L. D. Swindale**

.....Cooperation takes several forms, but one most worthy of mention is our cooperation at the Dharwad campus where ICRISAT and the University are working together on sorghum improvement and particularly in research of

find resistance to the devastating disease known as downy mildew. We have developed an excellent method for screening for the disease and rapid progress is now being made in the search for resistant and agronomically elite cultivars.

.....Both our institutions are located in the semi-arid tropics. Both have a mandate to improve the quality of life for rural people through improved and progressive agriculture, and both believe that agricultural education, research and extension can bring about change, can find new alternatives in agriculture to help relieve poverty and malnutrition, and to thwart Malthus and his dire predictions of inevitable famine and catastrophe.

.....One of the major food crops is ragi or finger millet. Average yields by farmers is only about 700 kg per hectare, but better farmers can obtain twice that amount. However, your University research scientists and scientists of the All India Coordinated Research Project for Dryland Agriculture have achieved close to 4,000 kg per hectare in experimental plots in rainfed conditions, about 5 times better than the average. With irrigation an additional 1,000 kg per hectare is possible. These high yields represent the potential of this crop on this soil at the present state of knowledge. It is unlikely that they can be reached by farmers or that they are economic under present circumstances. But they do demonstrate the maxima to which it is possible to strive.

Much of the rainfed potential can be realized — perhaps 2/3rds of it — by the use of improved varieties and fertilizers and their proper placement in the soil. The farmer must pay attention to timely thinning and weeding, and other cultural practices, and to careful harvesting at the right time. A high yielding crop can be obtained in rainfed conditions using these practices in 8 or 9 of every 10 years. Improved water management may enable success in every year and provide additional yields as well. Such possibilities are being investigated by the University and the Dryland Project. However, the combination of improved varieties and fertilizers without other inputs except reasonably good management is a workable package, relatively simple and fairly well understood by the farmers. The evidence of scientific research and trials all over the country indicates that it works. The separate elements of the package taken alone are not nearly as attractive as the combination.

Improved varieties and hybrids significantly out-yield unimproved varieties in most years in most rainfed areas. The cost of purchasing improved seeds is often small and the benefits substantial. The ratio of benefit to additional cost may exceed ten, certainly enough by normal standards to ensure widespread adoption. In spite of the apparent benefits, however, rates of adoption of improved seeds of dryland crops lag far behind rates of adoption of high yielding varieties of irrigated wheat, although they are not so far behind

the rates for high yielding varieties of irrigated rice. Various reasons have been suggested to explain this. Perhaps the major reason is that the introduction of new seeds alone does not represent a large enough change in the pattern of traditional agriculture to arouse the farmer's interest. Small faults or problems, real or imagined, associated with the new seeds dissuade him from trying them. They are simply not worth the trouble.

Similarly there is much evidence to show that fertilizer use is economic on the staple rainfed cereals. Several hundred experiments in cultivators' fields with sorghum, maize and pearl millet in rainfed areas of India have given average grains of 14 kgs of grain per kg of nitrogen, and 7 kgs of grain per kg of  $P_2O_5$ . Benefit cost ratios are 2.5 or better. Although the results suggest that fertilizer use alone is a satisfactory lead practice, there are too many examples where fertilizer added to local varieties did not provide significant improvements or did not cover the additional costs involved. The negative results are sufficient to feed farmers' fears and deter government agencies from recommending the application of fertilizers to local cultivars in rainfed agriculture.

.... The distribution system for supplying fertilizers in a timely manner to the villages is seldom adequate and further hinders their adoption. Inappropriate recommendations of balanced fertilizers do not help. Thus, although the use of improved seeds or the addition of fertilizers to local varieties do provide added benefits in most years, the additional yield of 300 to 400 kgs per hectare is not sufficient to lead to change.

A combination of improved seeds and fertilizers, however, yields an additional 1,000 to 1,500 kgs per hectare or more, and gives positive and beneficial yields consistently. The added benefits, often exceeding Rs. 2,000 per hectare, can significantly improve the farmer's income. The greater yields can significantly increase the production of food grains in the country.

.... For the moment I wish only to underline the fact that the normal growth in agricultural productivity arising from the slow improvement in farming practices through the utilization of new research findings is less than 2.0 per cent per annum in most parts of the world including the U.S.A. which is justifiably renowned for its productive agriculture. India desires a rate of growth in agricultural productivity in excess of 3.0 per cent per annum. Such an exceptional rate of growth cannot be obtained without simultaneous improvements with much higher rates in several parts of the country. Because the natural inertia of agriculture is so great we must strive for the maximum growth in order to achieve a minimum significantly higher than 2 per cent.

.....The soils in the northern districts of Karnataka are black. Technically we call them Vertisols, but they are known also as black cotton soils. They represent a vastly under-utilized resource in India, and your Department of Agriculture is well aware of this and has big plans to explore the full potential of these soils in Karnataka, and by so doing, to bring prosperity to the northern regions of the State. The plans are well developed and are being efficiently and enthusiastically implemented. The Department is helping the farmers to break the "kharif fallow", that is, to utilize the soils twice a year, in the rainy season, and in the winter or post-rainy season, increasing yields and incomes and helping to reduce soil erosion. This new approach can lead to profits per hectare in rainfed agriculture that approach those of highly subsidized, irrigated agriculture, without all the wasteful use of water. It should hardly be necessary to remind the people of Karnataka of the need to be efficient in the use of available water.

This is one of those more complete technologies than just improved varieties and fertilizer. Improved soil and water management is an essential part of it, to improve drainage, reduce erosion and runoff and generally to improve the workability of the soil. To utilize this technology the farmer must change his style of farming. He must grade and shape his land, install grass-protected drainage ways and use more efficient and more expensive animal-drawn implements. His work is much less back-breaking, but he must spend more time on his rainfed land, and be more careful to do things in the right way at the right time.

Should he bother? I say yes. Returns are substantial. For each additional rupee invested the farmer obtains  $2\frac{1}{2}$  in return. Labor usage or returns to labor also increase by  $2\frac{1}{2}$  times, and soil erosion is reduced from approximately 30 tons of soil per hectare per year to 3 or 4.....

.... The banks will need to improve their processing of loans and provide longer-term loans for the purchase of bullocks and implements. The animal scientists will need to ensure greater availability of bullocks because bullock use will expand by 250 per cent with this technology. Improved, regulated markets are required with greater volumetric capacities and with the flexibility to handle non-traditional crops. India is on the verge of an era of agricultural diversification and better, more dynamic market and distribution channels will be needed to cope with the changes. The State may need to improve the regional drainage system in the common interest and provide for its connection to on-farm and community drains.

Integrated rural development is a government program designed to help the rural poor. It is a people-oriented, agriculture based strategy that emphasises the wise and optimum use of all local resources. At its heart is productive

small-farmer agriculture but, recognising that agricultural development alone is not enough, it also incorporates schemes for off-season employment, for animal husbandry and food processing industries and industries that produce intermediate products and services for local agriculture, light industries making consumer products, and the development of improved infrastructure and appropriate institutions. Introducing the technology for deep black soils is a good way to promote a program for integrated rural development because many of the other features of such a program are a natural consequence of technological success. India is deeply committed to integrated rural development in its present Five-Year Plan, and hopefully this means that it will support the type of initiative and growth that I have outlined.

Now what relevance does all this have to the graduates here assembled? At this point in their career it probably means the most important thing in the world—jobs—positions or professions if you prefer, — more polite words; it comes to the same thing. Jobs as farmers. Perhaps not many of our graduates see this in their future. Jobs with the fertilizer companies and jobs in the banks. Jobs in the extension services that must be strengthened, jobs in marketing, food processing and retailing, jobs in teaching and jobs in research.

.....The agricultural universities of India have their genesis in the University Education Commission of 1949 which recommended the establishment of a system of rural universities in the country. To quote Dr. M. S. Randhawa: "through its concept of rural universities, the University Education Commission introduced the U.S. Land-Grant College philosophy into India". The most characteristic, organizational structure of those universities, the one great American innovation in higher education, is the combination of agricultural teaching, research and extension in a single institution, as you have it here at the University of Agricultural Sciences.

The faculty of the University has the major responsibility for translating that philosophy into education and research that impart the values of a mission-oriented life in agriculture. Their courses and curricula should provide a combination of how to do it, with why it is done and what it means. The concern of the faculty for applied farmer-oriented research should be a constant illustration of their understanding of the University's mission. So too should be their participation in demonstration work, in farmers' field days and other extension activities, and in seed production programs. The students, through their association with the professors involved in these activities receive in turn their sense of mission.

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## **FOREWORD**

The Annual Report for the year 1983-84 gives an account of various activities of the University during the year. The report highlights important events and the achievements made in some of the main functions of the University. A few new academic programmes, main thrusts on items of Research and Extension programmes as well as the development activities and fiscal situation are indicated.

The following important decisions were taken by the Board of Regents during 1983-84,

- i. To implement the scheme of time bound advancement to the non-teaching employees of the University in accordance with the provisions of the Government order in this regard.
- ii. To sanction project allowance to UAS staff working at UKP Bheemarayanagudi with effect from 7.8.1981 and to enhance the rate of allowance with effect from 29.7.1983.
- iii. To give two advance increments to the Veterinary graduates who have been appointed as Instructors/Research Assistants/Extension Guides.
- iv. To implement the scheme of time bound advancement in respect of Instructors/Research Assistants/Extension Guides.

During the year 1983-84 a total of 674 undergraduate and postgraduate students completed their respective degree programmes and a total of 966 students were admitted to the various undergraduate and postgraduate courses. Five graduates were selected for I.F.S. and one graduate was selected for appointment as a Veterinary Officer in the Indian Army.

One year postgraduate diploma in sericulture was introduced in the Department of Sericulture from the second trimester of 1983-84. Earn While You Learn Scheme specially as part of the Agronomic Practicals was continued and the students could earn sufficient profit. The Scheme of Graduate Assistantship was also continued to provide financial assistance to the postgraduate students in most of the PG departments.

The Silver Jubilee of the Veterinary College was celebrated during the year. The function was inaugurated by His Excellency the Governor of Karnataka and Hon'ble Chief Minister, Government of Karnataka, presided. A Farmers' Day was conducted as part of the Silver Jubilee celebration to acquaint the farmers of four districts of KDCC area with the Veterinary and Animal Husbandry services that are being rendered by the Veterinary College to the farmers. In the Veterinary College during the year, a Department of Meat Science started functioning.

A Kannada medium section B.Sc. (Agri) course was started to encourage the usage of Kannada, the regional language of Karnataka, for instructional purposes in technical course like agriculture,

An All India Seminar on Dryland Development was held in the University at Bangalore on 29th and 30th October, 1983. H. E. the Governor of Karnataka inaugurated the Seminar and the Hon'ble Chief Minister, Government of Karnataka, delivered the address. This Seminar led to the formation of the Dryland Boards in the State of Karnataka, the first of its kind in the country.

Main thrusts in the research programmes of the University during the year were, evolving new crop varieties and hybrids, improvement in poultry and animal breeds, use of bio-fertilizers, azospirillum and other organic manures and fisheries science. During the year 1983-84 seven new varieties of different crops, a new sheep breed and an agricultural implement were released. Fortytwo All India Coordinated Research Projects, twentynine ICAR adhoc projects and thirtynine research projects funded by several other organisations were functioning in the University in addition to several staff research projects and PG students thesis research programmes.

Six regional training programmes in collaboration with Government of India were conducted. The University experts rendered technical help to 250 farmers in the State to construct Bhagyalakshmi Biogas plants.

The Department of Kannada published 15 books during the year. A special publication entitled "Institution Building and Institution Management" was brought about by the University.

As a development activity several building programmes and farm facility improvement programmes were taken up.

(v)

The University received from the State Government a block grant of Rs. 520.00 lakhs and Rs. 150.00 lakhs development grant for the year against our total expenditure of Rs. 832.15 lakhs. The financial constraint has stalled the anticipated progress of the University development programmes. We hope, with more liberal help from the State Government as well as from the ICAR, it will be possible to develop more teaching, research and extension facilities in the University and show still better progress in the coming year.

N. G. PERUR  
*Vice-Chancellor*



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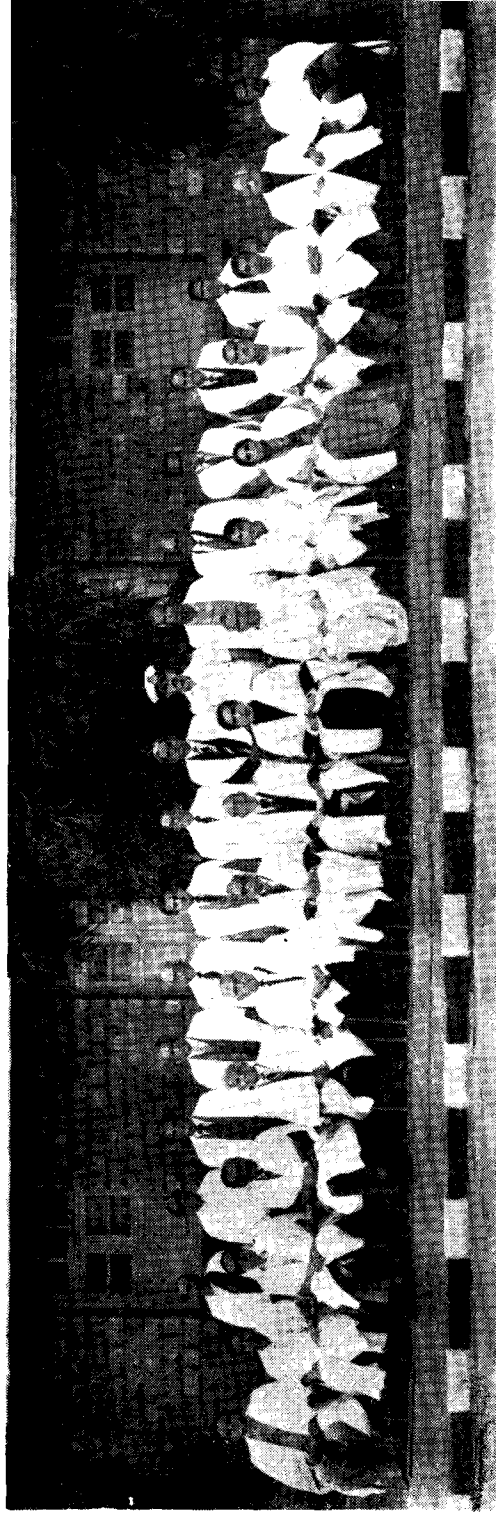
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## EIGHTEENTH CONVOCAATION



Members of the Board of Regents and the Academic Council with the Chancellor, Vice-Chancellor and the Chief Guest

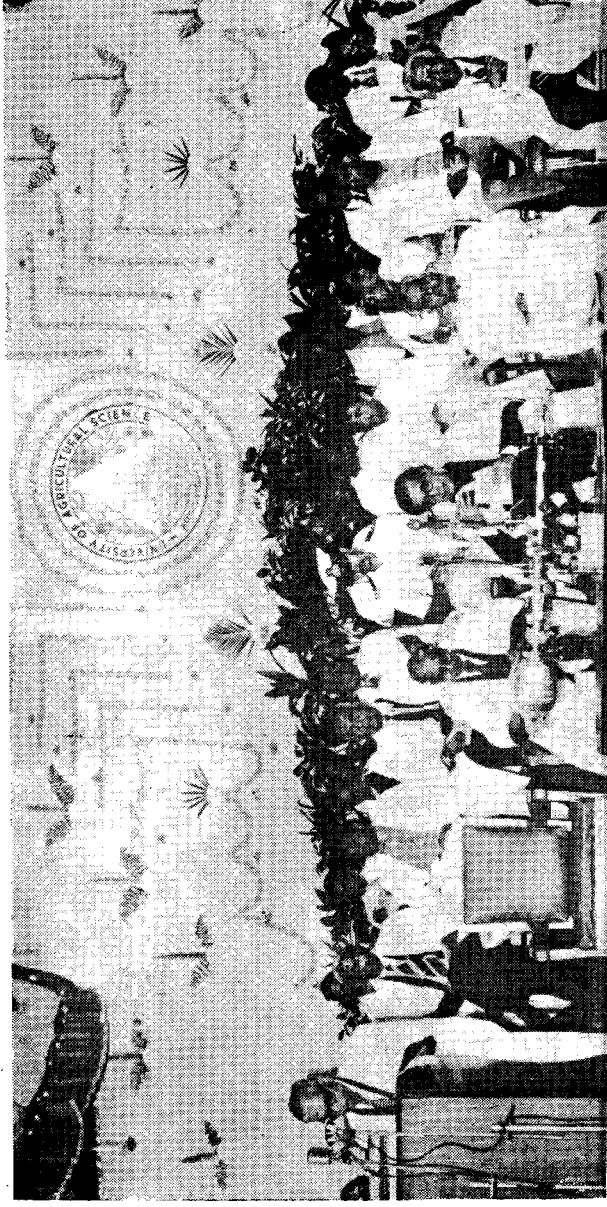


Academic Procession



A view of the graduates and the audience





The Vice-Chancellor Dr. N. G. Perur delivering welcome address



Mr. B. Shivaraman, Chief Guest delivering the Convocation address



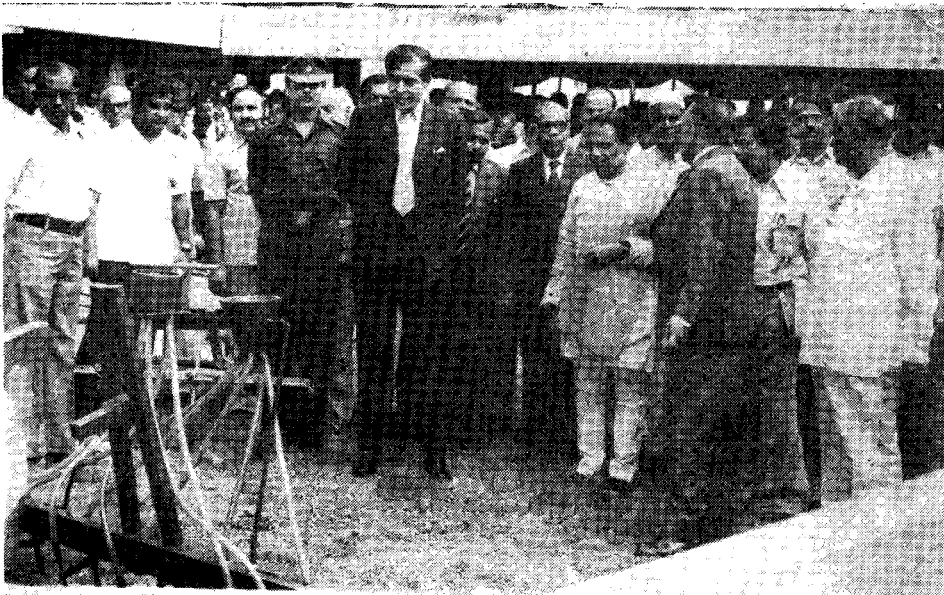
The Chancellor, Shri A. N. Banerji distributing the certificates



The Chief Minister, Sri Ramakrishna Hegde addressing the Seminar-cum-Workshop on Dryland Development



Dr. Prem Narain, addressing the Scientists



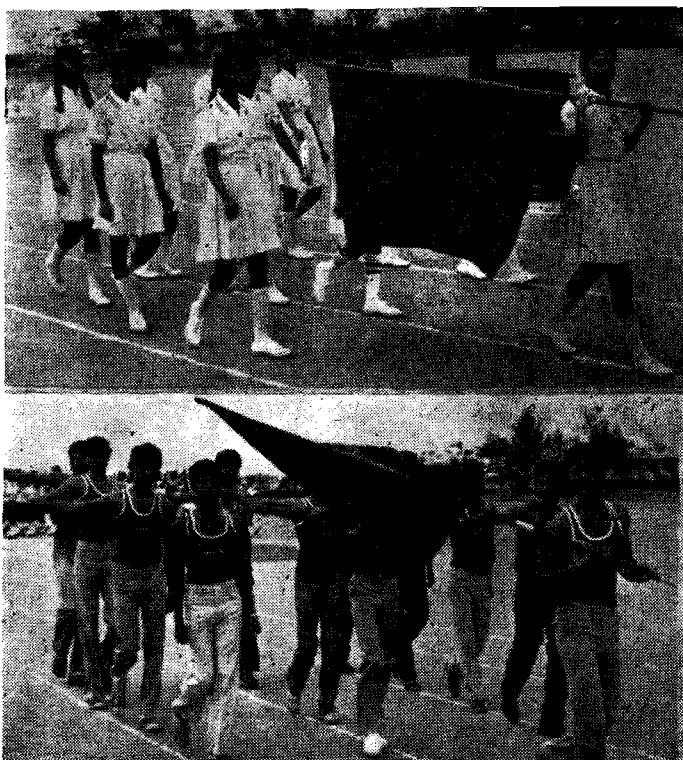
The Chancellor and the Chief Minister viewing the seed drill developed by the University



The Vice-Chancellor addressing the Sixth Southern Regional Conference on Microbial Inoculants



The farmers observing an experimental plot at GKVK during Krishi Mela



Annual Sports





Wheat crop under Lab-to-Land Programme





Cowpea - S-488



Turkey Bird

**PART I**  
**UNIVERSITY ADMINISTRATION**

**A. General**

**(i) BOARD OF REGENTS**

**Chairman**

Dr. N. G. Perur, Vice-Chancellor

**Members**

1. Mr. Maruthi D. Male (upto 16-1-84)
2. Mr. N. K. Ganapaiah (upto 16-1-84)
3. Mr. J. A. Karumbaiah (upto 16-1-84)
4. Mr. M. M. Nadaf (upto 16-1-84)
5. Mr. Manmohan Attavar (upto 22-2-84)
6. Mr. R. V. Halapanavar
7. Mr. H. Viswanath
8. Mr. Mune Gowda
9. Mr. R. K. Solapurkar
10. Dr. K. C. Naik
11. Secretary to Government, Agriculture and Animal Husbandry Department
12. Secretary to Government, Education and Youth Services Department
13. Secretary to Government, Finance Department
14. Director of Agriculture in Karnataka
15. Director of Horticulture in Karnataka
16. Director of Animal Husbandry and Veterinary Services in Karnataka
17. Director of Fisheries in Karnataka

**(ii) OFFICERS OF THE UNIVERSITY**

**Chancellor**

Mr. A. N. Banerji, His Excellency, the Governor of Karnataka

**Pro-Chancellor**

Mr. B. L. Gowda, Hon'ble Minister for Agriculture, Government of Karnataka

**Vice-Chancellor**

Dr. N. G. Perur

**Dean**

Dr. S. V. Patil (upto 25-2-84)

Dr. R. Narayana, I/c (from 25-2-84)

**Other Officers**

Director of Instruction (PGS), Dharwad	...	Dr. R. B. Patil
Director of Instruction (Agri), Hebbal	...	Dr. K. S. Krishna Sastry
Director of Instruction (Agri), Dharwad	....	Dr. R. K. Hegde I/c
Director of Instruction (Vety), Hebbal	...	Prof. K. Trivikrama Rao
Director of Instruction (Fisheries), Mangalore	...	Prof. H. P. C. Shetty
Director of Instruction (BSH),	...	Dr. R. Narayana
Director of Instruction (Home Science), Dharwad	...	Dr. (Mrs.) Leela Phadnis
Director of Extension	...	Dr. K. A. Jalihal
Director of Research	...	Dr. K. Krishnamurthy
Registrar	...	Mr. R. Krishnappa
Estate Officer	...	Mr. B. Venkataswamy
Comptroller	...	Mr. H. M. Nagabhushana
Librarian	...	Mr. H. R. Ramachandra (upto 9-1-84)
	...	Dr. R. Narayana, I/c (from 30-1-84)
Director of Student Welfare	...	Mr. K. Subbaiah
Administrative Officer	...	Mr. B. M. Venkatachala Raju I/c

**(iii) HEADS OF DEPARTMENTS****Basic Sciences and Humanities**

- |                 |      |  |
|-----------------|------|--|
| 1. Biochemistry | .... | Dr. T. K. Virupaksha<br>Professor (GKVK) |
| 2. Statistics   | .... | Dr. N. Sundararaj<br>Professor (GKVK)    |

**Agriculture**

- |                                   |      |  |
|-----------------------------------|------|--|
| 1. Agricultural Botany            | .... | Dr. J. V. Goud<br>Professor (Dharwad)              |
| 2. Agricultural Chemistry & Soils | ...  | Dr. P. B. Deshpande<br>Professor (Hebbal)          |
| 3. Agricultural Economics         | .... | Dr. R. Ramanna<br>Professor (GKVK)                 |
| 4. Agricultural Engineering       | .... | Dr. N. L. Maurya<br>Principal (Raichur)            |
| 5. Agricultural Entomology        | .... | Dr. T. S. Thontadarya<br>Professor (Hebbal)        |
| 6. Agricultural Extension         | .... | Dr. M. K. Sethu Rao<br>Professor (Hebbal)          |
| 7. Agricultural Microbiology      | .... | Dr. T. K. Ramachandra Reddy<br>Professor (Dharwad) |
| 8. Agronomy                       | .... | Dr. G. V. Havanagi<br>Professor (Hebbal)           |
| 9. Crop Physiology                | .... | Dr. Y. C. Panchal<br>Professor (Dharwad)           |
| 10. Horticulture                  | .... | Dr. U. V. Sulladmath<br>Professor (GKVK)           |
| 11. Plant Pathology               | .... | Dr. R. K. Hegde<br>Professor (Dharwad)             |
| 12. Seed Technology               | .... | Dr. G. N. Kulkarni<br>Professor (Dharwad)          |
| 13. Farm Forestry                 |      | —  |
| 14. Agricultural Marketing        | .... | Dr. P. G. Chengappa<br>Professor (Hebbal)          |

**Veterinary**

- |                                 |      |                                     |
|---------------------------------|------|-------------------------------------|
| 1. Animal Genetics and Breeding | .... | Dr. A. V. Rai<br>Professor (Hebbal) |
|---------------------------------|------|-------------------------------------|

2. Gynaecology and Obstetrics	....	Dr. R. V. Patil Professor (Hebbal)
3. Poultry Science	....	Dr. B. S. Ramappa Professor & Geneticist (Poultry), (Hebbal)
4. Surgery	....	Dr. P. H. Thippaiah Reddy Professor (Hebbal)
5. Veterinary Anatomy	....	Dr. Abdus Salam Professor I/c. (Hebbal)
6. Veterinary Pathology	....	R. N. Srinivasa Gowda Professor I/c. (Hebbal)
7. Veterinary Pharmacology		—
8. Veterinary Physiology	....	Dr. K. Thimmaiah Professor (Hebbal)
9. Veterinary Parasitology	....	Dr. S. Abdul Rahman Professor (Hebbal)
10. Veterinary Microbiology	....	Dr. R. Raghavan Professor I/c. (Hebbal)

#### **Fisheries**

1. Aquaculture	....	Dr. T. J. Verghese Professor (Mangalore)
2. Fish Processing Technology	....	Dr. T. M. Rudra Setty Professor (Mangalore)
3. Fishery Engineering	....	Prof. P. K. Salaian Professor (Mangalore)
4. Fishery Biology	....	Dr. S. L. Shanbhogue Professor (Mangalore)

#### **Home Science**

1. Foods and Nutrition		—
2. Home Economics	....	Dr. (Mrs.) M. P. Vaidehi Associate Professor (Hebbal)

## **B. General Administration**

### **(i) Activities of the Vice-Chancellor**

Dr. N. G. Perur continued as Vice-Chancellor of the University of Agricultural Sciences, during the year.

The important activities in which the Vice-Chancellor participated were as follows :

Inaugurated the Field Day of the Indian Institute of Horticultural Research at Hesarghatta on 7-4-1983.

Attended the Management Committee meeting of the National Academy of Agricultural Research Management at Hyderabad (A.P.) on 10-4-1983.

Inaugurated the NARP Seminar at Regional Research Station, Mandya on 11-4-1983.

Inaugurated the meeting of the Seed Production at Bangalore on 21-4-1983.

Presided over the Annual General Body meeting of the GKVK Hostels, UAS on 7-5-1983.

Attended the Research Advisory Council meeting of the Central Food Technological Research Institute, Mysore on 18-5-1983.

Attended the Executive Committee meeting of the Central Food Technological Research Institute, Mysore on 20-5-1983.

Presided over the inaugural function of the Third All India Seed Research Workshop held at UAS, Hebbal Campus on 23-5-1983.

Presided and delivered the Key-Note Address at the National Convension on Subabul held at the Institution of Agricultural Technologists, Bangalore on 25-5-1983.

Presided over a function on "World Environment Day" held at the Agricultural College, Hebbal on 11-6-1983.

Chief Guest at the Convocation of St. Joseph's College of Business Administration, Bangalore on 11-6-1983.

Presided over the Fulbright Seminar on Agriculture, Energy, etc. held at the Agricultural College, Hebbal on 16-6-1983.

Presided over the Seminar on "Kharif Crop Production" held at the Cooperative Training College Complex, Bangalore, organised by the IFFCO/UAS/KDDC on 20-6-1983.

Inaugurated the Summer Institute on Extension Research Methodology and Rural Development at Agricultural College, Hebbal on 28-6-1983.

Chief Guest at the Annual Day Celebrations of UAS Kannada Balaga, GKVK on 1-7-1983.

Delivered a talk at the Eleventh Programme on Sugarcane Development for Results, organised by the Industrial Management Services (India), New Delhi, at Bangalore on 10-7-1983.

Chief Guest at the Valedictory function of the Summer Institute on Agro-Climatology and Crop Growth, held at the Seminar Hall of the Veterinary College, Hebbal on 24-7-1983.

Presided over the Seventh Conference of All India Agricultural Research Statisticians held at UAS, Hebbal on 28-7-1983.

Chief Guest at a function organised by the All India Nepalese Unity Society at Bangalore on 31-7-1983.

Presided over the inaugural function of the Alumni Association of Agricultural College, Hebbal on 10-8-1983.

Inaugurated the Training Programme at the Staff Training Centre of the State Bank of Mysore, Jayanagar, Bangalore on 29-8-1983.

Presided over the inaugural function of "Pashuroga Nirnaya Prayogalaya" at Hebbal on 31-8-1983.

Delivered the Key-Note Address at the Seminar on "Grow More Trees" organised by the Institution of Agricultural Technologists, Bangalore and the State Department of Forests at the UAS, Bangalore on 1-9-1983.

Delivered a talk at the Deccan Sugarcane Technologists Association, Poona on 6-9-1983.

Attended the Executive Committee meeting of the Central Food Technological Research Institute, Mysore on 9-9-1983.

Presided over the inaugural function of the Conference on Microbial Inoculants held at UAS, Hebbal on 22-9-1983.

Delivered a Key-Note Address at the programme on "Selling New Ideas to Canegrowers" organised by the National Productivity Council, Bangalore at Hotel Windsor Manor, Bangalore on 23-9-1983.



Recorded a talk at All India Radio, Bangalore, on "Food Prospects by 2000 A.D" on 22-10-1983.

Delivered Dr. R. V. Thamane Memorial Lecture on "Soil Eco-System and Land Productivity" at Haryana Agricultural University, Hissar organised by the Indian Society of Soil Science, on 26-10-1983.

Participated in the Dryland Development Seminar jointly organised by the Karnataka State Department of Agriculture and the UAS at GKVK Campus on 29-10-1983 and 30-10-1983.

Addressed a Press Conference in connection with the Krishi Mela on 10-11-1983.

Released the UAS Sheep Breed at the National Convention on Sheep, held at the Institution of Agricultural Technologists, Bangalore on 11-11-1983.

Inaugurated the Sugarcane Seminar organised by the Syndicate Bank, Sriramanagar and the Gangavathi Sugars Ltd., at Gangavathi on 3-12-1983.

Delivered the Key-Note Address at the Rural-Urban Seminar organised by the Rotary International at Ramanagaram, Bangalore district on 11-12-1983.

Attended the meeting of the Vice-Chancellors and Pro-Chancellors of the Karnataka State Universities held at Raj Bhavan, Bangalore on 14-12-1983.

Inaugurated the Mushroom Marketing function at Mangalore, on 17-12-1983.

Inaugurated the Ninth Workshop on All India Coordinated Research Project on Tobacco, at Dharwad Campus of the UAS on 2-1-1984.

Attended the Executive Committee meeting and General Body meeting of the Indian Agricultural Universities Association at New Delhi on 10-1-1984.

Attended the Conference of the Vice-Chancellors of the Indian Agricultural Universities at New Delhi on 11-1-1984.

Delivered a talk on "The Role of Agricultural Universities in Rural Development" at the function organised by the Colorado State University at the Seminar Hall of the West End Hotel, Bangalore on 16-1-1984.

Inaugurated the Sixteenth Annual Conference of the Karnataka State Teachers-Educators' Association at Davanagere on 27-1-1984.

Chief Guest at the concluding function of "Animal Welfare Fortnight" held at Lavelle Road, Bangalore on 29-1-1984.

Chief Guest and distributed prizes at the Third ICAR Inter-Zonal Sports Meet held at Kanteerava Stadium, Bangalore on 5-2-1984.

Presided over the Seminar on "Technology for Small Farmers" held at the Auditorium of the Agricultural College, Hebbal, organised by the Bangalore Chapter of the Indian Society of Soil Sciences and the UAS, Bangalore on 15-2-1984.

Attended the Annual General Body meeting of the ICAR Society at Krishi Bhavan, New Delhi on 3-3-1984.

Delivered the Welcome Address at the Eighteenth Convocation of the UAS held on 9-3-1984.

*Important Visitors* : Mr. K. P. A. Menon, Managing Director, National Seeds Corporation, New Delhi on 26-4-1983.

Scientists from Philippines on 17-5-1983.

Mr. J. Rayan, Director, Mangalore Chemicals & Fertilisers Ltd., on 26-5-1983.

Dr. Hergrove, Head, Communication Centre, International Rice Research Institute, Manila, Philippines on 2-6-1983.

Dr. Hagad, FAO Representative in Horticulture on 3-6-1983.

Members of the IDA Mission on 8-6-1983.

A Technical Team from the Government of Oman on 10-6-1983.

Dr. Pollock and a Representative from USAID, New Delhi on 14-6-1983.

Members of the Board from Haryana Agricultural University, Hissar on 8-10-1983.

World Bank Team on National Seeds Project on 3-11-1983.

Members of the Quinquennial Review Team (QRT) on Potato on 10-11-1983

Three Member Delegation of the University of Dar-es-Salam, Tanzania on 18-11-1983.

Mr. Jagjit Singh, Member of Parliament and President, Federation of Association of Non-Teaching Employees of All India Universities, New Delhi on 20-12-1983.

Dr. Ellen, Expert in Farm Power, University of Nairobi, Nairobi, Kenya on 28-12-1983

A Norwegian Team on 16-1-1984

Dr. Kemmler from United Kingdom on 20-1-1984

Mr. B. Shivaraman, former Member of Planning Commission and Chairman, Central Silk Board on 9-3-1984.

B. M. VENKATACHALA RAJU  
*Administrative Officer i/c*

## **(ii) Meetings of the Authorities of the University**

### **(a) Board of Regents**

The Board of Regents held eleven meetings during 1983-84. The following are some of the important decisions :

#### **Amendment to Statutes of the University**

1. The Board approved amendment of Statute 78 as follows and recommended the same to the Chancellor for approval :

78 (1) : "Commutation of pension is permissible in the same manner and subject to the same conditions as prescribed in K.C.S.Rs. and as amended by the Government of Karnataka from time to time".

78 (2) : "Employees transferred under Section 7 of the UAS Act 1963, who opt to UAS pension scheme under Statute 63, are also allowed to commute pension admissible at the age of 60 for the service rendered between the age of 55 and 60 out of UAS pension fund up to maximum limit admissible as per K.C.S.Rs. less the commutation amount admitted by the Accountant General, Karnataka, Bangalore, according to Govt. Order No. A 7209 AUM 79 dated 29/30-1-1976 and Govt. Order No. AAH 33 AUM 80 dated 6-2-1981".

2. The Board decided to recommend to the Chancellor for approval of the following amendment to para 3 of Statute 32 (i) in place of the existing para :

"provided further that service personnel up to and including the cadre of Assistant can be appointed by the Vice-Chancellor without referring to the appointing authority, the wife, a son or unmarried daughter of an

UAS employee who dies in harness leaving his family in distress and where the family of the deceased employee is in immediate need of assistance on account of his sudden death, there being no other earning member in the family. The person to be appointed under this shall possess the educational qualifications prescribed for the post. The experience part of the qualification need not be insisted upon. The person so appointed shall be absorbed against a regular direct recruitment vacancy if he or she had earlier been appointed as a supernumerary for which the Vice-Chancellor shall have the power to create a supernumerary position”.

3. The Board while approving the following amendments to Statute 19 (1) recommended the same to the Chancellor for approval :

19 (1) : Read the powers and duties laid down in Sections 13, 15, 26 and 46 of the Act.

- (a) The Comptroller shall be responsible for the management of all funds of the University including the general fund, the foundation fund and other funds in accordance with the Statutes, Regulations and Provisions of the Act, subject to the overall direction of the Board and the Vice-Chancellor provided :
  - (i) All expenditure up to Rs. 50,000 on a single item shall have received the sanction or approval of the Comptroller or any other Officer or teacher concerned duly authorised by the Board.
  - (ii) All expenditure exceeding Rs. 50,000 but not exceeding Rs. 2,50,000 (Rupees two lakhs fifty thousand only) on a single item shall have received the approval of the Vice-Chancellor.
  - (iii) All expenditure exceeding Rs. 2,50,000 (Rupees two lakhs fifty thousand only) on a single item shall have received the approval of the Board.
  - (iv) All purchases exceeding Rs. 1,000 shall be made only on the basis of quotations or tenders.
  - (v) That no expenditure shall be incurred except in accordance with the financial estimates as approved by the Board, under Section 37 of the Act and as delegated under Section 46 of the Act.

4. The Board approved the following amendment to Statute 9 (1) (a) and recommended the same to the Chancellor for approval :

“The word ‘non-official’ occurring in the first line of Statute 9 (1) (a) may be deleted”.

5. The Board approved the following amendment to Statute 56 and recommended the same to the Chancellor for approval :

“56. Student Association –

There may exist within, but not as an official authority of the University, an organisation of the student body to be known as the Student Association, the Regulations of which shall be framed by the Academic Council”.

6. The Board, while approving to substitute the existing Statute 32 (3) (d) with the following, recommended the same to the Chancellor for approval :

“Notwithstanding the above provision, the Vice-Chancellor is empowered to appoint temporarily for a period not exceeding one year, persons recommended by a Local Selection Committee constituted by him to any of the category of posts of the cadre carrying up to and including Rs. 1050-50-1200-60-1500-75-1950, as revised from time to time, excluding promotional vacancies, pending permanent arrangements to recruit and appoint persons in the said posts as per the procedure prescribed and report the matter to the next Board meeting for information”.

#### **Other important decisions of the Board**

1. The Board extended the period of deputation of Mr. N. S. P. Rebello to the Government of Karnataka from 12-1-1982 to 31-12-1982 as a special case.

2. The Board ratified the action taken by the University in permitting Dr. R. V. Krishnamurthy, who is on deputation to the Karnataka State Sericulture Development Institute, Bangalore to visit United Kingdom to learn Research Techniques in Merlewood Research Station for a period of three months from 24-10-1982 by availing leave at his credit.

3. The Board approved the proposal to depute Dr. J. V. Goud, Professor of Agricultural Botany to attend the Sixth International Wheat Genetics Symposium at Kyoto-Japan from 28-11-1983 to 3-12-1983 with the admissible journey period and also to meet the cost of registration fee and 50 per cent of

the International travel cost (limited to total expenditure not exceeding Rs. 12,000) and the other 50 per cent being met by the Indian Council of Agricultural Research.

4. The Board agreed to spare the services of Dr. R. V. Krishnamurthy, Associate Professor of Zoology to the State Government for a further period of one year only from 22-1-1983.

5. The Board while ratifying the action taken by the University in permitting Dr. (Mrs) Meera Rao, to accept the post doctoral research position offered by the University of Zambia, Central Africa for a period of two years from the date of relief of Dr. (Mrs) Meera Rao, sanctioned study leave for this period, keeping her lien in the post of Associate Professor of Food and Nutrition.

6. The Board unanimously elected Mr. Maruti D. Male, to serve on the State Library Authority, Government of Karnataka for the next term.

7. The Board approved the proposal to extend the benefit of special pay of Rs. 50 per month to all the Stenographers in accordance with the Government Order.

8. The Board agreed for the payment of Rs. 100 to all the University employees in accordance with Government Order No. FD 181 (CSC) 81 dated 16-12-1981 on the occasion of the Silver Jubilee year of formation of the new State of Karnataka. This benefit is restricted only to the regular employees of the University.

9. The Board decided to give the project allowance in respect of the University employees working in the Bheemarayanagudi Research Station in accordance with the Government Order No. AFD 56 SRC 79 (ii) dated 31-10-1979.

10. The Board ratified the action taken by the University in deputing Dr. Srikant Kulkarni, Junior Pathologist, Wheat Scheme, R. R. S., Dharwad, as a Visiting Scientist at CIMMYT, Mexico, for a period of one month by treating his training period as on duty including journey period and to meet the expenses towards T. A. and D. A. for his tour from Dharwad to New Delhi and from New Delhi to Dharwad, out of scheme funds.

11. The Board ratified the action taken by the University in allowing Dr. C. A. Virakthamath to avail 11 days of Earned Leave from 8-10-1982 to 18-10-1982 instead of 9 days and treating the journey for attending the International Conference on Bio-taxonomy at London on 19th and 20th October, 1982 as on duty.

12. The Board decided to give a special allowance of Rs. 60 per month for all the vehicle drivers in the University (both Heavy Vehicle and Light Vehicle drivers) irrespective of the places they work and a special allowance of Rs. 30 per month for all the bus helpers in the University with effect from 1-4-1982 and the same will continue up to 31-3-1984 or until further orders.

13. The Board approved the proposal to amend the Cadre and Recruitment Regulations in respect of the two posts of Technical Auditors-cum-Draftsman in the University as follows :

“22. Technical Auditor-cum-Draftsman Rs. 860-1600 (revised to 1100-2025)	TWO	The ratio between promotion from among Head Draftsman (Rs. 600-1240 revised to 860-1650) in the University and direct recruitment shall be 1 : 1
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14. The Board approved the proposal to depute Mr. G. Thimmaiah and Mr. B. C. Narayanaswamy for 30 days besides the to and fro journey period to undergo training in the field of “Advance detection of plant diseases and pests relating to cotton and sunflower respectively” in USSR.

15. The Board approved the proposal to depute Dr. P. Vittal Rai, Professor of Agricultural Microbiology for 30 days, besides to and fro journey period to undergo training in the field of ‘Fundamentals of Biological Nitrogen Fixation and use of Bio-fertiliser’ at USSR.

16. The Board as a special case approved to depute Mr. D. S. Seshappa for doing Ph.D. degree who has secured admission for Ph.D. in Fishing Vessel Technology at Norway in view of the importance of the subject and the benefit accruing to the University from his higher studies in that field, irrespective of the existing bond obligations for the previous study leave.

17. The Board ratified the action taken by the University in deputing Mr. Ramachandra Bhatta, Assistant Professor of Cooperation to Poland under Indo-Polish Cultural Exchange programme for a period of three weeks in the field of Agricultural Cooperation and Farm Management, including the journey period as deputation and to meet other miscellaneous expenses connected with the preparation of passport/visa/health certificates and internal travel costs in India.

18. The Board approved the proposal to permit Dr. K. Krishnamurthy, Director of Research, to visit the People’s Republic of China under the scholarly exchange programme without any cost to the University but by treating his absence including to and fro journey period as on duty.

19. The Board agreed to permit Dr. V. Muniyappa to attend the 4th International Congress of Plant Pathology at Queensland, Australia and present his papers from 28-7-1983 to 30-8-1983, without any financial commitment on the part of the University except treating the period of his absence, including to and fro journey period as on duty.

20. The Board permitted Dr. G. Shivashankar to accept the assignment of consultancy with FAO, Rome for a period of eight months from the date of acceptance, retaining the lien in the University.

21. The Board ratified the action taken by the University in deputing Dr. K. R. Thimmaraju, to undergo training in Horticulture at Washington, USA, under UNDP/FAO programme from 15-3-1983 to 15-6-1983 without any financial commitment on the part of the University, except treating the period of absence in this regard, including the to and fro journey period, as on duty.

22. The Board approved the proposal to implement the scheme of time bound advancement to the non-teaching employees of the University in accordance with the provisions of Government Order No. FD 88 SRP (CSC) 81 dated 27-3-1982 and any amendment issued by the Government from time to time with effect from 1-4-1982.

23. The Board accorded approval for the deputation of Dr. K. Krishnamurthy, Director of Research to attend the XI Asian Pacific Weed Science Society Conference to be held at Philippines, Manila from 28-11-1983 to 2-12-1983, with admissible journey period and to meet 50 per cent of travel cost, (the total expenditure not exceeding Rs. 12,000) the remaining 50 per cent of the International travel cost being met by the Indian Council of Agricultural Research.

24. The Board agreed the proposal to sanction the project allowance to the UAS staff working at Bheemaranagudi with effect from 7-8-1981, the date on which the first regular employee reported for duty at Bheemaranagudi and also to give effect to the latest Government Order No. PWD 45 SAL 83 dated 29th July 1983 enhancing the rate of allowance with effect from 29-7-1983.

25. The Board decided to place the services of Mr. H. K. Narasimhe Gowda, Assistant Professor of Kannada at the disposal of the State Government for being appointed as a Member of the Official Language (Legislative) Commission from the date of his relief in the University.

26. The Board decided to approve the participation of Mr. R. Samiullah, Assistant Professor of Horticulture in a training programme from 12-8-1983 to 12-11-1983 in Netherlands under the Netherland Programme of Technical



Cooperation, treating the period of his participation as duty without any other financial commitment to the University.

27. The Board ratified the action taken by the University in permitting Dr. K. Giriraj to attend the training course in Sunflower Cultivation at the Institute of Agronomy and Crop Production, University of Pisa, Italy from 10-5-1983 to 18-8-1983, without any financial commitment to the University, treating this period as on duty.

28. The Board approved the proposal to give two advance increments to the Veterinary Graduates who have been appointed as Instructors/Research Assistants/Extension Guides after 1-1-1982 in the scale of Rs. 920-1725 and to fix the starting pay at Rs. 1,000 from their date of appointment.

29. The Board approved the scheme of time-bound Advancement in respect of Instructors/Research Assistants/Extension Guides.

30. The Board agreed to spare the services of Dr. J. V. Venkataram to the Indian Council for Cultural Relations, New Delhi, for being nominated for appointment as Visiting Professor of Agricultural Economics at the American University of Beirut, Lebanon.

31. The Board ratified the action taken by the University in permitting Miss Neelu Nangia, Assistant Professor of Sericulture to participate in the 10th International Congress of Plant Protection at Brighton, U. K. from November 20 to 25, 1983. Her absence during the above period and to and fro journey period from 15-11-1983 to 19-11-1983 and again from 2-12-1983 to 5-12-1983 be treated as on duty.

32. The Board approved the proposal to depute Dr. K. Krishnamurthy, Director of Research, to visit Hungary for a period of one month during February 1984 including actual to and fro journey period without any financial commitment to the University.

33. The Board ratified the action taken by the University in deputing Dr. D. Rajagopal to attend the two International programmes viz., Workshop on Photo-reception and Vision in Invertebrates at Bishop's University, Canada from 11-7-1982 to 26-7-1982 and 9th International Union for the study of Social Insects, University of Colorado, U.S.A. from 8-8-1982 to 14-8-1982.

34. The Board ratified the action taken by the University in permitting Dr. K. M. Bhojappa to visit Japan from 2-12-1983 to 19-12-1983 under Exchange of Scientists programme inclusive of journey period treating his visit as duty but without any cost to the University.

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35. The Board ratified the action taken by the University in permitting Dr. K. Giriraj, Senior Sunflower Breeder to visit Rumania to study sunflower improvement under Indo-Rumanian Joint Commission from 28-8-1983 to 14-9-1983 which includes to and fro journey from Bangalore to Rumania, and meeting the International travel cost and local expenditure in this regard by the University and also by treating the period of his absence, including journey period as on duty.

36. The Board decided that the scale of pay of Veterinary Assistant Surgeons revised in Govt. Order No. FD 22 SRP 82 dated 23-11-1982 from Rs. 920-1725 to Rs. 1100-2025 with effect from 1-8-1982 be implemented only in respect of Veterinary Instructors/Research Assistants/Extension Guides in the University.

#### **(b) Academic Council**

The Academic Council met three times during 1983-84. The following are the important decisions :

1. The Academic Council while approving the following Regulations in respect of the correspondence courses, recommended the same to the Board for approval.
  - a. The correspondence course shall be offered to the graduates of Agricultural Sciences in certain specialised areas. The students completing the courses successfully shall be awarded a certificate.
  - b. For admission purposes, the overall Grade Point Average or its equivalent at the first degree level in Agricultural Sciences shall be the criterion. Any further specific eligibility requirement for a particular course, if any, shall be indicated at the time of notification for admission to the course.
  - c. The graduates who have completed two years after their graduation are eligible for admission.
  - d. There shall be a minimum of 10 candidates for offering a particular correspondence course at a time. The maximum number admissible at a time for a course at a time shall be 50 candidates.
  - e. Candidate can take only one correspondence course at a time.
  - f. The correspondence course shall ordinarily be of 20 weeks duration.
  - g. The student enrolled for the correspondence course shall be required to pay Rs. 100 as course fee.

- h. The student shall be permitted to make use of the reference facilities in any of the Libraries and shall abide by the Rules of the Library.
- i. There shall be 15 lessons for each course.
- j. The evaluation system shall be as follows :
 

(i) A mid term test shall be conducted at the end of 8 lessons	30 marks
(ii) Assignment	20 marks
(iii) Final test	50 marks
- k. The student may be required to be present for about 3 working days at the campus where the teacher offering the course is located for further coaching, library work and for taking the final test during the last week of the programme.
- l. The time limit as indicated by the teacher shall be fixed for receipt of the assignments and answers to the questions and this time limit shall be strictly adhered to.
- m. A candidate getting not less than 50 per cent of the aggregate marks of the tests and assignments given by the teacher is said to have been satisfactorily completed the course and a certificate shall be issued to that effect at the end of the course programme.
- n. The correspondence course will be covered both in Kannada and English and the student shall be given the choice to choose any one medium.

*Note :* A provision of about Rs. 100 per student per course may be provided to meet the expenses of stationery, postage etc.

2. The Academic Council approved the proposal to increase the admission capacity to B.H.Sc. programme in the College of Rural Home Science, Dharwad from 25 to 40 from the academic year 1983-84 onwards.

3. The Academic Council approved the following Regulation relating to the conditions laid down for adding 10 marks for admission to undergraduate degree programmes to the candidates whose parent's profession is actual cultivation etc. :

“Add 10 marks to the percentage of marks as at (a) for candidates whose parent's/guardian's (if both the parents are not alive) profession is actual cultivation including Agricultural Labour/Poultry Farming/Livestock Farming/Fishing/Sericulture as evidenced by a certificate

from the Tahsildar or any other Revenue Officer of higher rank prescribed for the purpose, besides producing the evidences to the effect that the candidate has studied up to and including 7th Standard in School/s located outside the limits of a Municipal Corporation area in Karnataka as evidenced by a certificate from the Head of the concerned Institution/s”.

4. The Academic Council approved the following modified Regulation in respect of the eligibility requirements for the Master's degree programmes of this University :

“For purposes of admission to Master's degree programmes in this University, the candidate should possess a Bachelor's degree in .....from a University whose degree/s is/are considered equivalent to a similar degree/s offered by the University of Agricultural Sciences in terms of the duration and the minimum admission requirements with not less than 50 per cent of marks or equivalent Grade Point Average in the concerned subject in the absence of a concerned subject”.

5. The Academic Council decided that a maximum time of an equal number of years over and above the minimum period prescribed for completion of a given undergraduate degree programme in the University, be fixed before which one should complete that degree programme. If a student fails to complete the degree programme within this period his admission for the concerned degree programme be cancelled.

The same provision applies to students admitted to the Diploma in Agricultural Engineering also. This provision is applicable to students admitted from 1983-84 and onwards.

6. The Academic Council after taking into account the recommendations of the Committee constituted for this purpose, approved the following fee structure for various Certificates to be issued by different functionaries in the University as also the format of the Certificates as under :

Name of the certificate	By whom it has to be issued	To be countersigned by	Fee to be charged for the first copy	Fee to be charged for the duplicate copy
1	2	3	4	5
1. Bonafide Certificate	Asst. Registrar/ Head of the Academic Unit	D.I/Principal of the con- cerned College	Rs. 2.00	Rs. 5.00

1	2	3	4	5
2. Certificate of the academic progress	Asst. Registrar/ Head of the Academic Unit	D.I/Principal of the concerned college	Rs. 2.00	Rs. 5.00
3. Certificate indicating study expenses	Asst. Comptroller	-do-	Rs. 2.00	Rs. 5.00
4. Migration certificate	Registrar	—	Rs. 10.00	Rs. 20.00
5. Provisional certificate	Registrar	—	—	Rs. 10.00
6. Cumulative Grade card (Transcript)	Registrar	—	—	Rs. 20.00
7. Diploma/Degree certificate	Registrar	Dean and Vice-Chancellor		No duplicate shall be issued
8. Character certificate	DI/Principal of the concerned College	—	Rs. 2.00	Rs. 5.00
9. Any other certificate to be issued by the Registrar/DSW/ DI/Principal	—	—	Rs. 2.00	Rs. 5.00

The certificates should be issued only by the concerned officials as indicated above. The certificate may be issued on the request made by the student in writing, accompanied by Postal Order/Bank Draft/Bank challan for the amount prescribed.

*Note :* All certificates issued subsequent to the original should be marked "DUPLICATE".

7. The Academic Council decided to add the following proviso to item 5 of the existing Regulations relating to annual fees payable at the commencement of the first trimester for undergraduate courses in respect of those undergraduate students for whom NCC is compulsory.

"5 Caution Money Deposit (refundable)  
Rs. 300 (I year only).

(Rs. 250 refundable after return of NCC materials in case of NCC cadets and for others who are declared not fit for NCC, refundable immediately thereafter. The remaining amount of Rs. 50 will be refunded after completion of the degree)''.

8. The Academic Council decided to modify the existing Clause No. 30 of the Hostel Regulations 1982 as follows :

“30. The Hostel Managing Committee shall ordinarily consist of the following :

Chairman                      Chief Warden/Warden

Members                      In respect of each class, the resident student boarder having the highest Cumulative Grade Point Average/admission marks shall be nominated as a member. In case, the student boarder with the highest Grade Point does not agree to serve as a member of the Managing Committee, the next student boarder who has secured the highest Grade Point will be nominated, and so on. Other Wardens will be members.

The following office bearers will be elected from among the student members for the academic year :

General Secretary, Joint Secretary, Mess Secretary, Hostel Sports Secretary.

Wherever the strength of boarders in a hostel is less than 50, two residents could be nominated from the boarders of each class or block to act as members of the Managing Committee”.

9. The Academic Council after detailed consideration of the recommendations of the Expert Committee decided to recommend to the Board to start offering a Ph.D. programme in Foods and Nutrition from the next academic year 1984-85 both at Hebbal and Dharwad Campuses.

However, at Hebbal Campus this programme could be started only when a post of Professor of Foods and Nutrition is created and filled.

10. The Academic Council decided to recommend to the Board to start M.Sc. in Clothing and Textiles – M.Sc. (Clothing Textiles) at the Rural Home Science College, Dharwad. From the next academic year 1984-85 the admission requirement for this programme should be either a B.H.Sc. or B.Sc. (Home Science) from an Agricultural University with not less than 50 per cent of marks or equivalent in the aggregate.

11. The Academic Council decided to recommend to the Board the proposal to start Ph.D. degree programme in Poultry Science at Hebbal Campus from the next academic year 1984-85.

12. The Academic Council approved the following guidelines for grading of Internship training for final year B.V.Sc. students :

1. In case a student secures 'F' or 'EE' grade in any discipline, he shall repeat the course concerned for a period of one month and at the end of the period, he shall be evaluated and graded.
2. The students shall pay fees for this period as per University Regulations and not eligible for allowances.
3. All the teachers who have offered instruction in particular discipline both in Hebbal and Dharwad campuses of the University must be involved in the Final examination (both written and viva-voce).
4. The Heads of Departments concerned shall formulate the syllabus in their respective disciplines and send it to the Chairman, Board of Studies of the Faculty of Animal Sciences for being placed before the Board and the Academic Council for approval.

13. The Academic Council after taking into account the recommendations of the Committee decided to recognise the Central Plantation Crops Research Institutes Research Centre, Appangala, Coorg District as a centre of Postgraduate Research for UAS.

#### **Other Important Decisions**

1. The Academic Council approved the revised course titles and course outlines in Agricultural Extension for undergraduate students namely, Ag. Extn. 201, Ag. Extn. 301 and Ag. Extn. 302.

2. The Academic Council approved the change of prefixes from 'Ag. Ent'. to 'Sericulture' as well as the change of numbers in respect of the courses in Sericulture for undergraduate degree programme, postgraduate degree programme as well as P. G. Diploma in Sericulture.

3. The Academic Council approved the course outlines and course curriculum of Zool 103, 3+1 credits and Ph. 105, 1+1 credits for B.Sc. Sericulture degree programme.

4. Based on the recommendations of the Board of Studies of the Faculty of Basic Sciences and Humanities, the Academic Council decided to discontinue the requirement of Stat 301 course for B.V.Sc. students admitted prior to 1974 and in its place the existing Statistics course Stat 102 with 2+1 credits be included.

ded in the curriculum requirement of B.V.Sc. students admitted prior to 1974 and for those who have not yet completed Stat 301.

5. The Academic Council approved Kannada 501 (1+2 credits), post-graduate course.

6. The Academic Council approved the course curricula and course outlines for B.Sc. (Sericulture) degree programme.

7. The Academic Council approved the following two postgraduate courses in Forestry :

1. F.501 — Improvement of Forest Trees
2. F.502 — Taxonomy of Forest Trees.

8. The Academic Council approved the proposal to modify credit hours of the courses CT 102 from 2+1 to 1+2 credits prescribed for B.H.Sc. degree programme.

9. The Academic Council approved the proposal to change the credit hours of the course 'Fundamentals of Nutrition - F. N. 104 from 2+1 credits to 3+1 credits and 'Applied Nutrition' F. N. 204 from 1+2 to 0+2 credit hours.

10. The Academic Council approved the three postgraduate courses in Animal Nutrition namely, A. N. 518, A. N. 519 and A. N. 520.

11. On the recommendations of the Board of Studies of the Faculty of Animal Science, the Academic Council approved the renumbering of the undergraduate courses in the Department of Aquatic Biology as given below :

<i>Course title</i>	<i>Credit hours</i>	<i>Existing course No.</i>	<i>Revised course No.</i>
Limnology I	3+1	Aq. Biol 201	Aq. Biol 101
Limnology II	2+1	Aq. Biol 202	Aq. Biol 102
Marine Biology I	2+1	Aq. Biol 203	Aq. Biol 103
Marine Biology II	3+1	Aq. Biol 204	Aq. Biol 201
Benthic Ecology	1+1	Aq. Biol 205	Aq. Biol 104

12. The Academic Council approved the modified course for B.Sc, (D. T) — D. C. 401 — Chemical quality control of milk and milk products, 1+1 credits in place of the existing course D. C. 401 — Legal standards and regulations relating to milk and milk products 2+0 credits.

13. The Academic Council decided to delete the course P.Sc. 103, 1+1 credits from the schedule of courses to be offered to B.F.Sc. students and to



add the new course F. Econ 302 — Fishery Planning, Finance and Management with 1 + 1 credits to the schedule of courses to be offered to B.F.Sc. students.

14. The Academic Council approved the proposal to bifurcate the existing course D.E. 302 — Engineering Drawing and Workshop Technology, 1 + 3 credits for B.Sc. (D. T) programme into two courses namely, D. E. 103 — Engineering Drawing with 0 + 2 credits and DE 302 — Workshop Technology with 1 + 1 credits along with the course outlines.

### **(c) Board of Studies**

The Boards of Studies of the Faculty of Agriculture, Faculty of Animal Science and Faculty of Basic Sciences and Humanities held 2, 3 and 3 meetings, respectively during the period under report.

#### **Faculty of Agriculture**

1. The Board of Studies decided that only one common tour be presented for the undergraduate students in B.Sc. (Agri), B.Sc. (Hort), B.Sc. (Agril. Mark. & Cooperation) and B. Sc. (Seric) during the entire course and the study tour may be limited to a visit to important Agricultural Research Stations/ Institutions in the Southern States viz., Andhra Pradesh, Tamil Nadu and Kerala including Karnataka.

Such of the students desirous of going on educational tour on their own, without any financial commitment on the part of the University, may be permitted to go on all India tour during trimester break in the final year. Assistance of teachers as leaders for such tours may be provided. The minimum number of students for such tours should be more than 20. This may be given effect to from the academic year 1983-84.

2. The Board of Studies accepted the proposal for the new courses in Forestry namely SF 501 and SF 502.

3. The Board of Studies approved the course SF 402 Forest Eco-system and Environmental Conservation with 2 + 1 credits.

4. The Board of Studies was of the opinion that the relevant provision of the regulations regarding academic probation could be deleted.

5. The Board of Studies approved the proposal to recognise Sericulture as a separate Department at both Hebbal and Dharwad Campuses.

6. The Board of Studies approved the new postgraduate course : Seed Tech. 523.

7. The Board of Studies decided to recommend to the Academic Council the following regulation :

“Any undergraduate student, whose Cumulative Grade Point Average at the end of his/her sixth or subsequent trimester (in the case of four years degree programme) and third or subsequent trimester (in the case of 3 years Degree/Diploma programme) is less than 1.5/4.00, shall cease to be on the rolls of the University in the particular degree/diploma programme, he/she is pursuing”.

***Faculty of Animal Science***

1. The Board of Studies approved the modification to the existing D. C. 401 course for B. Sc. (D. T.) students.

2. The Board of Studies agreed that B.Sc. (Agri) students who wants to take up Master's Degree in Poultry Science should undergo one more undergraduate course P. Sc. 102, 2+1 credits. The Poultry Science course must be offered as one of the electives in B.Sc. (Agri) curriculum and those students who have taken the above course as one of the electives must be made eligible for admission to Master's degree in Poultry Science.

3. The Board of Studies agreed to the proposal for starting Ph. D. degree programme in Dairy Technology, Dairy Microbiology and Dairy Chemistry Departments of Dairy Science College and recommended the same for approval of the Academic Council.

***Faculty of Basic Sciences and Humanities***

1. The Board of Studies approved the starting of M. Sc. degree programme in Agricultural Chemicals and recommended it to the Academic Council for its decision.

2. The Board of Studies approved the starting of Master's degree programme in Rural Sociology and recommended to the Academic Council for consideration.

3. The Board of Studies approved the new postgraduate courses in Statistics namely Stat. 540 — 2+1 credits, Stat. 541 — 2+1 credits, Stat. 542 — 2+1 credits, Stat. 543 — 2+1 credits, Stat 544 — 2+1 credits and Stat 545 — 2+1 credits.

R. KRISHNAPPA  
*Registrar*

## PART II

### TEACHING

#### A. General

The outturn of graduates, number of students admitted during the year and scholarships awarded for various courses are presented below :

##### (i) Outturn of graduates

College	Course	No. completed
Agricultural College, Hebbal	Ph.D.	29
	M.Sc. (Agri)	104
	M.Sc. (Hort)	13
	M.H.Sc.	3
	B.Sc. (Agri)	139
	B.Sc. (Hort)	23
	B.Sc. (Agril. Mark. & Coop)	13
Veterinary College, Hebbal	Ph.D.	3
	M.V.Sc.	21
	M.Sc.(D.Sc.)	9
	B.V.Sc.	87
Agricultural College, Dharwad	Ph.D.	4
	M.Sc. (Agri)	73
	B.Sc. (Agri)	76
	B.Sc. (Agril. Mark. & Coop)	14
Fisheries College, Mangalore	M.F.Sc.	12
	B.F.Sc.	31
Rural Home Science College, Dharwad	M.H.Sc.	5
	B.H.Sc.	15
Agricultural Engineering Institute, Raichur	DAE	14
Total		688

##### (ii) The number of students admitted

1. B.Sc. (Agri)	288
2. B.Sc. (Hort)	35
3. B.Sc. (Agril. Mark. & Coop)	31

4.	B.Sc. (Seri)	22
5.	B.H.Sc.	40
6.	B.V.Sc.	118
7.	B.Sc.(D.T)	17
8.	B.F.Sc.	28
9.	D.A.E.	20
10.	M.Sc. (Agri)	146
11.	M.Sc.	85
12.	M.Sc (Hort)	16
13.	M.H.Sc.	4
14.	M.V.Sc.	21
15.	M.Sc. (D.Sc.)	16
16.	M.F.Sc.	21
17.	Ph.D.	78

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**(iii) Students strength at various Colleges and Institutions**

College	Course	No. on Roll
1	2	3
Basic Sciences & Humanities College, G.K.V.K.	M.Sc.	8
	B.Sc. (Agri)	150
	B.Sc. (Agril. Mark. & Coop)	17
	B.V.Sc.	118
	B.Sc.(D.T)	17
	B.Sc. (Hort)	35
	B.Sc. (Seri)	22
Agricultural College, Hebbal	Ph.D	114
	M.Sc. (Agri)	163
	M.Sc.	35
	M.Sc. (Hort)	89
	B.Sc. (Agri)	622
	B.Sc. (Agril. Mark. & Coop)	66
	B.Sc. (Hort)	122
	B.Sc. (Seri)	19
	Ph.D.	5
	M.V.Sc.	44
Veterinary College, Hebbal	M.Sc.(D.Sc.)	28
	B.V.Sc.	472
	B.Sc.(D.T)	57

1	2	3
Agricultural College, Dharwad	Ph.D.	57
	M.Sc. (Agri)	122
	M.Sc.	49
	B.Sc. (Agri)	483
	B.Sc. (Agril. Mark. & Coop)	73
Rural Home Science College, Dharwad	M.H.Sc.	11
	M.Sc.	3
	B.H.Sc.	94
Fisheries College, Mangalore	Ph.D.	1
	M.F.Sc.	38
	B.F.Sc.	122
Agricultural Engineering Institute, Raichur	D.A.E.	68
Total		3324

#### (iv) Convocation

The Eighteenth Convocation of the University was held at the Veterinary College, Hebbal, on 9th March 1984. A total of 745 candidates took various degrees as follows :

Sl. No.	Degree	In person	In absentia	Total
1.	Ph. D.	23	12	35
2.	M.Sc. (Agri.)	105	75	180
3.	M.Sc. (Hort)	8	4	12
4.	M.H.Sc.	1	3	4
5.	M.V.Sc.	19	13	32
6.	M.Sc. (D.Sc.)	6	3	9
7.	M.F.Sc.	3	12	15
8.	B.Sc. (Agri)	133	109	242
9.	B.Sc. (Hort)	19	8	27
10.	B.H.Sc.	6	15	21
11.	B.V.Sc.	60	49	109
12.	B.F.Sc.	2	27	29
13.	B.Sc. (Agril. Mark. & Coop)	11	19	30
Total		396	349	745

Gold medals and prizes were awarded to 50 candidates for outstanding performance in their studies.

The Convocation was presided over by His Excellency Shri A. N. Banerji, the Governor of Karnataka and Chancellor of the University. Mr. B. Shivaraman, Member, Commission on Centre-State Relations and Chairman, Central Silk Board, delivered the Convocation address.

**(v) Scholarship Awarded during 1983-84**

Name of the College	University of Agricultural Sciences				GOI & ICAR	UNDP
	Merit	General	Fee concessions	Loan		
1. <i>Agricultural College, Hebbal</i>						
i. Undergraduate						
(a) B.Sc. (Agri)	8	48	100	9	87	
(b) B.Sc. (Hort)	8	8	10	1	13	
(c) B.Sc. (Agril. Mark. & Coop)	8	4	8	2	12	
(d) B.Sc. (Sericulture)	4	2	2	1	4	
(e) Dairy Technology	6	-	-	-	3	
ii. Postgraduate	40	4	4	-	60	20
2. <i>Agricultural College, Dharwad</i>						
i. Undergraduate						
(a) B.Sc. (Agri)	8	36	10	6	37	
(b) B.Sc. (Agril. Mark. & Coop)	8	4	2	1	8	
ii. Postgraduate	23	-	-	-	21	
3. <i>Veterinary College, Hebbal</i>						28
i. Undergraduate	16	42	52	5	51	
ii. Postgraduate	18	-	8	4	3*	
4. <i>Fisheries College, Mangalore</i>						
i. Undergraduate	8	8	8	2	10	
ii. Postgraduate	4	-	-	-	2	
5. <i>Home Science College, Dharwad</i>						
i. Undergraduate	6	4	-	1	7	
ii. Postgraduate	2	-	-	-	-	
6. <i>Agril. Engineering Institute, Raichur</i>						
i. Diploma	6	3	2	-	-	

\* Under improvement of Teaching Faculty.

R. KRISHNAPPA  
Registrar

## B. Reports of the Teaching Institutions

### I. College of Postgraduate Studies, Dharwad

The programme of Postgraduate Instruction in the University consists of Master's degree in Agriculture, Veterinary, Fisheries, Horticulture, Home Science, Dairy Science, Poultry Science, Statistics, Biochemistry and Sericulture and Doctor of Philosophy (Ph.D.) in Agriculture and Animal Sciences, Postgraduate programmes in Agriculture are offered at GKVK, Hebbal, as well as Dharwad Campuses. The Postgraduate courses in Animal Science faculty are offered at Hebbal (Animal Sciences) and Mangalore (Fisheries Sciences) Campuses.

*Special lectures:* The following special lectures were arranged for the benefit of postgraduate students :

<i>Name of the speaker</i>	<i>Date</i>	<i>Topic</i>
1	2	3
Prof. M. A. Muralidharan IARI, New Delhi	21-11-83	Current Status of Research in Agril. Marketing in India
Prof. D. K. Bahl IARI, New Delhi	21-11-83	The Problems of Regression on Analysis
Dr. P. K. Aiyasamy TNAU, Coimbatore	3-6-83	Growth Rates in Agriculture in India
Dr. R. D. Ghodke ICRISAT, Hyderabad	24-3-84	Evaluation of Dry Land Technology
Dr. T. S. Walker ICRISAT, Hyderabad	24-1-84	Management as a Factor of Production
Mr. S. Kusumakar Managing Director, KSSC Bangalore	25-1-84 May 83	Food Policy Structural Activities of KSSC
Mr. Nazeer Ahmed Deputy Director of Seed Certification	July 83	Cotton Seed Production and Seed Certification in Karnataka
Mr. N. P. Desai, Rtd. Jt. Director of Agri., Bangalore	13-3-84	Seed Certification in Karna- taka
Dr. K. L. Sharawat, Soil Scientist ICRISAT, Hyderabad	16-6-83	Diagnosis of Iron Deficiency in Groundnut
Dr. N. Sethunathan Senior Scientist C.R.R.I., Cuttack	3-6-83	Current Status of Pesticide Degradation Research in C.R.R.I.

1	2	3
Dr. J. V. Possingham, Chief C.S.I.R.O., Dn. of Hort. Research, Adelaide, South Australia, UNDP/FAO Consultant	9-8-83	Fruit Growing Research in Australia
Dr. T. Venkatarayappa, Dn. of Horticulture, GKVK, Bangalore	11-2-84	His experiences in Canada
Dr. M. V. Rao D.D.G. ICAR, New Delhi	4-1-84	Plant Breeding on Research Strategies in India
Dr. J. V. Goud, Prof. and Head Dept. of Agril. Botany	12-1-84	Information Regarding 6th Wheat Genetics Symposium held at Japan
Dr. S. Ramanujam Head, Dept. of Genetics IARI, New Delhi	27-3-84	Recent Trends in Genetic Research
Dr. Sayed Zaki	28-7-83	Brucellosis in Animals and Man
Dr. S. B. P. Rao CEO, ICMF, Bombay	28-10-83	Problems and Prospects of Cotton Production in India
Dr. G. B. Singh A.D.G., ICAR, New Delhi		Research Priority for Resource Management in Seventh Plan
Dr. R. P. Singh Project Director (DL) Hyderabad	6-2-84	Problem and Prospects of Dry Farming in India
Dr. V. C. Baligar Prof. of Soil Sci., West Virginia Univ., USA	26-3-84	Crop Production Research in Central Brazil
Prof. Shivaji Ramalingam Prof. of Parasitology University of Malaya	16-12-83	Research on Mosquitoes and Mosquito Borne Diseases in Malaysia and Some Pacific Islands
Dr. K. Nagarajan	5-1-84	Biology and Control of Ora- banche, a Complete Para- site on Tobacco
D . V. G. Rao	24-3-84	Highlights of Research at MACS, Poona



1	2	3
Dr. M. B. Thippannavar Director, ISARD, Dharwad	10-3-83	Planning and Implementation of Programme in Inst. for Studies on Agricultural and Rural Development, Dharwad
Dr. B. S. Giriappa Gowdar Dept. of Criminology, Karnataka Univ., Dharwad	26-3-83	Science against Crime
Dr. S. N. Singh, Sr. Scientist IARI, New Delhi	30-3-83	Challenges of Extension in the Coming Years
Dr. S. V. Supe, PKV, Akola Maharashtra	8-8-83	Measurement Techniques in Extension Research
Dr. D. M. Nanjundappa Vice Chancellor, Karnatak University, Dharwad	23-8-83	Extension Education as a Means of Linking Education with Development
Mr. Viswanath Koliwad Organising Secretary, Family Planning Association of India Dharwad	10-11-83	Administration of Family Planning Association of India
Mr. Naik, Personnel Manager M/s Kirloskar Electrical Co. Ltd., Hubli	17-11-83	Organisation and Administra- tion of Kirloskar Elec. Co., Hubli
Mr. N. Shivanna, Principal Agril. Officer, Dharwad	24-11-83	Management of Agricultural Extension in Dharwad Dist.
Mr. B. A. Reddy, Chief Engineer Command Area Development Authority (CADA), Belgaum and his team	8-12-83	Different Aspects of Organisa- tion and Administration of CADA
Dr. (Mrs.) Leela Phadnis, Director of Instruction (R.H.Sc.), Dharwad	19-12-83	Administration of the UAS, Bangalore
Mr. M. B. Hasalkar, Project Officer and Dr. A. N. Kabbur Leader, Medical Project, India Development Service (IDS), Dharwad	5-1-84	Different Aspects of Organisa- tion and Administration in IDS

1	2	3
Dr. Paul Jairaj, Scientist, Univ. School of London, U.K.	18-5-83	Dissecting Aortic Aneurysm
Dr. Funio Matsumura Pesticide Research Centre Michigan State Univ., East Lansing, Michigan, U.S.A.	21-4-83	Biocontrol of Insect Pests of Crops and Pesticide Degradation
Dr. N. Sethunathan CRRl, Cuttack	6-5-83	Pesticide Microbiological Work at CRRl
Dr. G. S. Venkataraman IARI, New Delhi	6-9-83	Nitrogen Fixation by BGA and Indo-US Project
Dr. Lloyd Frederick and Mrs. Shirley Frederick, AID Washington, D.C.	20-1-84	Prospectives of Biological Nitrogen Fixation Research and Indo-US Project
Dr. Donald L. Keister C. F. Kettering Res. Lab. Yellow Spring, Ohio	9-2-84	Energy Requirements of Bio- logical Nitrogen Fixation and Indo-US Project
Dr. Arun K. Agarwal J. N. University, Delhi	-do-	-do-
Dr. Jake Halliday NifTAL, Hawaii	10-2-84	Nitrogen Fixation by Tropical Legumes and Indo-US Project
Dr. H. D. Gross, Crop Science Dept., North Carolina State University, Raleigh	11-2-84	Physiological Aspects of Nitrogen Fixation in Le- gumes
Dr. V. Ranga Rao C. F. Kettering Res. Lab. Yellow Spring, Ohio	13-2-84	Free Living Nitrogen Fixation in Rhizobia
Dr. D. T. Lingappa and Dr. (Mrs.) Yamuna Lingappa College of the Holy Cross Worcester, M.A.	27-2-84	Biogas Production from Urban Waste
Dr. N. S. Subba Rao, Head, Division of Microbiology IARI, New Delhi	12-3-84	BNF Project and Indo-US Project Activities
Dr. G. K. Murthy US Public Health Services	2-5-83	Food Borne Intoxication

1	2	3
Dr. Fumio Matsumara, Prof. and Director, Pesticide Res. Centre Michigan State University, USA	20-4-83	Microbial Degradation of Pesticides
Dr. Davis, Director, Stored Produce Insect Research and Development Lab., USDA, Savanna, Georgia	26-4-83	The Use of Mineral Salts in Blended Cereal Foods for Insect Control
David L. Qearson, Assoc. Prof. of Biology, Pennsylvania State Univ.	11-6-83	Tiger Beetles
Dr. Radha D. Kale, Asst. Prof. Dept. of Zoology, UAS	23-7-83	Potentials of Vermiculture
Dr. Sonny Ramaswamy, Asst. Prof. of Entomology, Mississippi, USA	28-12-83	Insects have Call Girls
Dr. H. D. Blocker, Prof. of Entomology, Kansas Univ., USA	9-1-84	1. Entomological Research at Kansas State University
	11-1-84	2. Methods in Systematic Analysis
	13-1-84	3. Systematic Res. in Leaf-hoppers

3. Number of students who have secured ICAR fellowships :

	Hebbal	Dharwad
Agricultural Economics :		
ICAR Fellowship	4	4
Karnataka State Agril. Marketing Board Fellowship	4	4
Seed Technology :		
Merit Scholarship	1	1
ICAR Scholarship	1	3
KSSC Sponsored Scholarship	1	
Chemistry and Soils :		
UNDP	1	
Merit Scholarship	1	2
Long-term Fertilizer Scheme	1	
CADA	2	
Potash Research Fellowship	1	
Graduate Assistantship	2	2
Fellowship		3

Horticulture :	Hebbal	Dharwad
UNDP Fellowship	20	10
ICAR Fellowship	10	3
UAS Merit Scholarship		3
HRDP		1
ICAR Faculty Improvement Scholarship		2
Agricultural Botany :		
Fellowships		7
ICAR Fellowship		6
Aspee		1
Graduate Assistantship		1
UAS Merit Scholarship		2
Agricultural Microbiology :		1
UAS Merit Scholarship	4	
ICAR Fellowship	4	
General Scholarship from Govt. of India (Cultural exchange programme with Sudan)	1	
Science Talent Scholarship (ICAR)	1	
BNF Fellowship	1	
UNDP Fellowship	2	
Agricultural Entomology :		
ICAR Fellowship		7
Graduate Assistantship		2
Plant Pathology :		
ICAR Fellowship		11
UNDP Fellowship		1
UAS Merit Scholarship		2
Aspee Fellowship		1
Biochemistry :		
UAS Merit Scholarship	1	
Agricultural Extension :		
ICAR Fellowship	2	
Fellowship from CADA	1	
Graduate Assistantship	2	
Merit Scholarship	2	
Agricultural Engineering :		
UAS Merit Scholarship		1
Statistics :		
UAS Merit Scholarship	3	
Marketing Board Scholarship	1	

<b>Animal Nutrition :</b>	<b>Hebbal</b>	<b>Dharwad</b>
Merit Scholarship of UAS	2	
<b>Animal Genetics and Breeding :</b>		
UAS Merit Scholarship	2	
ICAR Senior Fellowship	2	
Students Deputed	2	
<b>Gynaecology and Obstetrics</b>		
ICAR Fellowship	1	
UAS Merit Scholarship	1	
<b>Pharmacology :</b>		
Junior ICAR Fellowship	1	
UAS Merit Scholarship	1	
National Loan Scholarship	1	
<b>Veterinary Pathology :</b>		
ICAR Fellowship	2	
UAS Merit Scholarship	1	
M/s. Yarana Feed Scholarship	1	
<b>Veterinary Physiology :</b>		
FAO Fellow from Afghanistan	1	
Dairy Microbiology	3	
<b>Dairy Medicine</b>		
UAS Scholarship	1	
Dairy Microbiology	3	
<b>Dairy Technology</b>		
UAS Merit Scholarship	2	
ICAR Scholarship	2	

*4. Award, medals, merit certificates given to the PG students passing out during the year :*

Name	Degree	Department	Award
1	2	3	4
a) K. Sudhir		Chemistry and Soils	UAS Gold Medal
b) B. S. Nandish	M.Sc. (Agri.)	Seed Technology	-do-
c) Mr. R. S Hegde	M.Sc. (Agri.)	Agronomy	-do-
d) Dr. S. V. Hegde		Agril. Microbiology	-do-
e) Mr. M. N. Upadyaya and Miss Anne Mathews			UAS Gold Medal and Paul's Merit Prize

1	2	3	4
f) Mr. B. L. Dinakar		Agril. Botany	UAS Gold Medal
g) Mr. R. N. Gadag		-do-	-do-
h) Mr. S. D. Biradar and Mr. B. L. Dinakar			Merit Scholarships.
i) Mr. R. G. Bhat	M.Sc. (Agri.)	Plant Pathology	UAS Gold Medal
j) Dr. P. Venkata- ramaiah	Ph.D.	Agril. Extension	-do-
k) Mr. N. B. Rotti	M.Sc. (Agri.)	Agril. Extension	General Merit
l) Dr. H. N. Narasimha murthy		Animal Genetics and Breeding	UAS Gold Medal
m) Dr. M. N. Dixit		Gynaecology & Obstetrics	-do- -do-
n) Dr. Balakrishna Rao		Vet. Pharmacology	-do-
o) Dr. T. Venugopal		Vet. Medicine	-do-

5. Names of students who were selected as IAS, IPS and IFS officers and commissioned officers in the army, navy, air force, etc.

1. Mr. B. Shivanagouda	IFS	(Agril. Botany Student)
2. Mr. R. G. Kalaghatigi	IFS	-do-
3. Mr. G. A. Kinhal	IFS	-do-
4. Mr. B. J. Hosamath	IFS	-do-
5. Mr. G. J. Teggi	IFS	-do-
6. Dr. G. M. Kannappa Shetty	Veterinary Officer in the army	Vet. Pathology Student

#### Completion of Degree Programme :

The following students have completed their P. G. Degree programme. The topics of these are as follows :

Name of the student/Major advisor	Topic of the thesis
1	2

#### Ph.D.

##### Agronomy

1. K. B. Abdulkhader  
G. V. Havanagi  
Effect of depth of irrigation based on cumulative pan evaporation, mulching and drip irrigation with fertilizer levels on growth and yield of arecanut (*Areca catechu* L.)

1	2
2. M. Sannamarappa K. Shivashankar	Interaction of intercrops in maximising utilization of resources in arecanut stands ( <i>Areca catechu</i> L.) in the maidan tracts of Karnataka.
3. K. Subrahmanyam L. A. Dixit	Studies on plant response to coated superphosphate in cowpea-sorghum cropping sequence.
4. K. T. Krishne Gowda A. Bommegowda	Agronomic investigations on the problem of poor seed set and yield in sunflower.
<b>Agricultural Botany</b>	
5. K. N. Ganeshaiah G. Shivashankar	Host-genotypic variation for symbiotic nitrogen fixation in cowpea ( <i>Vigna unguiculata</i> (L.) Walp.)
6. Basavaraj M. Khadi J. V. Goud	Genetic studies on ascorbic acid content, fruit yield, yield components and accumulation of some mineral elements in chilli ( <i>Capsicum annum</i> L.)
<b>Crop Physiology</b>	
7. T. G. Prasad K. S. Krishna Sastry	Physiological investigations into the causes for low productivity in field bean ( <i>Lablab purpureus</i> L. Sweet).
8. C. K. Mathai K. S. Krishna Sastry	Growth and yield analysis in black pepper varieties ( <i>Piper nigrum</i> L.) under different light conditions.
<b>Agricultural Economics</b>	
9. B. K. Barooah J. V. Venkataram	Farm financial management by farmers in Sibsagar district, Assam.
10. K. N. Ranganatha Sastry R. Ramanna	Growth dimensions of agriculture in Karnataka.
<b>Chemistry and Soils</b>	
11. Rosalind Michael M. K. Badiger	Studies on some aspects of micronutrients of plants and in animal nutrition and trace elements as phytotoxicants.
12. C. A. Sreenivas Murthy P. B. Deshpande	Studies on the effect of industrial effluents on soil properties and crop growth.

1	2
13. S. G. Patil P. B. Deshpande	Adsorption, persistence and deputation of dimethoate and carbendazim in soil, water and their residues in greengram harvest.
<b>Agricultural Entomology</b>	
14. S. Srinivasan S. Lingappa	Studies on crop loss by thrips <i>Tabaci lindeman</i> (Thysanoptera : Thripidae), its chemical control and the dissipation of monocrotophos and dimethoate in onion.
<b>Agricultural Extension</b>	
15. Y. T. Hiriyannaiah M. K. Sethu Rao	A study on rationality in decision-making by sugarcane cultivators of Mandya district in Karnataka State.
16. R. Muraleedhara Prasad M. K. Sethu Rao	Comparative analysis of achievement motivation of rice growers in three states in India.
17. B. N. Renukaradhya M. K. Sethu Rao	A critical study on farmers training programme in selected common areas of Karnataka State.
18. P. Venkataramaiah M. K. Sethu Rao	Development of a socio-economic status scale for farm families of North Karnataka.
<b>Agricultural Microbiology</b>	
19. K. S. Shetty R. B. Patil	Bacteriological and serological determination of pathogenic variability of <i>Xantomonas campestris</i> PV <i>orgzae</i> .
20. S. V. Hegde P. V. Rai	Symbiotic nitrogen fixation and transporting to <i>Cajanus cajan</i> (L.) Millsp.
<b>Horticulture</b>	
21. S. Ramachandran Nair Foza Singh	Seed germination and tissue culture studies in orchids.
22. K. R. Melanta U. V. Sulladmath	Studies on propagation of cashew ( <i>Anacardium occidentale</i> L.) by cuttings.
23. M. M. Khan U. V. Sulladmath	Studies on the vegetative propagation of sandal woods ( <i>Santalum album</i> L.) by cuttings.



1	2
24. D. L. Maheswar R. Krishnan	Pachytene analysis, interspecific hybridization and response to chromosomal doubling in two steroid bearing solanum species – <i>Solanum viarum</i> Dunal and <i>Solanum mammosum</i> Linn.
25. D. Nandakumar R. Krishnan	Intervarietal hybridization and induction of auto-tetraploids in steroid-bearing solanum species.
26. B. B. Madalageri K. M. Bojappa	Studies on heterosis, combining ability and gene action for quantitative characters in bulb onions ( <i>Allium cepa</i> var. <i>cepa</i> L.)
27. Surupa Deva Shikamany K. L. Chadha	Effect of time and different doses of N and K on growth, yield and quality of Thompson seed less grape ( <i>Vitis vinifera</i> L.)

#### Plant Pathology

28. Kenchaiah H. R. Reddy	Studies on <i>Pythium aphanidermatum</i> (Edson) Fitzp. causing campling-off and fruit rot of tomato with special reference to efficacy of systemic fungicides.
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#### Animal Genetics and Breeding

29. Dr. K. Krishna Reddy A. V. Rai	Genetic and non-genetic studies on growth and reproduction in Mandya and Vellore sheep and their halfbreds with Dorset horn and Suffolk breeds.
30. Dr. K. C. Raghavan A. V. Rai	Genetic studies on growth and immunoglobulin levels in buffaloes.

#### M.Sc. (Agri.)

#### Agricultural Economics

1. A. Meenakshi R. Ramanna	An evaluation of agricultural market information system and its impact on the farm economy of Shimoga district, Karnataka.
2. N. S. Kumar C. Nanjareddy	Economics of mixed farming in Sidlagatta taluk, Kolar district.

1	2
3. G. P. Gracy J. V. Venkataram	An analysis of performance of Primary Agricultural Credit Societies in different States of India.
4. K. Somanath J. V. Venkataram	An evaluation of investment in tractors by farmers in Hoskote taluk of Bangalore district, Karnataka.
5. M. G. Bhat K. C. Hiremath	An economic enquiry into the adoption of high yielding cereal varieties in Karnataka.
6. Y. C. Kademani K. C. Hiremath	Economics of inter-cropping in Bijapur and Dharwad districts in Karnataka.
7. G. Padmanabha Reddy K. C. Hiremath	Instability in cereal production and new technology in Karnataka State – A district level analysis.
8. S. S. Patil K. C. Hiremath	Marketing efficiency of food grains in Karnataka – A case study of jowar in Bijapur district.
9. T. R. Ugalwat K. C. Hiremath	An economic analysis of marketing of groundnut in Bijapur district, Karnataka State.
10. S. B. Hosamani K. C. Hiremath	An economic analysis of production and marketing of cotton – A case study of small farmers in North Karnataka.
11. N.R. Mamle Desai K. C. Hiremath	An economic analysis of marketing of tur in Gulbarga district in Karnataka.
12. D. S. Lokamanya K. C. Hiremath	An economic evaluation of the impact of modern technology in mixed plantations in Sirsi taluka of Uttara Kannada District – A case study.
13. M. Mahadevappa K. C. Hiremath	An economic analysis of multiple cropping in Bhadra reservoir project area – A case study.
<b>Seed Technology</b>	
14. N. M. Patil M. Mahadevappa	Investigation on the techniques of hybrid seed production in rice ( <i>Oryza sativa</i> ).
15. B. S. Nandish M. Mahadevappa	Influence of mother plant nutrition and spacing on the planting value of rice seeds.

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16. B. C. Uma Maheswara M. Mahadevappa	Investigation on seed production in rice. Effect of production, location and seed density on the planting value.
17. D. K. Kurki S. J. Patil	Manipulation of pollen parent for increasing hybrid seed yield in maize ( <i>Zea mays</i> L.)
18. K. P. Maheswarappa K.G. Shambulingappa	Investigation on the hybrid seed production and performance in sunflower ( <i>Helianthus annuus</i> L.).
19. Jambanna S. Aili G. N. Kulkarni	Effect of fertilizer doses and growing seasons on seed production and quality of sorghum cultivar SB 1079 and SB 905.
20. S. B. Kotbagi G. N. Kulkarni	Effect of various levels of phosphorus and gypsum application on seed yield and quality in groundnut.
21. M. Shekargowda G. N. Kulkarni	Effect of sulphur and zinc on seed yield, quality and storability in sunflower.
22. M. R. Eshanna G. N. Kulkarni	Effect of pre-soaking of maize seeds on germination, seedling vigour and growth.
23. S. B. Godi G. N. Kulkarni	Studies on graded doses of N and P in relation to production, quality and physiological maturity of chilli seed.
24. B. P. Manjunath Reddy G. N. Kulkarni	Effect of foliar application of zinc and iron on yield and seed quality in algalga.
25. A.S. Channaveera Swamy S.D. Shashidhara	Effect of shelling methods and parameters on seed quality in maize.
<b>Horticulture</b>	
26. B. Raju H. V. Pattanshetty	Effect of mulches and irrigation on the growth and yied of cardamom.
27. R. Krishna Manohara A. B. Pal	Inter-relationship between powdery mildew resistance and other economic traits in pea ( <i>Pisum sativum</i> L.).
28. P. Narayanaswamy K.R. Thimma Raju	Studies on blossom biology, sex ratio and fruitset in certain cultivars of mango ( <i>Mangifera indica</i> L.)

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29. K. V. Uma Devi K.R. Thimma Raju	Studies on the embryogenesis in monoembryonic citron ( <i>Citrus medica</i> L.) and polyembryonic khagzi lime ( <i>Citrus aurantifolia</i> Swing).
30. B. C. Bharali A. G. Huddar	Studies on extension of storage life of mango fruits ( <i>Mangifera indica</i> L.) cv. Dushehari and Mallika.
31. Shameekumar Patil N. Vijayakumar	Studies on growth and flowering in 'Limoneria Lisbon' and 'Seville Lemon' ( <i>Citrus limon</i> (Linn) Burmann).
32. G. Gopinath B. B. Madalgeri	Studies on the inheritance of bacterial wilt ( <i>Pseudomonas solanacearum</i> E. F. Smith). Resistance and characters of agronomic importance in brinjal ( <i>Solanum melongena</i> L).
33. Loknath Deoju U.V. Sulladmath	Bud burst in grapevine Cv. "Thompson Seedless" ( <i>Vitis vinifera</i> L.) as influenced by time of pruning and certain chemicals.
34. H. Shivanna N. Vijayakumar	Studies on the effect of pre-treatments and growth regulators on rooting of jack ( <i>Artocarpus heterophyllus</i> L.) by stem cuttings.
35. S. Keshava Murthy A. G. Huddar	Studies on storage behaviour of banana fruits cv. Dwarf cavendish as influenced by post-harvest treatments.
36. H. Sidda Reddy K. S. Krishnappa	Effect of Mixtalol (1-Triacontanol) on growth, yield and tuber quality of two cultivars of potato ( <i>Solanum tuberosum</i> L.)
37. Y. Raghu Ramulu Shantha Krishnamurthy	Storage studies in Coorg madarins ( <i>Citrus reticulata</i> Blanco).
38. K. R. Neelakanta Murthy R. Krishnan	Studies on <i>Catharanthus roseus</i> (L) G. Don.
<b>Agronomy</b>	
39. Basavaraj S. Pavate V. S. Patil	Response of sorghum genotypes to different fertility levels during summer season.

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40. S. Sreenivasa A. Bommegowda	Studies on the agronomic practices for the production of tomatoes.
41. M. Munirangappa B. G. Rajashekhar	Intercropping of fodders in finger millet ( <i>Eleusine coracana</i> Gaertn.)
42. Rajendra David M. K. Munegowda	Utilization of paper mill effluent for lucerne ( <i>Medicago sativa</i> L.) production at Bhadravathi.
43. V. N. Hegde Gururaj Hegde	Effect of incorporation of intercropped legumes on yield and quality of sugarcane.
44. G. S. Manjunatha M. N. Sheela- vanthar	Response of chick pea ( <i>Cicer arietinum</i> L.) to row spacings and phosphorus levels under irrigated conditions.
45. Dayanand M. M. Hosamani	Studies on weed control in drill sown upland paddy ( <i>Oryza sativa</i> L.)
46. H. B. Gangadharaiah A. Bommegowda	Productivity of contrasting rice ( <i>Oryza sativa</i> L.) plant types at varied levels of fertility and spacing.
47. Govind V. Nayak B. G. Rajashekhar	Relative efficiency of cowpea ( <i>Vigna unguiculata</i> (L.) Walp) and horsegram ( <i>Macrotyloma uniflorum</i> (Lam.) Verdc.) under late <i>kharif</i> .
48. Lokanatha H. Malligawad B. T. Kudasomannavar	Effect of phosphorus, iron and zinc levels on fodder yield and quality of lucerne ( <i>Medicago sativa</i> L.) under irrigated conditions
49. Subraya S. Bhat G. N. Kulkarni	Response of pigeon pea ( <i>Cajanus cajan</i> L.) genotypes to different dates of sowing and their comparison with bengalgram ( <i>Cicer arietinum</i> L.) under residual moisture conditions.
50. A. M. Annaiah L. A. Dixit	Agronomic studies on the utilization of paper mill effluent in the production of rice ( <i>Oryza sativa</i> L.)
51. Kumaraiah K. R. Kulkarni	Effect of nitrogen, rhizobium inoculation, lime and phosphorus application on growth and yield of redgram ( <i>Cajanus cajan</i> (L.) Millsp.)

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52. K. P. Janna B. K. Lingegowda	Intercropping studies in finger millet genotypes with redgram.
53. K. Somasekhara V. S. Patil	Response of sorghum ( <i>Sorghum bicolor</i> (L.) Moench) genotypes to different row spacings under irrigation.
54. V. N. Salimath V. S. Patil	Performance of sorghum ( <i>Sorghum bicolor</i> (L.) Moench) genotypes at two row spacings during <i>rabi</i> season under irrigation.
55. G. N. Dhanapal A. Bommegowda	Field studies on the screening of herbicides for dry land crops.
56. Ramesh Bubu G. N. Kulkarni	Effect of scheduling irrigation on growth and yield of sunflower ( <i>Helianthus annuus</i> L.)
57. M. S. Mahabaleswara A. Bommegowda	Chemical weed control in drilled finger millet ( <i>Eleusine coracana</i> Gaertn.) intercropped with row crops.
58. Brahmanand Hegde S. K. Gumaste	Intercropping of fodder legumes in grain sorghum ( <i>Sorghum bicolor</i> (L.) Moench.) CSH-5 under paired row plantings.
59. S. N. Biradar R. A. Setty	Intercropping of safflower ( <i>Carthamus tinctorius</i> L.) with bengalgram ( <i>Cicer arietinum</i> L.) under irrigated conditions.
60. D. D. Gadagi A. S. Prabhakar	Response of irrigated hybrid cotton to dates of sowing and plant population.
61. N. Ravi B. R. Hegde	Influence of planting time and method of establishment on the growth and yield of rainfed ragi ( <i>Eleusine coracana</i> Gaertn.)
62. S. S. Muddemmanavar S. K. Gumaste	Studies on fodder and ratooning abilities of sorghum varieties as influenced by fertilizer levels.
63. Ramesh S. Hegde L. A. Dixit	Effect of fertilizer management practices in chilli ( <i>Capsicum annuum</i> L.) intercropping system in transitional tract of Dharwad.
64. D. Siddalinga A. S. Prabhakar	Effect of quantity and time of application of prilled urea, neem cake coated urea and urea

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	supergranules on growth and yield of maize ( <i>Zea mays</i> L.)
65. D. C. Saundatti B. S. Nadagoudar	Mechanical manipulation of growth as a means of increasing productivity of cotton ( <i>Gossypium hirsutum</i> L.)
66. S. K. Channal V. R. Koraddi	Studies on planting pattern and fertilizer requirement for intercropping of cotton and groundnut under assured rainfall conditions.
67. M. K. Jayaramegowde G. V. Havanagi	Studies on the performance of two sweet pepper ( <i>Capscium annuum</i> L. var. <i>Grossum</i> Send.) varieties under different row spacing and plant population levels.
<b>Agricultural Extension</b>	
68. M. Venkateshappa B. S. Siddaramaiah	A study on communication behaviour and training needs of extension personnel under Training and Visit system in Bangalore district.
69. K. N. Venkatesh Murthy M. B. Channegowda	Relative influence of home visit, leaflet and home visit <i>plus</i> leaflet on the knowledge, attitude and symbolic adoption behaviour of small farmers and big farmers – A field experiment.
70. S. S. Patil M. B. Channegowda	Communication pattern of agricultural researchers at the main station and at the sub-stations of the Regional Research Station, Dharwad, Karnataka State.
71. S. S. Baadgaonkar P. Venkataramaiah	Measurement of farmers knowledge and factors affecting the adoption behaviour of groundnut cultivators of Uttara Kannada district of Karnataka State.
72. M. K. Manandhar J. Sreenivasa Murthy	A study on the impact of farm broadcast among the farmers of Kavre, Palanchok district in Nepal.
73. N. B. Rotti K. M. Jayaramaiah	A study on knowledge and adoption behaviour of sugarcane growers of Belgaum district in Karnataka State.

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74. M. Gurunatha Reddy K. M. Jayaramaiah	A study on adoption behaviour of banana growers of Tungabhadra project area in Karnataka State.
75. G. Kullayi Reddy H. S. Hanumanthappa	A study on management orientation, farming efficiency and consultancy pattern of rainfed groundnut growers in Kolar district of Karnataka State.
76. Basavaraj S. Gavi K. M. Jayaramaiah	An evaluative study on the impact of Small Farmers Development Agency on adoption behaviour, annual income and employment potential of small farmers, marginal farmers and agricultural labourers of Dharwad district.
77. S. V. Kumbar K. M. Jayaramaiah	A study on adoption behaviour and consultancy pattern of grape growers of Bijapur district in Karnataka State.
78. C. S. Torgal K. M. Jayaramaiah	A study on impact of Lab-to-Land programme on adoption behaviour and economic conditions of small farmers, marginal farmers and agricultural labourers.
79. S. Venkataramu M. K. Sethu Rao	A study on adoption behaviour of contact farmers in Mandya district of Karnataka State.
80. Subhasi Kappattanavar K. M. Jayaramaiah	A comparative study on knowledge, adoption behaviour and credit orientation of small, medium and big farmers of Dharwad district in Karnataka State.
81. N. Rajanna M. K. Sethu Rao	A study on training needs of field extension personnel with reference to subject matter areas of plant protection and extension teaching methods in Bangalore district.
82. S. Mahadevaswamy K. T. Ramachandra	An analysis of the procedure followed in organising method demonstration by the Agricultural Assistants of Mysore district, Karnataka.
83. K. R. Mallesha Gowda B. S. Siddaramaiah	Impact of film show and its combination with group meeting on knowledge and symbolic adoption of farmers – A field experiment.



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84.	Srinivas N. Sudi K. M. Jayaramaiah	A study on contact farmers as opinion leaders in T and V system.
85.	K. V. Natikar K. M. Jayaramaiah	An analysis of communication patterns of extension personnel in T & V system of Dharwad district.
86.	B. Nijalingappa K. T. Ramachandra	Evaluation of 'Reshme Krishi' by its sericulture clientele.
87.	K. N. Janardhana M. K. Sethu Rao	Attitude of contact and fellow farmers towards T & V system and their adoption of recommended practices in Bangalore district—Comparative study.
88.	K. N. Prabhakar B. S. Siddaramaiah	A study on the credibility and utilization pattern of sericulture information sources among farmers of Chikkaballapur taluk.
89.	D. Kotresh Naik M. K. Sethu Rao	A study on information source credibility and consultancy pattern of Agricultural Assistants in Bangalore district of Karnataka State.
90.	B. L. Rame Gowda B. S. Siddaramaiah	A study on the rate of adoption and innovativeness of farmers in adopting Indaf-1 ragi and MR-301 paddy varieties.
91.	G. M. Varadaraju M. K. Sethu Rao	A study on communication pattern and information source credibility of contact farmers of Mysore district in Karnataka.
92.	Mukund S. Saraf C. M. Dudhani	A study on adoption behaviour, management orientation and economic performance of farmers in Malaprabha Command Area in Karnataka.
93.	V. Venkatesha Sharma A. Seshadri Iyer	An analysis of the readability, content and usefulness of 'Krishi Vignana' journal by farmers and extension workers.
<b>Agricultural Botany</b>		
94.	N. G. Lakshman Rao K.G. Shambulingappa	Studies on correlation and path-coefficient analysis in sunflower ( <i>Helianthus annuus</i> L.)

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95.	Shrikant M. Hebbal Srikant Kulkarni	Genetic analysis of yield and yield components in cowpea ( <i>Vigna unguiculata</i> (L.), Walp.
96.	K. Chandrashekharappa S. R. Viswanatha	Studies on heterosis and line $\times$ tester analysis of combining ability in grain and forage sorghum crosses.
97.	J. S. Hiremath K. G. Hiremath	Genetic studies on sesamum ( <i>Sesamum indicum</i> Linn.)
98.	M. Byregowda A. Seetaram	Studies on mutation frequency and rectification of defects in four finger millet ( <i>Eleusine coracana</i> Gaertn.) cultivars following gamma irradiation.
99.	Kumar V. Koorse M. S. Sarma	Genetic variability studies in roselle ( <i>Hibiscus sabdariffa</i> L.)
100.	Channarayappa K. Virupakshappa	Response to selection, correlation and path analyses in niger ( <i>Guizotia abyssinica</i> Cass.)
101.	J. Chandra Prakash G. Shivashankar	Gene action and combining ability for oil content, yield and yield components in sesamum ( <i>Sesamum indicum</i> L.)
102.	P. S. Balakrishna G. Shivashankar	Inheritance of yield and quality characters in watermelon ( <i>Citrullus lanatus</i> (Thunb.) Mansf.)
103.	S. G. Hegde K.G. Shambulingappa	Correlations and path analyses in different genotypes of rice ( <i>Oryza sativa</i> L.) under varied spacing and fertility levels.
104.	C. S. Dattananda A. Seetharam	Karyomorphological studies in cultivated, wild and weed forms of the genus Eleusine.
105.	Sudheer Nadiger S. N. Kadapa	Variability and heterosis for tannin content in leaves and boll burst of four cultivated species and hybrids of cotton ( <i>Gossypium</i> spp.)
106.	D. L. Savithramma G. Shivashankar	Studies on induced mutagenesis in winged bean ( <i>Psophocarpus tetragonolobus</i> (L.) DC) through ethyl methane sulphonate.
107.	H. G. Kallesh G. Shivashankar	Path analysis and selection indices in three $F_2$ populations of horsegram ( <i>Macrotyloma uniflorum</i> (Lam) Verdec).

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108. A. S. Thimmappa H. M. Chandrappa	Genetic analysis of quantitative traits in greengram ( <i>Vigna radiata</i> (Linn.) Wilczek).
109. P. Rudraswamy M. Gopalakrishna Rao	Induced mutagenesis in horsegram ( <i>Macrotyloma uniflorus</i> (Lam) Verdec.) using gamma rays and ethyl methane sulphonate.
110. B. R. Chaya G. Shivashankar	Studies on genetic variability, character association and formulation of selection indices for grain yield in six F <sub>2</sub> populations of paddy ( <i>Oryza sativa</i> Linn.) under varying fertilizer levels.
111. R. L. Ravikumar M. Mahadevappa	Heterosis and combining ability studies in rice ( <i>Oryza sativa</i> L.) using male sterile lines as testers.
112. Rajashekhar S. Karlatti P. C. Hiremath	Studies on leaf and inflorescence blight of marigold ( <i>Tagetes erecta</i> Linn.) caused by <i>Alternaria zinniae</i> M. B. Ellis
113. Jalinder Gundappa Srikant Kulkarni	Studies on black stem rust of wheat caused by <i>Puccinia graminis</i> f. sp. <i>tritici</i> (Pers.) Eriks and Henn.
114. M. Saifulla K. G. Ranganathaiah	Investigations on seed-borne aspects of anthracnose of sorghum ( <i>Sorghum bicolor</i> (L.) Moench) caused by <i>Colletotrichum graminicola</i> (Ces.) Wils.
115. K.V. Lakshmana Murthy K. G. H. Setty	Studies on burrowing nematode, <i>Radopholus similis</i> (Cobb, 1893) Thorne 1949, on banana in Karnataka
116. M. S. Patil R. K. Hegde	Studies on leaf spot of safflower ( <i>Carthamus tinctorius</i> Linn.) caused by <i>Ramularia carthami</i> Zaprometov.
117. B. M. Kumara Swamy K. M. Ponnappa	Comparative study of <i>Colletotrichum</i> spp. occurring on cowpea, avare and horsegram in Karnataka.
118. K. S. Ravi H. R. Reddy	Studies on pigeon pea ( <i>Cajanus cajan</i> (Linn.) Millsp.) phyllody disease.

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119. B. J. Anantha Padmanabha K. G. H. Setty	Studies on the efficacy of plant extracts in control of root-knot nematode, <i>Meloidogyne incognita</i> on tomato.
120. Pradeep R. Kivati K. M. Ponnappa	A study on the drought wilt of coconut palm caused by <i>Botryodiplodia theobromae</i> Pat.
121. H. Ravindra K. G. H. Setty	Studies on root-knot nematode <i>Meloidogyne incognita</i> on greengram, <i>Vigna radiata</i> (L.) Wilezeck.
122. M. Venu Gopal T. B. Anilkumar	Studies on variation in <i>Xanthomona campstris</i> Pv. <i>mangiferaeindicae</i> (Patel et al.,) Robbs et al. The causal organism of bacterial canker in mango.
123. N. G. Ravichandra K. Krishnappa	Studies on the control of the burrowing nematode, <i>Radopholus similis</i> (Cobb 1893) Thorne 1949, infesting banana ( <i>Musa acuminata</i> Colla.)
124. Ashok N. Hedge R. K. Hegde	Studies on wilt of black pepper ( <i>Piper nigrum</i> L.) caused by <i>Phytophthora palmivora</i> (Butler) Butler.
125. K. Peddi Reddy T. B. Anilkumar	Comparative studies of fungicide resistant and susceptible isolates of <i>Helminthosporium haladoes</i> Drech.
126. A. S. Sadashivaiah K. G. Ranganathaiah	Investigations on seed-borne aspects of root-rot of sunflower caused by <i>Macrophomina phaseolina</i> (Tassi) Goid.
127. Ashok B. Bawarkod K. M. Ponnappa	Studies on epidemiology and control of leaf blight of onion ( <i>Allium cepa</i> Var. <i>Cepa</i> Linn.) caused by <i>Alternaria cepulae</i> Ponnappa and Deshpande.
128. G. Rajender Singh T. B. Anilkumar	Efficacy of systemic fungicides in controlling diseases of cowpea ( <i>Vigna unguiculata</i> (L.) Walp.)
129. A. Sreedharan H. R. Reddy	Studies on purple top roll (PTR) of potato in Karnataka

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130. S. Somasundara T. B. Anilkumar	Factors affecting infection and disease development in sunflower by <i>Alternaria helianthi</i> (Hans.) Tubaki and Nishihara.
131. R. G. Bhat R. K. Hegde	Studies on leaf blight of arecanut ( <i>Areca catechu</i> L.) caused by <i>Phyllosticata areca</i> Hohnel.
<b>Agricultural Entomology</b>	
132. G. Surya Srinivas S. Lingappa	Studies on development of an artificial diet for the groundnut leaf miner <i>Aproaerema modicella</i> (Deventer) (Lepidoptera : Gelechiidae) and evaluation of chitin inhibitors.
133. S. Eswarappa M. B. Shyamala	Studies on the stability and spread of Kenchu virus of silkworm <i>Bombyx mori</i> Linnaeus.
134. K. B. Subramanya G. K. Veeresh	Studies on snails with special reference to Giant African Snail, <i>Achatina fulica</i> (Bowdich) (Gastropoda : Achatinidae)
135. T. K. Narayana Swamy M. B. Shyamala	Investigations on 'Kenchu' virus of silkworm <i>Bombyx mori</i> Linnaeus—response of silkworm breeds, host specificity and transovarian transmission.
136. J. K. Gachchinamath T. S. Thontadarya	Studies on the bee-flora of the Indian bee, <i>Apis cerana</i> Fabricius (Hymenoptera : Apidae) and its role in pollination of lucerne, <i>Medicago sativa</i> Linnaeus.
137. Cohwira K. Medappa G. K. Veeresh	Field studies on the efficacy and dispersion of <i>Parasierola nephantidis</i> (Muesebeck) (Hymenoptera : Bethylidae) the larval parasite of coconut black headed caterpillar <i>Opisina arenosella</i> Walker (Lepidoptera : Xyloryctidae).
138. N. Ramadas Rai C. A. Viraktimath	Biology, some aspects of morphology and chemical control of cowpea and borer, <i>Maruca testulalis</i> (Geyer) (Lepidoptera : Pyralidae).
139. R. A. Balikai T. S. Thontadarya	Effect of some insecticides in the control of cotton pests with special reference to Amitraz.

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140. N. Sreenivasa T. S. Thontadarya	Studies on the life history of pulse beetles, <i>Callosobruchus chinensis</i> Linnaeus and <i>Callosobruchus analis</i> Fabricius (Coleoptera : Bruchidae), loss caused by them and their control.
141. Y. V. Venkataramana Jois S. Lingappa	Chemical control of brinjal pests with special reference to the residual toxicity of carbaryl to the fruit and shoot borer, <i>Leucinodes orbonalis</i> Guenee (Lepidoptera : Pyralidae).
142. K. Shivaramu R. Balasubramanian	Studies on bioecology of the spice beetle, <i>Stegobium paniceum</i> (Linnaeus) (Coleoptera : Anobidae) and efficacy of etrimphos as spice seed protectant.
143. G. C. Kuberappa M. Jayaramaiah	Studies on some aspects of ecology and evaluation of fungicides against white muscardine disease of silkworm, <i>Bombyx mori</i> Linn. caused by <i>Beauveria bassiana</i> (Bals.) Vuill.
144. R. S. Bhadragoudar K. Jai Rao	Role of bhendi ( <i>Abelmoschus esculentus</i> (Linnaeus) Moench) as a trap crop and egg parasitoids, <i>Trichogramma</i> spp. as components in the integrated control of cotton bollworms, <i>Heliothis armigera</i> (Hubner) and <i>Earias</i> spp.
145. K. Chandrashekhara K. C. Devaraj Urs	Chemo sterilization of the spotted bollworm <i>Earias vittella</i> (Fabricius) (Lepidoptera : Noctuidae) with thiotepa and bisazir.
146. Prashanth Mohanraj G. P. ChannaBasavanna	Behavioural ecology of the Dahlia mite, <i>Polyphago tarsonemus latus</i> (Banks) (Acarina : Tarsonemidae).
147. M. S. Lalasangi Puttaswamy	Bionomics, loss estimation and control of the pod borer, <i>Maruca testulalis</i> (Geyer) (Lepidoptera : Pyralidae) on cowpea ( <i>Vigna unguiculata</i> (L.) Walp.)
148. Goudappa M. Patil R. Govindan	Investigations on the Uji-fly, <i>Exorista sorbillans</i> (Wiedemann) (Diptera : Tachinidae) infesting silkworm, <i>Bombyx mori</i> L.

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149. C. B. Habibulla Khan S. Lingappa	Studies on insecticidal action of fungicides, fungicidal action of insecticides and their interaction.
150. P. Sreedhar K. C. Devaraj Urs	Studies on trapping of the tobacco cutworm, <i>Spodoptera litura</i> (Fabricius) (Lepidoptera : Noctuidae) with pheromones in groundnut fields.
<b>Crop Physiology</b>	
151. B. T. Ninganur Y. C. Panchal	Physiological studies on productivity in some safflower ( <i>Carthamus tinctorius</i> L.) genotypes under rainfed conditions.
152. Jai Prakash R. Patil Y. C. Panchal	Studies on injurious effects of 2,4-D on cotton ( <i>Gossypium</i> species) and their possible recovery by some antidotes.
153. V. Kasi Reddy V. R. Shashidhar	Genotypic difference in stomatal frequency, stomatal number per plant, photosynthetic efficiency and their relationship with productivity under rainfed conditions in fox tail mill ( <i>Setaria italica</i> ).
154. B. Kulashékara Gupta Malathi Chari	Effect of calcium on water relations and productivity in groundnut ( <i>Arachis hypogaea</i> , L) and cowpea ( <i>Vigna unguiculata</i> L).
155. C.H. Aravinda Kumari Y. C. Panchal	Physiology of male sterility in sorghum ( <i>Sorghum bicolor</i> L. Moench): Histological and histochemical studies.
156. Shivakumar M.Hiremath K. V. Janardhan	Productive efficiency of groundnut ( <i>Arachis hypogaea</i> L.) genotypes as influenced by incident solar radiation.
157. I. S. Aftab Hussain S. Ramarao	Role of zinc in the growth and yield of french bean ( <i>Phaseolus vulgaris</i> L.) and ragi ( <i>Eleusine coracana</i> Gaertn.)
158. Shashi Kumar S. Ramarao	Water use efficiency in genotypes of cowpea ( <i>Vigna unguiculata</i> L. Walp.)

1	2
159. Suresh B. Katarki K. Venkatasubbaiah	Studies on seed viability loss and its control in cotton genotypes.
<b>Chemistry and Soils</b>	
160. S. L. Vijayakumar L. Susheela Devi	Studies on Zn, Cu, Fe and Mn in the soils of Mandya and Mysore districts.
161. S. S. Purnimath M. K. Badiger	Yield and quality improvements of safflower as influenced by N, P, S and B.
162. C. Satyanarayana C. V. Patil	Efficiency of insoluble phosphatic fertilizers in acid soils of Karnataka.
163. S.R. Ranganna Shetty T. Satyanarayana	Influence of hive and FYM on transformation of native and applied P in acid soils of Bangalore.
164. T. S. Vageesh K. Balakrishna Rao	Studies on the effect of salinity on two genotypes of lucerne ( <i>Medicago sativa</i> Linn.)
165. R. S. Patil K. Balakrishna Rao	Studies on some soil properties in relation to hybrid cotton yields in command areas of Tungabhadra and Malaprabha Projects.
<b>Agricultural Microbiology</b>	
166. M. N. Sreenivasa P. V. Rai	Study of aflatoxin production in bengalgram ( <i>Cicer arietinum</i> L.) its biological properties and the factors limit its production.
167. Anne Mathews P. V. Rai	Mimosine content of <i>Leuceana leucocephala</i> and its role in rhizobial strain specificity.
168. R. Gururaja R.R. Mallikarjunaiah	Interactions among <i>Azotobacter chroococcum</i> , <i>Glomus fasciculatum</i> and <i>Penicillium glaucum</i> on growth and yield of sunflower ( <i>Helianthus annuus</i> L.).
169. Shivaram K.S. Shetty	Isolation and screening of nitrogen fixing blue green algae from Cauvery Command area of Karnataka.
170. M. Narayana Upadyaya S. V. Hegde	Root associated nitrogen fixation in finger millet ( <i>Eleusine coracana</i> Gaertn.).



1	2
171. Alamdar Hussain Khan S. V. Hegde	Interaction effect of Rhizobium strains and pigeon pea ( <i>Cajanus cajan</i> L.) Millsp. genotypes on symbiotic characters.
172. D. Dyala Doss D. J. Bagyaraj	Histological and histochemical changes in the roots and leaves of <i>Eleusine coracana</i> Gaertn. colonized by V. A. Mycorrhiza.

### **Agricultural Engineering**

173. V. P. Dyamannavar R. Ramaiah	Investigations on alternate furrow system of irrigation for optimum spacing for hybrid maize in fine textured soil of Dharwad.
174. S. S. Nandihalli R. Ramaiah	Evaluation of furrow dimensions in skip furrow method of irrigation in black soil for maize.
175. V. K. Gajare R. Ramaiah	Effect of irrigation frequency on crop growth and yield of cabbage by drip method of irrigation.
176. Ananthakrishna Achar R. Ramaiah	Evaluation of the length of graded furrows used in red soils of Dharwad region.
177. S. C. Chandraiah R. Ramaiah	Investigation for standardising of mini-boarders used for groundnut cultivation in light soils of Dharwad.
118. T. Made Gowda R. Ramaiah	Standardisation of stream size for check basin method of irrigation in red soil of Dharwad.
179. K.R. Nijalingappa R. Ramaiah	Effect of filter material thickness on tile discharge in tile drain system.
170. G.G. Gunda R. Ramaiah	A study on the performance of contour bunds in Athani taluka of Belgaum district, Karnataka State.
181. S. V. Nadagouda S. S. Kumathe	Efficiency of envelope materials and their thicknesses in a tile drainage system.

### **Statistics**

182. Shashikala Iyengar N. Sundararaj	Anthropometric measurements in assessment of nutritional status : A statistical study.
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1	2
<b>M.Sc. (Hort )</b>	
133. K. Sujatha S. K. Bhattacharjee	Studies on the effect of growth regulating chemical in some bulbous ornamental plants.
184. K. E. Shekharappa A. G. Purohit	Effects of types of cuttings and IBA on the rooting of hardwood cuttings of pomegranate ( <i>Punica granatum</i> L.)
185. A. R. Venkatesh U. V. Sulladmath	Effect of different levels of nitrogen, phosphorus and potash on growth, yield and quality of China asters.
186. Anil Kumar S. Patil D. P. Singh	Crossability behaviour and inter-relationship among nine different species of capsicum.
187. G. S. Channaveerappa J. V. Narayana Gowda	Studies on vegetative propagation of <i>Michelia champaka</i> L. by air layering and grafting.
188. Kariyanna K. M. Bojappa	Studies on root distribution in sapota ( <i>Achras sapota</i> L.)
189. R. Veeregowda K. T. Shivashankar	Genetic analysis of yield and its components in Ashgourd ( <i>Benincasa hispida</i> (Thumb), Cogn.)
190. H. C. Venkatesh N. Vijayakumar	Studies on propagation of guava ( <i>Psidium guajava</i> L.)
191. I. N. Doreyappa Gowda K. S. Krishnappa	Chemical control of over sprouting in potato ( <i>Solanum tuberosum</i> L.) stored at room temperature.
192. P. S. Venkatakrishna B. G. Muthappa Rai	Studies on nitrogen management for flower production in jasmine - Kakada ( <i>Jasminum multiflorum</i> Andr.)
193. M. Chandre Gowda K. R. Thimma Raju	Studies on floral biology, fruitset and the effect of NAA on fruit growth and essential oil content in Bursera ( <i>Bursera pectinata</i> Poifon)
194. M. C. Shivananda K. R. Thimma Raju	Studies on floral biology, fruitset and physico-chemical changes associated with fruit development in jack ( <i>Artocarpus heterophyllus</i> L.)

1	2
195. C. S. Rachayanavar U. G. Nalawadi	Studies on the influence of intra-row spacing with different levels of nitrogen and phosphorus on growth and flower production in chrysanthemum.
196. K. N. Sadashivaiah M. M. Rao	Studies on hastening of coconut seednut germination ( <i>Cocos nucifera</i> ) by injection technique.
197. H. V. Bharamagoudar K. M. Bojappa	Studies on the response of kagzi lime ( <i>Citrus aurantifolia</i> ) seedling strains to different levels of NPK under soils of Malaprabha project area.
198. C. Ramachandra U. G. Nalawadi	Studies on the effect of dates of planting with different levels of nitrogen and phosphorus on growth and flower production of China aster.
199. D. R. Patil M. M. Rao	Studies on promotion of fruitfulness in Thompson Seedless grapevine ( <i>Vitis vinifera</i> )
200. Angadi K. M. Bojappa	Influence of different levels of NPK and FYM on growth yield and quality attributes of betlevine ( <i>Piper betle</i> ) cv. Ambadi)
201. J. C. Mathad M. M. Rao	Effect of growth regulators on success of veneer grafting and wedge grafting of Alphonso mango.
202. B. Sathyanarayana Reddy P. Muddappa Gowda	Effect of dates of planting on growth, yield and certain quality attributes of three cultivars of brinjal.
203. N. V. Malamardi V. M. Bankapur	Influence of phosphatic fertilizers on growth, yield and quality of bush Frenchbean varieties.
204. D. P. Livingstone M. M. Rao	Studies on the regulation of vegetative growth and flowering in mango cv. Pairi.
205. E. Mohan M. M. Rao	Studies on the effect of pruning and growth regulators on vegetative growth and flowering in cashew.

#### M.V.Sc

##### Veterinary Anatomy

206. Hariharchandri Kalita      Studies on the cardiac glands of buffalo.  
K.N. Chandra Mouly

1	2
<b>Animal Genetics and Breeding</b>	
207. S. Basavaraju B. P. Hegde	Haemoglobin polymorphism in Jersey and Jersey crossbreds and its relationship with production traits.
208. H.N. Narasimha Murthy A. V. Rai	Prediction of 300 days lactation yield from part records in buffaloes.
209. T. Sewang P. Basavaiah	Persistency of milk production in medium size buffaloes.
<b>Gynaecology and Obstetrics</b>	
210. M. N. Dixit B. M. Dubey	Studies on serum trace elements in buffaloes during normal and disturbed conditions of oestrous cycle, pregnancy and parturition.
211. K. S. Jayaram B. M. Dubey	Studies on blood serum concentration of certain electrolytes and non-electrolytes during normal and disturbed conditions of reproduction in Bannur sheep.
212. S.K. Shashikumar B. M. Dubey	Studies on certain biochemical constituents in uterine secretion of buffaloes during pre-oestrus, oestrus, dioestrus and early pregnancy.
213. K.B. Sreenivasa Reddy V.N.V. Reddy	Concentration of creatine and creatinine in urine, ascorbic acid in blood during oestrous cycle of normal and quiescent oestrous cows.
214. V. Lakshmana Reddy S. M. Reddy	Studies on blood glucose, cholesterol, total protein, ascorbic acid and inorganic phosphorus in cycling oestrous cows, anoestrous cows and heifers.
215. A. S. Kulkarni R. V. Patil	Role of copper, zinc and manganese in ovarian tissue and blood serum during follicular, luteal and nonfunctional conditions of ovary in buffaloes.
<b>Veterinary Pharmacology</b>	
216. Balakrishna Rao Honnegowda	Effect of malathion on the pharmacokinetics of sulphadimidine in buffalo calves.

1	2
<b>Veterinary Pathology</b>	
217. R. Jayaram S. J. Seshadri	Pathology of canine <i>Seborreic dermatitis</i> and associated changes in myroid.
218. O. Lakshman Reddy S. J. Seshadri	Pathology of hepatic disorders in bovines.
<b>Veterinary Parasitology</b>	
219. Y. V. Lokesh M.S. Jagannath	Studies on ticks of domestic animals in Kolar district, Karnataka with and emphasis on the life cycle of <i>Olobius megnini</i> Duges 1883 (Acari : Argasidae).
220. Christopher Neal S. Abdul Rahman	Incidence of ticks on domestic animals in Chickmagalur district of Karnataka and a study on the life cycle of <i>Hyalomma hussaini</i> Sharif, 1928. (Acari : Ixodidae)
221. Anjaline Hemalatha S. Abdul Rahman	Ascariasis in domestic fowl reared on deep litter and cage system.
<b>Veterinary Medicine</b>	
222. M. Krishnamurthy K.N.V. Sastry	Studies on certain aspects of immune status and immunotherapy in bovine mastitis.
223. T. Venugopal M. T. Rai	Observation on the relation of morphology of parasites to pathogenesis in bovine theileriasis.
224. M. Narayana Bhat Syed Iqbal Ahmed	Therapeutic and toxic effects of different levels of Clofibrate in canines affected with TVT and some observations on the effects of surgery coupled with chemotherapy.
<b>Animal Nutrition, Management and Products Technology</b>	
225. A. W. Subbaiah B. S. Rao	Substitution of fish meal by feather meal, groundnut cake and soybean meal in broiler rations.
226. Nayeemulla Beig B. S. Rao	Effect of feeding lucerne meal on the performance of layers
<b>Veterinary Microbiology and Public Health</b>	
227. K. Prabhakara A. S. Upadhye	Immune response of dogs to leptospiral vaccines.

1	2
<b>Poultry Science</b>	
228. B.L. Chidananda Pratap Kumar	Performance of Japanese quails ( <i>Coturnix coturnix</i> Japanica) on cage and deep litter.
<b>Dairy Science</b>	
<b>Dairy Chemistry</b>	
229. Ramakrishnaiah G. S. Bhat	The influence of urea on heat stability of milk.
230. Kasturibai Patil M.K. Ramamurthy	Problems of estimating lactic acid and neutralizers in milk and milk products.
231. Narasimha Murthy M.K. Ramamurthy	Studies on comparative merits of different methods for estimation of autoxidative and hydrolytic changes in stored ghee.
<b>Dairy Microbiology</b>	
232. Koshi David P. A. Shankar	Preparation and use of immobilised lactic acid bacteria.
233. K. Ramaswamy P. A. Shankar	Studies on non-spore forming thermodurics of milk.
<b>Dairy Technology</b>	
234. Surendra Babu K. Atmaram	Studies on the utilisation of soymilk in the manufacture of cheddar cheese with special reference to protein break-down during ripening process.
235. R. Rajarathinam C.P. Anantakrishnan	Comparative study of the preparation and changes in ripening of edam cheese from cow and buffalo milk.
236. S. Sathya N. N. Dastur	Studies on the composition of Surti paneer and changes undergone during storage.
<b>Fisheries</b>	
<b>Fishery Biochemistry</b>	
237. T.N. Prathapa Chandra L. N. Srikar	Bacterial extracellular proteases useful in fermentation of fish.

1	2
<b>Fish Processing Technology</b>	
238. B. Hanumanthappa T.C. Chandrasekhar	Studies on the preparation and keeping quality of hot smoked mackerel ( <i>Rastrelliger kanagurta</i> ).
239. Krishnakumar G. G. Hiremath	Studies on handling and preservation of oil sardines ( <i>Sardinella longiceps</i> ) in chilled sea water.
240. M. S. Satish G. G. Hiremath	Production, utilization and storage studies of minced meat of oil sardine ( <i>Sardinella longiceps</i> ).
241. A. Ganapathi Bhat K. V. Saralaya	Canning of the Indian major carp, mrigal ( <i>Cirrhina mrigala</i> ).
<b>Fishery Aquatic Biology</b>	
242. S. Solomon Ravikumar T. R. Chandrasekhara Gupta	Effects of pesticides on the cultivable carps.
243. K. N. Prabhudeva N. R. Menon	Toxicology of <i>Perna viridis</i> exposed to metal-oil combinations.
<b>Fishery Statistics</b>	
244. Azad Ismail Saheb K. S. Udupa	Morphometric relationships of the Indian mackerel, <i>Rastrelliger kanagurta</i> (Cuvier) with a note on its reproduction.
<b>Fishery Oceanography</b>	
245. H. R. Venkataswamy Reddy V. Hariharan	Studies on some physico-chemical characteristics of the estuarine and nearshore sediments of Mangalore and the meiobenthos.
<b>Fishery Microbiology</b>	
246. B. V. Krishna Murthy I. Karunasagar	Microbiology of frozen prawns handled and processed in chilled sea water.
247. M. Subburaj I. Karunasagar	Relation between histidine decarboxylating bacteria and levels of histamine in fishes.
248. H. S. Veerappa Gowda I. Karunasagar	Effect of naturally occurring protease inhibitors on fish spoilage bacteria.

1	2
<b>Aquaculture</b>	
249. A. N. Ravishankar P. Keshavanath	Observations on the growth response of <i>Macrobrachium rosenbergii</i> (De Man) fed on different pelleted feeds.
250. N. Basavaraja G. P. Satyanarayana Rao	Hormonal manipulation of sex in the carp, <i>Cyprinus carpio</i> (Linn.) standardization of dosage.
251. Iqulas Ahmed T. J. Verghese	Studies on polyculture of <i>Macrobrachium rosenbergii</i> (De Man) and carps.
252. K. M. Renukaradhya T. J. Verghese	Protein requirement of the carps, <i>Catla catla</i> (Hamilton) and <i>Labeo rohita</i> (Hamilton)
253. B. S. Narayana Gowda G. P. Satyanarayana Rao	Studies on the reproductive biology of the freshwater catfish, <i>Clarias batrachus</i> (Linn.)
<b>Fishery Biology</b>	
254. D. K. Narayana Reddy M. Mohan Joseph	Studies on the population ecology and reproductive biology of the clam, <i>Villorita cyprinoides</i> (Gray)
255. Sibnaryan Dam Roy M. Mohan Joseph	Biology of spawning in the brown mussel <i>Perna indica</i> (Kuriakose and Nair)
256. S. M. Shivaprakasha P. Santha Joseph	Some aspects of the biology of the white sardine, <i>Kowala coval</i> (Cuvier)
<b>Fishery Hydrography</b>	
257. K. Segar V. Hariharan	Nitrogen cycle and its influence on the standing crop of plankton in a fertilizer effluent discharge area off Mangalore.
<b>Fishery Engineering</b>	
258. Narayana P. Puthran P. K. Salian	Comparative study of two-seam and four-seam trawl nets in the inshore waters of Arabian sea off Mangalore.
<b>Home Science</b>	
<b>Child Development and Family Relations</b>	
259. S. B. Biradar V. Gaonkar	A comparative study on anthropometric measurements of urban and rural pre-school children.



1	2
<b>Food and Nutrition</b>	
260. Bharati R. Byokod Leela Phadnis	Nutrient adequacy of diets served in hospitals of Hubli-Dharwad corporation.
261. G. Susheela Shetty Leela Phadnis	Nutritional status of rural per-school children (Causes and related factors)
262. R. P. Lalitha Reddy T. S. Gouramma	<i>In vitro</i> protein digestibility and cooking characters of greengram ( <i>Vigna radiata</i> (L) Wilczek) and redgram ( <i>Cajanus cajan</i> (L.) Millsp varieties.
263. Jyotsna L. Pise Rama Rao	Nutrient adequacy of meals served in different types of public catering institutions.

## 2. Agricultural College, Hebbal, Bangalore

Dr. K. S. Krishnasastry continued to be the Director of Instruction (Agri) during the period under report.

**Teaching:** The academic year 1982-83 ended on 3-9-1983. The I trimester 1983-84 for all undergraduate and senior postgraduate classes commenced on 26-9-1983 and ended on 31-12-1983. The I trimester for junior postgraduate classes, however, commenced on 10-10-1983 and ended on 13-1-1984. The II trimester for all undergraduate and postgraduate classes commenced on 23-1-84 and the teaching was interrupted from 6-3-1984 to 15-4-1984 due to agitation by the students and consequently the trimester was extended up to 2-6-1984 to make up the minimum duration of the trimester.

A one year Postgraduate Diploma course in Sericulture was introduced in the Department of Sericulture from the II trimester of 1983-84.

### Students strength

	Undergraduate		
	II year	III year	IV year
B.Sc (Agri)	235	165	237
B.Sc (Hort)	41	35	50
B.Sc (Agri. Mark. & Co-op)	20	31	29

	<i>Postgraduate</i>	
	Junior	Senior
M.Sc. (Agri)	133	130
M.Sc. (Hort)	16	16
M.H.Sc	5	5
Ph.D.	27	66

### ***Students performance***

One hundred and thirty five students have completed the B.Sc.(Agri) degree from this College during the year under report. Twenty two students have completed the B.Sc.(Hort) degree and thirteen students have completed the B.Sc.(Agri.Mark. & Co-op) degree during the year 1982-83.

Twenty six students have completed their Ph.D. degree and 120 have completed Masters' Degree in various subjects from this College during the year

The following students of this college were awarded Gold medals at the eighteenth annual Convocation held in March 1984, for their outstanding performance in their degree programmes.

1. Dr. S. V. Hegde, Ph.D. in Agril. Microbiology
2. Dr. T. G. Prasad, Ph.D. in Crop Physiology
3. Dr. Y. T. Hirianniah, Ph.D. in Agril. Extension
4. Dr. K. Virupakshappa, Ph.D. in Plant Breeding & Genetics
5. Dr. B. C. Suryanarayana, Ph.D. in Agronomy
6. Dr. B. Srinivas, Ph.D. in Agronomy
7. Dr. C. A. Viraktamath, Ph.D. in Entomology
8. Mr. K. Sudhir, M.Sc. (Agri) in Soil Science
9. Mr. M. P. Jagadeesha Murthy, M.Sc. (Agri) in Agril. Economics
10. Mr. K. G. Venkatesh Reddy, M.Sc. (Agri) in Agril. Economics
11. Mr. B. S. Nandeesha, M.Sc. (Agri) in Seed Technology
12. Mr. Naganagouda M. Patil, M.Sc. (Agri) in Seed Technology
13. Mr. H. G. Mallesh, M.Sc. (Agri) in Plant Breeding & Genetics
14. Miss B. R. Chaya, M.Sc. (Agri) in Plant Breeding & Genetics
15. Miss Anne Mathews, M.Sc. (Agril. Microbiology)
16. Mr. M. N. Upadhyaya, M.Sc. (Agril. Microbiology)
17. Miss P. Lalitha Reddy, M.H.Sc. in Foods & Nutrition
18. Mr. Kalidasa Shetty, I Rank holder in B.Sc.(Agri) - 8 Gold medals
19. Mr. Harsh Kumar Bharadwaj, II Rank in B.Sc. (Agri)
20. Miss Vinitha Rama Rao, I Rank in B.Sc. (Hort)
21. Miss Sophia Doku, I Rank in B.Sc. (Agri. Mark & Co-op)
22. Mr. T. M. Gajanana, II Rank in B.Sc. (Agri. Mark & Co-op)

*Earn while you learn scheme :* As part of the Agronomy practicals, the students of III B.Sc. (Agri) have raised paddy and maize for fodder and have earned an average profit of Rs. 44.61 each. The scheme of Graduate Assistantship was continued to provide financial assistance to the postgraduate students in all the P.G. Departments.

#### Visitors

1. Dr. V. Gopinathan Nair, Professor and Head, Department of Genetics, Kerala Agricultural University, Kerala
2. Dr. Pillai, Rice Breeder, Sri Lanka
3. Dr. P. S. Reddy, Project Coordinator (Groundnut), Akola
4. Dr. Kemmler of International Potash Limited
5. Dr. G. S. Sekhon, Director, Potash Research Institute of India
6. Dr. Scarlet Epstein, Sussex Univ., England
7. Dr. B. T. Lingappa, Worcester University, USA
8. Dr. Conard Swartzentruber, Horticulturist and Mr. Madhu Paul, Vegetable Specialist from Mennomite Central Committee, Bangladesh
9. Dr. S. S. Virmani, Plant Breeder, IRRI, Manila
10. Dr. M. R. Siddiqui, Coordinator, NSP, New Delhi
11. Dr. P. K. Agarwal, Seed Physiologist
12. Dr. Chandgi Ram, Visiting Scientist, Hissar, Haryana
13. Mr. E. E. Ahmed, Representative of the Ministry of Finance and Economic Planning, Government of Sudan, North Africa
14. Prof. M. A. Muralidharan, Professor, Division of Agri. Economics, IARI, New Delhi
15. Dr. D. K. Behl, S-3 Scientist, Division of Agril. Economics, IARI, New Delhi
16. Mr. E. E. Ahmed, Ministry of Finance and Economic Planning, Agricultural Sector, Sudan
17. Mr. K. M. Ponnappa, IAS, Managing Director, Karnataka State Warehousing Corporation, Bangalore
18. Mr. Satyanarayana Setty, IAS, Managing Director, Mysugar Co. Ltd, Bangalore
19. Dr. C. C. Maji, Asst. Director General (ES & M) ICAR, New Delhi
20. Dr. V. Mejrhil, Environmental Ecology Institute, Prunfoiu, Czechoslovakia

21. Dr. Kerry F. Schella, Associate Professor, Department of Forestry, University of Tennessee, Knoxville, Tennessee
22. Mr. R. K. Ramesh, Plantation Consultant, Basavanahalli, Chickmagalur
23. Dr. G. R. Korwar, Scientist (Agronomy), AICRPDA, Hyderabad
24. Mr. Drake Hocking, Agro-Forestry Advisor, AICRP Dryland Agriculture, Hyderabad
25. Mr. C. Sreeramulu, Associate Director of Research, Tirupathi.

**Seminar/Symposia/Workshop**

1. Workshop on Oilseeds was conducted in the Department of Agril. Botany from 31-1-84 to 1-2-84.
2. A one-day Seminar on Land Use Planning for Small Farmers was organised in the Department of Chemistry and Soils on 15-2-1984.
3. The Department of Agril. Extension organised a Summer Institute on Extension Education Research Methodology and Agricultural Development from 28-6-1983 to 19-7-1983.
4. A State Level Symposium on Extension Research in Karnataka was organised on 19-10-83 in collaboration with the Indian Society of Extension Education, Karnataka Chapter.
5. Third All India Seed Technology Research Workshop was held in May 1983.
6. A Fulbright Seminar on Agriculture, Energy and Indian Society was organised by the Department of Agril. Economics, for 25 Professors of the University of Tennessee, U.S.A. during June 1983 in collaboration with the USEFI, New Delhi.
7. A short-term educational programme to fifteen Visiting Professors from Colorado State University, USA was organised from January 11 to 22, 1984 in collaboration with the United States Educational Foundation in India, New Delhi. Thirty five lectures by eminent scientists from the UAS and other organisations were arranged during the course of the programme and this programme was well appreciated by the USEFI.
8. A Seminar on Grow More Trees was organised by the Department of Farm Forestry on September 1, 1983.
9. A Short Term course in Nutrition Hygiene and Sanitation was organised for Rural Women in collaboration with Baptists Hospital.

10. A Workshop to Develop a Teaching Manual for Vocational Horticulture, organised by the N.C.E.R.T., New Delhi, was held at the Agricultural College, Hebbal, from January 12 to 24, 1984. Teachers/scientists from the Departments of Horticulture, Agronomy and Soil Science participated in the Workshop. All the required facilities were provided for the Workshop.

#### ***Training/Study Tour***

1. Dr. M. Mahadevappa, Professor of Seed Technology, visited various Seed Technology and Plant Breeding Research Institutes in Europe from 20-2-1984 to 30-3-1984 with the financial assistance from Commonwealth Foundation.

2. Dr. M. Mahadevappa, Dr. B. A. Satyan and Dr. P. K. Ananda Rao attended the International Genetic Congress held at New Delhi from 12-12-1983 to 21-12-1983 and presented research papers.

3. Dr. P. V. Rai, Professor of Agri. Microbiology attended the BNF Training programme on Technology and Inoculants production at USSR from 1-10-1983 to 30-10-1983.

4. Mr. N. R. Viswanath, Assistant Professor of Agri. Microbiology, participated in the NIFTAL training Workshop on Azolla conducted at Bangkok, Thailand from 23-1-1984 to 28-1-1984.

5. Dr. P. G. Chengappa, Professor of Agri. Marketing and Co-operation participated in the International seminar on Changing Structure of Agricultural Marketing in India, conducted by the Institute of Development Studies, Mysore from 4-5-1983 to 6-5-1983.

6. Dr. K. M. Bhojappa, Professor of Horticulture, visited various University Departments/Research Stations in Japan under the short period exchange of Scientists programme, organised by the Indian National Science Academy (INSA) and Japan Society for Promotion of Science (JSPS) for study of Citriculture in Japan.

7. Mr. R. Samiullah, Assistant Professor of Horticulture, has undergone Training in Vegetable Cultivation at International Agricultural Centre, Wageningen, Netherlands and at U. K. for a period of 3½ months followed by four week training in Plant Tissue Culture Technique from 12-8-1983 to 22-12-1983.

K. S. KRISHNA SASTRY  
*Director of Instruction (Agri)*  
*Hebbal*

### 3. College of Agriculture, Dharwad

The new library building opened to the students about a year back, is a significant addition to the campus. This year, some more furniture have been provided to the library. The location, atmosphere of the library induced the students to visit the library and become book adict. Number of students visiting the library have considerably increased.

#### Students strength

	B.Sc. (Agri.)	B.Sc. (Ag. Mark. & Coop.)
I year	136	14
II year	129	19
III year	112	19
IV year	104	21
Repeaters	75	4
Total	556	77

#### Students performances

- i) No. of students completed their degree programme.

B.Sc. (Agri.)	76 (SC-7 and ST-1)
B.Sc. (Ag. Mark. & Coop.)	14

- ii) Following students have secured first five places in B.Sc. (Agri.) degree course :

	CGPA
1. Mr. Raveendra Nagappa Gadag	3.94
2. Mr. V. Thippeswamy	3.91
3. Mr. Ravishankar Vasantarao Deshpande	3.87
4. Mr. Ashok S. Halepyati	3.86
5. Mr. Sangamesh V. Angadi	3.84

- iii) The following students secured first three places in the B.Sc. (Ag. Mark. & Coop.)

1. Mr. Shivanagouda Mallanagouda Mundinamani	3.74
2. Mr. Venkataraman Gajanan Hegde	3.61
3. Mr. Thippeswamy	3.57

- iv) The following 14 students have been awarded ICAR Junior Fellowships for study and research for their Master's degree programme during 1983-84.

Name of the student	Rank
<b>I. Plant Breeding &amp; Genetics</b>	
1. Mr. S. Gumaste	4
2. Mr. R. V. Deshpande	19
3. Mr. R. N. Gadag	29
<b>II. Horticulture</b>	
1. Mr. B. R. Nagaraj	19
2. Mr. R. M. Gouda Patil	25
3. Mr. G. K. Naik	37
<b>III. Mycology &amp; Plant Pathology</b>	
1. Mr. F. M. Durayannanavar	3
2. Mr. M. K. Naik	4
<b>IV. Agronomy</b>	
1. Mr. Chidanand P. Mansur	22
<b>V. Agricultural Entomology</b>	
1. Mr. M. Mallaiah	14
<b>VI. Seed Technology</b>	
1. Mr. R. Gurumurthy	6
<b>VII. Agricultural Extension</b>	
1. Mr. M. S. Nagaraja	10
<b>VIII. Agricultural Economics</b>	
1. Mr. V. G. Hedge	2

**Visitors**

1. Seven IAS probationers and four IPS probationers visited Agricultural College, Dharwad on 17.5.83 and 18.5.1983.
2. Member of the Executive Council and Scientist from Konkan Krishi Vidhyapeeth, Dapoli (Maharashtra) visited Dharwad on 1.6.83 and 2.6.1983.
3. Hon'ble Sri B. L. Gowda, Minister for Agriculture, Govt. of Karnataka visited the campus on 2.8.1983.
4. Dr. D. M. Nanjundappa, Vice-Chancellor, Karnataka University, Dharwad visited Agricultural College, Dharwad on 23.8.1983.
5. Hon'ble Sri B. L. Gowda, Minister for Agriculture, Govt. of Karnataka ; Vice-Chancellor, Director of Research and the Board of Regents, UAS participated in the Krishimela function on 25.9.1983.

6. Dr. Niv, Tian Tuny, Director, Academy of Agricultural Science, China and Dr. Sun Y. I., Sorghum Breeder, China visited the campus on 18-10-1983 and 19-10-1983.
7. Hon'ble Minister of State for Agriculture Sri Revanna visited the campus on 7-12-1983 and 8-12-1983.
8. Ninety delegates from all over India participated in the Indian Tobacco Workshop at Dharwad campus from 2.1.1984 to 5.1.1984.

R. K. HEGDE

*Director of Instruction (Agri) (i/c)*  
*Dharwad*

#### **4. Veterinary College, Hebbal**

The Silver Jubilee Celebration of the Veterinary College for having successfully completed 25 years of its existence was celebrated in the quadrangle of the Veterinary College from June 10 to 12, 1983. The function was presided over by the Hon'ble Chief Minister of Government of Karnataka and inaugurated by His Excellency the Governor of Karnataka. The Hon'ble Minister for Agriculture released the souvenir. Earlier, Dr. N. G. Perur, Vice-Chancellor welcomed the gathering. The Director of Instruction (Vety) read the report of activities of the Institution. On this occasion the mementoes were presented to the Chief Guests and to all the four past and present Directors of Instruction. The Registrar proposed the vote of thanks.

An exhibition was organised and the same was inaugurated by Sri Ganapaiah, Board Member. A scientific session was also organised and the scientists, teachers and students participated in the discussion.

A "Farmer's Day" was conducted on the last day wherein the farmers from four districts of KDDC area participated in the deliberations.

A students function was held in the evening of the last day when Dr. Chandrasekhar of the National Institute of Tuberculosis was the Chief Guest.

The Department of Meat Science started functioning independently from March 3, 1984.

The Director of Instruction (Vety) and some of the staff members of the College participated in the short term training programme for University teacher from Colorado State University at West End Hotel on "Animal Agriculture".

The Indian Society of Animal Reproduction has awarded fellowship to Dr. R. V. Patil, Professor of Gynaecology and Obstetrics in the 5th National



Congress on Animal Reproduction held at Pantnagar during February 1984 for his meritorious services in teaching, research and extension in the field of Animal Reproduction and service rendered to ISSAR.

The University deputed 18 teachers during the year to attend the seminars, workshops, etc. organised at various Veterinary Colleges in the country.

The final year and pre-final year B.V.Sc. students have undertaken All India and State Educational tours respectively during the year as a part of curriculum.

#### **Students strength**

Undergraduate					Postgraduate	
I yr.	II yr.	III yr.	IV yr.	V yr.	I yr.	II yr.
114	119	127	116	112	29	26

#### **Students performances**

The academic performance of the students on the whole during the year was quite satisfactory.

#### **Visitors**

1. The teachers from the University of Tennessee.
2. Prof. Glen Haul, Dean of Agriculture and former Prof. of Animal Science, University of Tennessee.
3. Dr. Paul Jairaj, Experimental Pathologist, Department of Surgery, Faculty of Clinical Services, London University.
4. Dr. James W. Smith of American Embassy, New Delhi.
5. Dr. R. M. Edelsten of Centre for Tropical Veterinary Medicine, University of Edinburgh, Scotland, U. K.

#### **Seminars, Symposium and Training Programmes**

The internship training programme was continued during the year and about 80 students completed the training programme of 6 months duration.

Six-day training programme was organised from May 16 to 28, 1983 in "Diagnostic Techniques" for the benefit of Asst. Directors of Department of Animal Husbandry and Veterinary Services in Karnataka.

Five-day training programme was conducted in "Fodder Production" from August 1 to 5, 1983 for the benefit of Veterinarians working in ICDA and Extension Officers working in the Department of Animal Husbandry and Veterinary Services in Karnataka.

### **Other important events**

Dr. N. G. Perur, Vice-Chancellor, UAS, released the 'UAS sheep' breed at the National Convention on Sheep held at the IAT building at Bangalore on 11-11-1983.

The new building of UAS/KDDC Diagnostic Laboratory was inaugurated at Bangalore Dairy premises on 31-8-83 by Sri Meenakshi Sundaram, IAS, Managing Director, KDDC. The Vice-Chancellor, UAS presided over the function. The other three diagnostic laboratory buildings at Hassan, Tumkur and Mysore have also been inaugurated.

K. TRIVIKRAMA RAO  
*Director of Instruction (Vety)*  
*Hebbal*

### **5. College of Fisheries, Mangalore**

The academic year 1983-84 commenced on September 19, 1983 for II, III and IV B.F.Sc. and on October 10, 1983 for I B.F.Sc., Sr. M.F.Sc. and Ph.D. and on October 24, 1983 for Jr. M.F.Sc.

During the academic year, 21 students were admitted at Mangalore to the first year of the postgraduate programme, 15 for Fish Production and Management and 6 for Industrial Fishery Technology.

The class-wise break-up is as follows:

Ph.D.	: 1	Final B.F.Sc.	: 31
Senior M.F.Sc.	: 17	Third year B.F.Sc.	: 35
Junior M.F.Sc.	: 21	Second year B.F.Sc.	: 27
		First year B.F.Sc.	: 36

### **Students performances**

Thirty one students completed their B.F.Sc. degree programme at the end of the academic year 1982-83, while one student completed at the end of first trimester of 1983-84, 14 candidates completed their M.F.Sc. programme during 1982-83, while another 8 completed during 1983-84.

Mr. Ibrahim Mohammad Hassan, FAO Fellow from Peoples Democratic Republic of Yemen completed his one year training programme in Fish Stock Assessment on September 30, 1983 under the guidance of Shri K. S. Udupa, Associate Professor of Fishery Statistics.

Break-up of the students who were placed on academic probation during the year is as under :

<i>Class</i>	<i>I trimester</i> 1982-83	<i>II trimester</i> 1982-83	<i>III trimester</i> 1982-83
III B.F.Sc.	—	1	1
IV B.F.Sc.	7	6	6

*Student Counselling:* 21 teachers were involved in student counselling programme during the year.

*Gold Medal for outstanding merit:* Mr. K. Shivarama Rao and Mr. K. R. Dinesh were awarded UAS gold medals for outstanding performance in B.F.Sc. and M.F.Sc. degree programmes respectively.

*Appointments/Nomination to Expert Committee:* Prof. H.P.C. Shetty, Director of Instruction (Fisheries) was appointed/nominated to the following bodies during the period under report.

1. Member of ICARs Fisheries Sub-Group for the VII Five Year Plan.
2. Member of ICARs Research-cum-Development Forum's Committee to Coordinate research and development in the field of fisheries.

#### **Visitors**

1. Dr. B. B. Shetty, M. L. A., Brahmavar, visited the College to inaugurate the Regional Workshop of NARP Sub-Project, Brahmavar on 29.4.1983.
2. Mr. M. M. Nadaf and Mr. R. V. Halapanavar, Members of the Board of Regents of the University visited the College on 24.5.1983.
3. A team of 12 members of the Executive Council and Scientists of the Konkan Krishi Vidyapeeth, Ratnagiri visited the College on 27.5.1983.
4. Mr. Mohammed Hussain Baloch, Deputy Minister for Fisheries and Mr. Vijay Ranchan, Commissioner for Fisheries, Government of Gujarat, visited the various Departments of the College on 17.6.1983.
5. Dr. Anders Endal, Director of Research, Fish Technology Research Institute, Norway, went round the various Departments of the College on 31.8.1983.
6. Dr. P. V. Dehadrai, Fisheries Development Commissioner, Government of India and Mr. K. M. Joseph, Director, Exploratory Fisheries Project, Government of India visited the various Departments of the College on 3.9.1983.

7. Dr. Smith, Far East Regional Director, U. S. Embassy, New Delhi, accompanied by Mrs. Smith and Dr. Minglani of American Embassy visited from 20.9.1983 to 21.9.1983 for administrative review of the PL-480 project on *Vibrio parahaemolyticus*.
8. Dr. B. L. Bayne, Pollution Expert, Institute for Marine Environmental Research, Plymouth visited the College on 15.11.1983.
9. Dr. C. Wood of the Tropical Development and Research Institute, London visited the College on 27.11.1983.
10. Dr. G. Rangaswamy accompanied by a group of scientists visited the Campus from 7.12.1983 to 9.12.1983.
11. Dr. Richard K. Koehn, Professor, Ecology and Evolution Department, State University of New York, USA visited the College from 8.12.1983 to 9.12.1983.
12. Mr. Ogundale, FAO Trainee, Nigeria visited the College on 11.12.1983.
13. Dr. N. G. Perur, Vice-Chancellor, UAS visited the College from 16.12.1983. to 17.12.1983.
14. Mr. H. Ellen, an expert in Farm Power and Machinery, Netherlands visited the College along with his family from 2.1.1984 to 5.1.1984.
15. Mr. J. Stoneman, Fisheries Adviser, Overseas Development Administration, U. K. was at the College from 31.1.1984 to 1.2.1984 to discuss the proposal for U. K. Technical Assistance to this College.
16. Mr. Peter Gurtner, Chief of the Naval Architecture Division, FAO, Rome went round the College on 19.2.1984 and 20.2.1984.
17. Members of the Board of Regents, UAS went round the College on 19.3.1984.

*Teaching Methodology Course:* A teaching methodology course was conducted at the College from 21.11.1983 to 23.1.1984 for the benefit of teachers appointed during the last 3 years. All the senior teaching staff of the College were involved in conducting the course. A number of guest lectures were also arranged.

H. P. C. SHETTY  
*Director of Instruction (Fisheries)*  
*Mangalore*

### 6. College of Rural Home Science, Dharwad

#### Students strength

Class	III trimester 1982-83	I trimester 1983-84	II trimester 1983-84
<i>Undergraduate</i>			
I year	25	40	40
II year	26	26	26
III year	20	20	20
<i>Postgraduate</i>			
Junior M.Sc.	9	3	3
Sensor M.Sc.	9	9	9

#### Training programme

Mr. Rama Rao attended the Silver Jubilee celebration of Foods and Nutrition Department of Lady Irwin College, New Delhi during October 84.

All the teachers of the college participated in the Teaching Methodology Seminar organised during Dec-April, 1984.

*Lab to Land programme:* Mrs. V. Gaonkar, Mrs. Suhasini Rao, Miss Chaya Badiger, Mrs. K. R. Rama Rao and Mrs. K. Saroja were involved in Lab to Land programme. Each of them were responsible for ten families at Tadasinkoppa.

Promoting of goat rearing as an income generating activity was taken up for the year.

LEELA PHADNIS

*Director of Instruction (Home Science)*  
*Dharwad*

### 7. Dairy Science College, Hebbal

The Dairy Science College was located in the Agricultural College building. The Dairy Technology building which is under construction is in progress.

The University deputed 3 teachers during the year to attend Seminars, Workshops etc. organised at various Institutions in the country.

#### Students strength

*Undergraduate* : 68

*Postgraduate* : Senior : 9  
: Junior : 17

**Students performance**

The academic performance of students on the whole was satisfactory during the year.

**Visitors**

Dr. S. H. Vyas, Principal and Dean, Faculty of Dairy Science, Gujarat Agricultural University visited the College on 15-2-84 and taken round the departments and explained the activities of the Institution.

K. TRIVIKRAMA RAO  
Director of Instruction (Vety)  
Hebbal

**8. Agricultural Engineering Institute, Raichur**

The academic year started on 19-9-83.

**Students strength**

Class	III trimester 1982-83	I trimester 1983-84	II trimester 1983-84
I year DAE	20	20	16
II year DAE	17	20	20
III year DAE	22	28	21

**Students performance**

In all 101 courses amounting to 234 credit hours including 38 repeat courses were offered during the year. Sixteen students successfully completed the diploma during the year.

The class-wise break up of the students on the basis of their CGPA is detailed below :

CGPA	III trimester 1982-83			I trimester 1983-84			II trimester 1983-84		
	I	II	III	I	II	III	I	II	III
4.00	—	—	—	—	—	—	—	—	—
3.00 to 3.99	3	2	5	2	2	2	2	3	Result
2.00 to 2.99	4	5	8	4	5	11	3	7	not yet
Below 2.00	13	10	9	10	13	15	11	10	announced

**Visitors**

1. Mr. J. H. Patel, Hon'ble Minister for Power on 10-1-84.
2. Mr. B. L. Gowda, Hon'ble Minister for Agriculture and Pro-Chancellor on 15-2-84.
3. Mr. Shivalingaiah, Administrator, CADA, TBP on 7-3-84.

A special guest lecture was arranged by the Agricultural Engineering Society of the Institute. The speaker was Mr. Nagaraj, Lead Bank Officer, State Bank of Hyderabad, Raichur. He spoke on the facilities available to educated unemployed youth through Lead Banks.

**Other important events**

Tungabhadra Pedal-cum-Power Winnower developed at this Institute was released by the State Level Release Committee in its second meeting held on 25.7.83 at Bangalore.

The Farm Machinery stall of the Institute was adjudged as the best stall in the exhibition arranged by Lions Club, CADA, TBP, Munirabad and Syndicate Bank, Sindhanur between November 8-10, 1983. The exhibition was inaugurated by the Hon'ble Chief Minister of Karnataka.

Dr. N. L. Maurya, Principal of the Institute has been awarded 'ISAE Commendation Medal 1984' by the Indian Society of Agricultural Engineers for his outstanding contribution in the field of Animal Energy Research.

N. L. MAURYA  
*Principal*

**9. College of Basic Sciences and Humanities, GKVK, Bangalore**

The academic year 1983-84 started on October 10, 1983.

**Students strength**

Degree Programme	Students on rolls (March 84)
B.Sc. (Agri)	150
B.V.Sc.	115
B.Sc. (Hort)	35
B.Sc. (Ag. Mark. & Coop.)	17
B.Sc. (DT)	17
B.Sc. (Seri.)	22
M.Sc. (Agril. Biochemistry)	3
	359

One important development in the College during the year was the starting of a Kannada medium section in Agriculture to encourage the usage of Kannada, the regional language, for instructional purpose in technical courses like agriculture. Though initially 23 students joined the Kannada medium section only about 10 students continued.

The normal work of the College went on satisfactorily except for some sporadic disturbances by the students on 26 & 27-7-1983 to support the implementation of Gokak Committee Report and to get their demands fulfilled ; on 22-8-1983 in view of a scuffle that took place in the GKVK Hostels ; and again on 6-3-1984 onwards on account of an assault on a Kannada cine actor in Ooty and to agitate for redressal of some of their demands. The College was closed from 26-3-1984 and it was reopened from 16-4-1984, as the students withdrew their agitation.

The Seminar on Dry Land Development organised by the Government of Karnataka and the University for the Officers of the Development Departments was held in the College of BS & H on 29 & 30-10-1983. His Excellency, Sri A. N. Banerjee, the Governor of Karnataka inaugurated the seminar and Sri Ramakrishna Hegde, Hon'ble Chief Minister of Karnataka delivered the address.

The Director of Instruction (BS&H) as a member of the UAS team attended the XII Convention of the Association of the Indian Agricultural Universities held from 30-5-1983 to 1-6-1983 at Palampur, Himachal Pradesh. He delivered a lecture on "Facts and Falacies about the Eucalyptus" at the Science Forum, National College on February 15, 1984. He was interviewed in the programme 'Meet the Scientist' by the All India Radio and the same was broadcasted on 19-2-1984.

Dr. G. Nagendrappa attended the Convention of Chemists held under the auspices of the Indian Chemical Society at Cuttack during December, 1983 and presented a paper. Mr. Rudrappa, attended a workshop on 'Instrumentation in Environmental Studies' at the Indian Institute of Science, Bangalore during February, 1984.

The staff members of the Department of Microbiology participated in the Sixth Southern Regional Conference on Microbial Inoculants held at Hebbal and the Associate Professor presented four papers.



Dr. N. Sundar Raj, Mr. E. Vasanthakumar, Mr. Gurumurthy and Mr. K. M. S. Sharma of the Department of Statistics attended the Symposium on "Users of Statistics" held at Bangalore University during May, 1983 under the joint auspices of Indian Statistical Institute and the Department of Statistics, Bangalore University.

The Professor of Statistics chaired the sessions on Agriculture I and Agriculture II (Group VIII and IX papers) in the 22nd Annual Econometric Conference held at Bangalore during January, 1984 and also was one of the members of the Organizing Committee. The Department of Statistics took the leadership of holding the Seventh Conference of Research Statisticians at UAS, Bangalore during July 1983 under the joint auspices of the UAS and the Indian Agricultural Statistical Research Institute, New Delhi which was inaugurated by His Excellency A. N. Banerjee, Governor of Karnataka. The Professor of Statistics, chaired the session on 'Teaching of Statistics in Agricultural Universities'.

Dr. G. P. Sathyavathi, Assoc. Professor of Botany I/c, attended the workshop in Instrumentation for Environmental Studies at the Indian Institute of Science during February, 1984. Mr. Balakrishna Gowda and Mr. M. D. Rajanna, Instructors in Botany attended the V All India Workshop on Medicinal and Aromatic Plants during October, 1983 held at the Department of Forestry, Himachal Pradesh Agricultural University and presented a paper.

Mr. S. Nagaraju, Instructor in Economics attended All India Labour Economists Conference held at Lucknow during October, 1983.

R. NARAYANA  
*Director of Instruction (BS&H)*

### C. University Library

Keeping in view of providing more facilities and good atmosphere to the Library clientele, the University Library reorganisation work at GKVK/Hebbal Campuses was taken up during February, 1984. It gained momentum and accelerated during March 1984. Some of the collections transferred from Hebbal to GKVK Campus have been arranged to suit the space and need of the readers.

*Library Sub-Committee:* As in the past, the Library Sub-Committee at GKVK continued to play a predominant role in assisting the University Librarian in accomplishing the goal and adding productive and meaningful

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books and journals. The Library Sub-Committee met three times during the period under report to review the indents received from various faculties at Hebbal/GKVK Campuses. It recommended titles which would withstand the advancement of information and march of time.

The Library Sub-Committees of other teaching campuses, *i.e.*, Dharwad, Mangalore and Raichur met periodically under their respective Chairmen. The approved lists of books and journals were received in the University Library for further formalities, like counter-checking for price, duplication and then sending the lists for Dean's and Vice-Chancellor's perusal and approval.

*Acquisition*: At Central Library, about 1354 titles of books were recommended by the various faculties. While scanning these indents, 360 titles were dropped for duplication, 994 titles were placed before the Library Sub-Committee for perusal and recommendation. In all, 950 titles were approved by the Committee for procurement, 44 titles were rejected as they were considered to be of less importance.

*NARP Sub-Projects*: Special grants were made available by the ICAR to all NARP Sub-Projects to build infrastructural information centres at Bidar, Bijapur, Brahmavar, Mudigere and Navile (Shimoga) and to provide information for the scientists working under various schemes. Accordingly brochures, list of publishers catalogues of recent books and other book selection aids were sent to those centres for perusal and selection. The selection of books were ordered after obtaining the final approval of the Director of Research. 225 titles were approved out of 250 titles received or indented.

*Details of additions to the University Library, GKVK/Hebbal campuses*

Particulars	Year 1982-83	Year 1983-84
Purchase	1656	1416
Gift	457	137
Pamphlets	300	122
Dissertations/Theses	151	241
Bound Periodicals	991	1823
Maps	3	1
Total	3558	3740

*Synopsis of the University Library collection at GKVK/Hebbal campuses*

Particulars	1982-83	1983-84
Books (including bound volumes of periodicals)	96,929	1,00,300
Pamphlets (including ISI Standards)	8263	8385
Dissertations/Theses	1289	1531
Reports	5985	6152
Microfilm/Photocopies	66	68
Maps	54	55
Microfiche	166	166

*Text Book Bank :* The Text Book Bank at GKVK Campus continued to be most popular among students clientele. The particulars of the activities of this section are noted below.

Particulars	1982-83	1983-84
Total collection	1107	1136
Number of members	341	190
Number of books issued	372	571
Amount collected and remitted (Rs.)	1,116	1,713

*Gifts :* As in previous years, the Library continued to receive a number of volumes benevolently gifted by the national and international institutions.

*Membership and the use of Libraries at GKVK/Hebbal campuses :* Circulation Section is the fountain of activities of the Library. This section looks after the membership, enrolment of staff and students, issue and return of books, reservation of loaned books, discharging of membership and issuing of 'NO DUE' Certificates. It also arranges to borrow/lend books on inter-library cooperation.

*Membership of University Library from 1-4-1983 to 31-3-1984*

Particulars	Potential			Actual		
	1981-82	1982-83	1983-84	1981-82	1982-83	1983-84
1	2	3	4	5	6	7
B.Sc. (Agri)	878	827	722	679	755	691
B.Sc. (Hort)	150	151	157	112	131	157
B.Sc.(Ag.Mark & Co-op.)	98	91	83	82	70	83
B.V.Sc.	543	545	590	305	438	521
B.Sc. (D.T.)	36	57	64	34	53	64
B.Sc. (Sericulture)	—	19	41	—	16	35

1	2	3	4	5	6	7
Postgraduates	447	448	388	415	338	367
Ph.D.	111	97	119	81	77	90
P.G.Dip. in Sericulture	—	—	2	—	—	2
Staff				776	870	962
Total				2484	2748	2972

*Technical Section :* During the year under report, 1320 titles were classified and 1472 titles catalogued. The progressive total of titles so far classified and catalogued are 47,791 and 57,157 respectively. During the year, 3,968 catalogue cards are prepared, typed and merged at GKVK and Hebbal campus libraries catalogues. The Section also prepared 1,320 shelf list cards and merged in the shelf list catalogue.

*Periodicals Section :* During the year the Library Sub-Committee had agreed to subscribe for 19 new titles. Due to fluctuating conversion rates of foreign currencies and paucity of funds, some journals were dropped from the subscription. The Library Sub-Committee had also agreed to procure certain titles of back volumes.

*Details of Journals received by the University Library*

Category	As on 31-3-1983	As on 1-4-1984
1. Subscription	971	990
2. Gift	180	180
3. Exchange	160	160
	1,311	1,330
Number of issues received	18,203	11,451
Number of reminders sent	1695	1,060
Number of bills passed for payment	—	618

For various reasons, several institutions which were earlier mailing all their publications on gratis basis, have insisted on for subscription.

Due to long and unusual delay in publications of Mysore Journal of Agricultural Sciences, many of the institutions on our exchange mailing list for MJAS are not forthcoming to terms on exchange basis.

1823 volumes of journals were got bound during the year.

*Reports Section :* This Section is most popular among P. G. students and scientists who write term papers, theses and scientific articles. The scientific

and technical reports of several Indian and foreign institutions and organisations, theses, ISI Standards, UNESCO, WHO, FAO, UAS and ICAR publications are housed in this Section. The Seminar papers submitted by the students and staff of several faculties are bound and kept for handy reference. A separate catalogue exclusively for the Report Section is kept in this section to help the readers for easy consultations.

*Growth of Reports Section*

	1981-82	1982-83	1983-84
Acquisition of Reports	742	362	167
Acquisition of Theses	174	151	241

**Documentation Section:** The Documentation Section in the Library is another important Section which provides appropriate information to the students and scientists as well as compiling bibliographies and indexing of current periodical literature.

Under the Project Oriented Documentation Service, 1800 articles of interest from the current periodicals are notified for the scientists working at various research stations of the University. During the year under report, 350 articles were supplied to the scientists against BAT.

One hundred fifty primary journals on agriculture were scanned and 4000 articles of interest were indexed.

As in earlier years, "Recent Additions" and "Library Bulletins" were issued at regular intervals.

Bibliographies published by the University Library.

<i>Sl.No.</i>	<i>Title</i>	<i>Compiled by</i>
1.	Select bibliography on Marine Fisheries (1970-78) (3000 entries)	Mr. M. Venkatachalappa.
2.	Plant tissue culture of economically important crops with 900 entries covering the period from 1960-1982 (maintained on cards form)	Mr. S. Stanley Madan Kumar,
3.	A geometeorology vis-a-vis green revolution with 150 entries covering the period from 1961-1983 (maintained in cards form)	Mr. S. Stanley Madan Kumar,
4.	First supplement to Catalogue of thesis with 1,000 entries from September 1980 to December 1983 (maintained in cards form)	Mr. K.K. Manjunath

**Other Activities**

- i) Literature on Chemical Control of *Agrotis ypsilon* Rott in tobacco has been compiled and sent to the Chief Scientific Officer, ARS, Navile, Shimoga.

- ii) Literature on problems of orobanche in tobacco has been compiled and sent to Mr. Solapurkar, a Member, Board of Regents.
- iii) Literature on control of Black Headed Caterpillar *Nephantis serinopa*, M. has been compiled and sent to the Chief Scientific Officer, ARS, Navile, Shimoga.

*Reprographic Services* : The reprographic service done are given below :

	1982-83	1983-84
I. Requests received	2617	5227
Number of pages copied and supplied	38788	49696
Amount collected (Rs.)	27,714-50	35,622-80
II. Photocopies received from outside	Nil	2

*Outstation Libraries* : Constant efforts are being made to develop the Libraries of all the Regional Research Stations and Agricultural Research Stations on the lines of the University Library. One Assistant Librarian has been entrusted with this task.

Mr. K. K. Manjunath, Documentalist, participated in the Refresher Seminar on Library Information, from November 14-16, 1983, held at the Documentation Research Training Centre, Bangalore.

Mr. D. Venkatesh and Mr. Stanley Madan Kumar, were selected as Deputy Librarians and posted to Bangalore and Mangalore, respectively.

Mr. K. Gurulingaiah was promoted as Assistant Librarian and posted to University Library, GKVK Campus.

Mr. Sreenivasa Raju, selected as Library Assistant, was posted to GKVK Campus Library.

Miss K. R. Gayathri, selected as Library Assistant was posted to GKVK Campus Library.

It is with profound grief the University Library places on record the services rendered by Late H. R. Ramachandra, who shouldered the responsibility of Library for nearly 18 years and who had taken pains to build the varied collection from scratch.

R. NARAYANA  
University Librarian i/c

### D. Student Welfare

The Directorate of Student Welfare is fully seized about the alround development of the students personality. It is concerned very much to provide facilities where students live and it also assists students in getting various scholarships, fellowships, loans and financial aid from various agencies both voluntary and government. The Directorate is also striving to provide maximum facilities both indoor and outdoor for the students to actively involve in their leisure time activities like games and athletic programmes. In addition to the hostel facilities, students are also provided cafeteria facilities in all our campuses. To bring out the hidden cultural and literary talent in the students, regular cultural activities and debates, essay writing competitions within the colleges and inter-colleges of our University and also inter-college competitions, are regularly conducted at our University headquarters and also in the other campuses of the University.

National Cadet Corps, Physical Education and National Service Scheme programme are carried out under the guidance of professional persons. This Directorate is constantly on the alert to provide the required facilities to make the stay of the students on the campus a fruitful one in academic, social and recreational life. To further the above causes, many co-curricular and extra-curricular programmes are provided for the students in all our campuses. The following are a few of our achievements in the various fields during the year under review.

*Student Counselling:* As in the previous years, 15 to 20 fresh students were assigned to teachers for the purpose of counselling and advisory services. The students of the other classes and the postgraduate students continue to be under the guidance of teachers to whom they were already assigned in the previous year. But, of late, there is some slackness both on the part of students as well as teachers in effectively arranging meetings and discussions. On enquiry from some senior teachers, it is given to understand that the students fail to respond to attend the meetings called by the teachers. It is time a review has to be done into the counselling programmes and suggestions should be invited from the senior teachers in order to improve this system and make this programme a meaningful organisation for furthering the alround development of the students, and also to improve the teacher-taught relationship.

*Students Meet:* As per the revised procedure suggested by the University, the Heads of the Institutions were requested to meet the students classwise at least once in a month. For these meetings the concerned Teacher Counsellors, Wardens, and other officials have to be invited to discuss the student problems

concerned with curricular, co-curricular, extra-curricular and other administrative matters. It is also proposed to keep the proceedings on record. The main idea of this Students' Meet is to have the first hand information about the students problems on one hand and also to discuss with the students regarding administrative limitations in implementing all the issues raised by the students. The frank discussions in these meetings helped very much in bringing the students, teachers and officials to understand each other closely. During the period under review, one meeting at GKVK, one at Agricultural College, Hebbal, two at Agricultural Engineering Institute, Raichur, one at Dharwad and one at Mangalore were held. The Vice-Chancellor attended the meetings at Bangalore and Dharwad Campuses. At Dharwad and Mangalore Campuses the Directors of Instruction are regularly conducting the class representatives meetings along with the Students' Association Executive Body, staff advisors, wardens and the administrative officials once in a month regularly to review the students problems and find appropriate remedy.

*Orientation Programme :* The orientation programmes are arranged for the fresh students during the first week after the admissions, in all the campuses to educate them about the University life. In this programme, information regarding the academic procedures like, registration, courses, credits, average grade points, cumulative grade points, pre-requisites, academic probation, course load, calculation of grade points and also the financial assistance like scholarship, freeship, university loans, students aid fund etc., along with the procedures to be followed were explained in detail to the students. The Director of Student Welfare/Dy. Director of Student Welfare educates the students regarding the co-curricular, extra-curricular activities, hostel facilities along with the rules and regulations, cafeteria services, health services and also the facilities available under the programmes "Earn while you learn project".

*Students' Association :* Usually, the Students' Association used to be formed during the very first trimester of the academic year by conducting direct elections. However, it was our experience that in our major campuses – Hebbal, G.K.V.K. and Dharwad there used to be very strained relations among the students after the elections. In some cases, some unwanted incidence of students involving in physical fights were noticed. This used to cause hardships for the elected body to organise activities smoothly. In order to avoid all these unpleasant incidents, a new procedure of electing class representatives at the first stage, and the elected class representatives choosing the Students' Association Executive Body is introduced during the year 1983-84. Accordingly, Associations were formed at Fisheries College, Mangalore; Rural Home Science College, Dharwad; Veterinary College, Hebbal and the Agricultural, Engineering Institute, Raichur, following the above criteria.



*Activities of the Student Associations and Hostels*

Campus 1	Date 2	Function 3	Invitees/Chief Guest 4
G.K.V.K.	21-4-1983	Inaugural Function of the Association	Mr. B. L. Gowda, Hon'ble Minister for Agri., Govt. of Karnataka
Hebbal	10-5-1983	Inaugural Function of the Agril. College Students' Assn.	Mr. K. S. Narasimhaswamy, Writer Mr. S. V. Govindarajan, Retd. Soil Chemist, ICAR.
Hebbal	2-7-1983	Agril. College Hostel Day Celebrations	Mr. Udayakumar, Cine Artist
Raichur	30-7-1983	A. E. I. Hostel Day Celebrations	Mr. M. Muniswamy, Supt. Eng., P. W. D., Raichur. Mr. K. S. Naidu, Principal, LVD College, Raichur.
Dharwad	2-8-1983	Agril. College Hostel Day Celebrations	Mr. B. L. Gowda, Hon'ble Minister for Agriculture Dr. N. G. Perur, V.C., UAS.
Raichur	12-8-1983 and 13-8-1983	UAS Inter-Campus Youth Festival	Dr. S. V. Patil, Dean, UAS Dr. N. L. Maurya, Principal, AEI. Mr. Vinay Kumar, Dy. Commissioner Dr. N. G. Perur, V.C., UAS.
Mangalore	18-8-1983	Fisheries College Hostel Day Celebrations	FR. LEO D'Souza, S.J., Principal, St. Aloysius College, Mangalore Prof. H.P.C. Shetty, D.I.
Mangalore	19-8-1983	Annual Social Gathering of the Fish. Col. Students' Assn.	Mr. L. Revanasiddaiah, IPS, D. I. G., Western Range Prof. H.P.C. Shetty, D.I.

1	2	3	4
G.K.V.K.	20-8-1983	Hostel Day Celebrations	Mr. S. Srinivasa, Patron Bangalore Bonsai Club. Dr. N. G. Perur, V. C., UAS.
G.K.V.K.	27-8-1983	Valedictory Function of the Students' Association	Mr. Khadri Shamanna, Editor, Kannada Prabha. Dr. N. G. Perur, V. C., UAS.
Dharwad	29-8-1983	College Day of the R.H.Sc. College	Mr. Channaveera Kanavi Director of Publications (Retd), Karnatak University, Dharwad. Dr. Leela Phadnis, D.I., (RHSc.), Dharwad
Hebbal	3-9-1983	Agrico. Students' Assn. Valedictory Function	Mr. Ravi, Film Director Mr. Navarathna Ram, Writer
G.K.V.K.	24-2-1984	Inauguration of the "AGMACO" Club	Mr. K. M. Ponnappa, Managing Director, Karnataka State Warehousing Corporation.

In addition to the activities cited above conducted by the respective associations, the Directorate of Student Welfare conducted the following activities on behalf of the Govt. of Karnataka and other private agencies who have provided shields and finances. The following are some of the activities during the year under review.

1. The Department of Health and Family Welfare Services, Govt. of Karnataka, conducted an essay writing competition in Kannada on Family Welfare at State level. This Directorate is very happy to report that all the three prizes that were instituted for the competition have been won by the following students of our University :

- |      |  |           |           |
|------|--|-----------|-----------|
| i)   | Mr. M.C. Nandeesh, Sr. M.F.Sc., Fisheries College, Mangalore     | I Prize   | Rs. 500/- |
| ii)  | Mr. Azad Ismail Saheb, Sr. M.F.Sc., Fisheries College, Mangalore | II Prize  | Rs. 300/- |
| iii) | Mr. Pulikeshi Karamaddi, Jr. M.Sc(Agri.) Agril. College, Dharwad | III Prize | Rs. 200/- |

2. The UAS Inter-Campus Youth Festival was conducted on 12 and 13-8-1983 at Raichur Campus. The festival was inaugurated at 2.30 p.m. on 12-8-1983 by Dr. S. V. Patil, Dean, UAS, while Dr. N. L. Maurya, Principal, A.E.I., Raichur, presided over the function. The students from all the seven institutions of the University participated in the festival and it was very colourful.

The closing function was held on 13-8-1983 at 7.30 p.m. Mr. Vinay Kumar, Deputy Commissioner, Raichur, was the Chief Guest and Mrs. Vinay Kumar, distributed the prizes to the participants and medals to the winners. Dr. N.G. Perur, Vice-Chancellor, UAS, presided over the function.

The following are the results of the two-day Youth Festival :

**1) English Debate**

- i) Mr. V. Jayakumar, GKVK, Bangalore
- ii) Mr. V. Srinivasa Murthy, Fisheries College, Mangalore

**2) Kannada Debate**

- i) Mr. Ganesh M. Hegde, Veterinary College, Bangalore
- ii) Miss B. Geetha, Rural Home Science College, Dharwad.

**3) English Elocution**

- i) Mr. V. Srinivasa Murthy, Fisheries College, Mangalore
- ii) Mr. V.K. Jaya Raghavendra Rao, GKVK, Bangalore

**4) Mono Acting**

- i) Miss B. Geetha, Rural Home Science College, Dharwad
- ii) Mr. B.V. Venkataramu, Agricultural College, Bangalore

**5) Vocal Music (Classical)**

- i) Mr. S. Mahendran, Agricultural College, Bangalore
- ii) Mr. V.R. Kiresur, Agricultural College, Dharwad

**6) Instrumental Music (Classical)**

- i) Mr. S. Mahendra, Agricultural College, Bangalore
- ii) Mr. V.R. Kiresur, Agricultural College, Dharwad

**7) Kannada Folk Songs**

- i) Miss B.M. Nalini, Rural Home Science College, Dharwad
- ii) Mr. V.K. Jaya Raghavendra Rao, GKVK, Bangalore

**8) Kannada Lyrics**

- i) Mr. K.K. Rathod, Agricultural College, Dharwad
- ii) Mr. Satish Kumar, Veterinary College, Bangalore

**9) Quiz**

- i) Mr. A. Jaykumar Patil, Fisheries College, Mangalore
- ii) Mr. M.R. Girish, Agricultural College, Bangalore

**10) Film Hits**

- i) Miss Rekha Dixit, Rural Home Science College, Dharwad
- ii) Mr. Satish Kumar, Veterinary College, Bangalore

**11) Group Song**

- i) Mr. Rajashekhar and Party, Agricultural College, Dharwad
- ii) Miss Rekha Dixit and Party, Rural Home Science College, Dharwad

**12) Group Dance**

- i) Mr. Chandra Naik and Party, A.E.I., Raichur
- ii) Miss Shailaja and Party, Rural Home Science College, Dharwad

**13) Classical Dance**

- i) Mr. S. Mahendran, Agricultural College, Bangalore
- ii) Miss Vandana Nadiger, Agricultural College, Dharwad

3. At the instance of the Chief Conservator of Forests, Government of Karnataka, in connection with the 'Vanya Prani Saptah 1983', an English Essay writing competition was conducted on "Wild Life", at Collegiate level. The essays written by the following students have been adjudged as best and prizes have been awarded :

Mr. Azad Ismail Saheb, Sr. M.F.Sc., Fisheries College, Mangalore	I Prize	Rs. 300/-
Mr. B.N. Mahesha Chandra Babu, II B.Sc.(Agri.) Agricultural College, Hebbal	II Prize	Rs. 200/-
Miss Shoba V. Nagannavar, Jr. M.Sc.(Agri.), Dharwad	III Prize	Rs. 100/-
Mr. Thippeswamy Jr. M.Sc.(Agri.), Dharwad	Consolation prize	Rs. 50/-
Mr. Pranesh Jahagirdar, IV B.V.Sc., Vety. Col., Hebbal	Incentive prize	Rs. 25/-

4. An Inter-Collegiate Kannada Essay writing competition on "Family Welfare" was conducted at UAS, at the instance of the Directorate of Health and Family Welfare Services, Government of Karnataka, Bangalore. Essays written by the following students were adjudged as the best and they were awarded cash prizes by the Directorate of Health and Family Welfare Services, Government of Karnataka.

Mr. Y.S. Prabhakar, Final B.Sc.(Agri. Mark. & Coop)	I Prize	Rs. 300/-
Miss B. Usha, Rural Home Science College. Dharwad	II Prize	Rs. 250/-
Mr. H. D. Srihari, Final B.Sc.(Agri.) Agricultural College, Hebbal	III Prize	Rs. 200/-
Miss K. Mallamma B. Hubli Rural Home Science College, Dharwad	IV Prize	Rs. 150/-
Mr. B. Narayanaswamy, Final B.Sc.(Agri.), Agricultural College, Hebbal	V Prize	Rs. 100/-

Under the same scheme, a State level essay writing competition in Kannada was conducted for the postgraduate students of all the universities in the State and the essays were evaluated by the Directorate of Health and Family Welfare Services. It is with pride that we have to report that all the three prizes that were instituted for the State level competition have been won by the following students of our University.

Mr. Azad Ismail Saheb, Sr. M.F.Sc., Fisheries College, Mangalore	I Prize	Rs. 500/-
Mr. S.C. Kollurmath, Jr. M.Sc.(Agri.) Agricultural College, Dharwad	II Prize	Rs. 300/-
Mr. B.B. Biradar, Sr. P.G. Student, (Seed Tech.), Agricultural College, Hebbal	III Prize	Rs. 200/-

5. An Inter-Collegiate Kannada Debate for the rolling shield instituted in memory of late Prof. B.A. Balachowdaiah, was held in the auditorium of the College of B.S. & H., GKVK on 3-2-1984. The Rolling Shield was won by the PES College, Hanumanthanagar, Bangalore.

6. On behalf of the National Council for Co-operative Training, New Delhi, an Inter-Collegiate English Debate on 'Co-operation' was conducted on 2-3-1984 in the Agricultural College Auditorium, Hebbal. The following three students were adjudged as the winners in the debate.

Mr. V. Srinivasa Murthy, Jr. M.F.Sc., Fisheries College, Mangalore	I Prize	Rs. 100/-
Miss K.N. Sridevi, II B.Sc.(Agri. Mark & Coop), Agricultural College, Hebbal	II Prize	Rs. 75/-
Mr. Y.S. Prabhakar, Final B.Sc.(Agri. Mark & Coop), Agricultural College, Hebbal	III Prize	Rs. 50/-

The I and III prize winners were deputed to Lucknow University to participate in the National Debate on 'Co-operation' from 5 to 7-3-1984.

7. At the instance of the Nehru Centre, Bombay, an Inter-Collegiate English Essay writing competition was conducted and the following three students were adjudged as the winners :

Mr. B.M. Maheshchandra Babu	I Prize	Rs. 250/-
II B.Sc.(Agri.), Agricultural College, Hebbal		
Mr. Raghu Kalyani	II Prize	Rs. 150/-
Jr. M.F.Sc., Fisheries College, Mangalore		
Mr. V. Srinivasamurthy,	III Prize	Rs. 100/-
Jr. M.F.Sc., Fisheries College, Mangalore		

The above three prize winners were deputed to take part in the final essay writing competition conducted by Nehru Centre at Nehru Planetarium, Bombay on 9-3-1984. At the National level, nobody has been awarded the first prize. It is gratifying to report that Mr. B. M. Maheshchandra Babu, II year B.Sc. (Agri.) of our University has secured the II Prize of Rs. 750 in this competition.

*Hostels (Food Services) :* Hostels are managed by the Hostel Managing Committee comprising of the Director of Instruction, Warden, student representatives. This year, a new procedure was introduced in electing the Hostel Management Committee members by taking the student's (Hostel resident) having highest CGPA from each class of section. These members are called as block representatives and the block representatives inturn elected the Hostel Management Committee consisting of various secretaries to look after the messes, reading rooms, sports etc. The Hostel messes are managed by the prefects and the Hostel Management Committee. The prefects are nominated by the Hostel Management Committee for each month.

The expenditure on the mess charges were shared by the students by dividing system.

The following are the staff members who were incharge in Managing the affairs of the during the year under report :

Campus	Designation	Name of the official
<i>Hebbal :</i>	Rector	Vacant
Agril. College Hostel	Chief Warden	Dr. A. Bomme Gowda
	Warden	Mr. M. A. Shankar
Vety. College Hostel	Chief Warden	Dr. R. V. Patil
	Warden	Dr. R. N. Srinivasa Gowda

1	2	3
UAS Girl's Hostel	Warden	Mrs. Shantha D. Urs
<i>GKVK:</i>	Rector	Vacant
GKVK Hostel	Chief Warden	Mr. Chandrashekhar Buggi
	Warden	Mr. A. G. Huddar
	Warden	Mr. Nanjunde Gowda
<i>Dharwad:</i>	Rector	Dr. L. A. Dixit
Agril. College Hostel	Chief Warden	Dr. P. C. Hiremath
		Mr. S. D. Shashidhar
		Mr. C. B. Kuridikeri
Rural Home Science College Hostel	Warden	Mrs. V. Gaonkar
P. G. Students' Hostel	Warden	Dr. M. C. Devaiah
<i>Mangalore:</i>		
Fisheries College Hostel	Warden	Mr. K. V. Rajgopal
<i>Raichur</i>		
A.E.I. Hostel	Warden	Mr. D. S. K. Devadattam

The strength of the boarders in the different hostels and the average food charges during 1983-84 were as follows:

Name of the UAS Hostels	No. of rooms available	No. of boarders accommoda- ted	Daily average food charges	
			Vegetarian	Non- Vegetarian
1	2	3	4	5

#### Hebbal Campus

<i>Agril. College Hostel</i>			Rs.	Rs.
I Block	64	190	4.17	5.18
II Block	64	190		
<i>Vety. College Hostel, Hebbal</i>				
I Block	64	200	5.36	5.85
II Block	64	200		
<i>UAS Girls' Hostel</i>				
I Block	14	67	3.54	
'D' type quarters	2	18	(Common mess)	

1	2	3	4	5
<b>GKVK Campus</b>				
I Block	64	192	4.78	5.47
II Block	65	195		
III Block	66	198		
<b>Dharwad Campus</b>				
<i>Agril. College Hostel</i>				
Suyoga Block	18	72	5.95	—
Spurthi Block	18	72		
Pragathi Block	102 + 5	209		
Krishik Block	133	266		
<i>P. G. students Hostel</i>	32	64	6.80	
			(Common mess)	
<i>Rural Home Science College Hostel</i>				
A - Block	4	30	3.90	
B - Block	4	32	3.56	
<b>Mangalore Campus</b>				
<i>Fisheries College Hostel</i>				
Cauvery Block	18	47	8.36	
Narmada Block	18	47		
Ganga Block	18	48		
<b>Raichur Campus</b>				
<i>Agril. Engg. Instt. Hostel</i>	18	50		5.25

#### **NCC and Physical Education**

Physical Education, N.C.C. and Swimming, Boating and Rowing are course requirements for all the first year students in all the campuses. Classes are handled by the physical education staff and for N.C.C. by the part-time N.C.C. Officers with the help of the staff sent by the Directorate of N.C.C. at Bangalore and Dharwad.

A combined annual training camp was conducted at G.K.V.K. Campus from 4-9-1983 to 15-9-1983. 267 cadets from Bangalore and 75 cadets from Dharwad participated in the camp.

One cadet Mr. K. V. Gopikrishna, II B.Sc. (Agri) passed 'C' certificate and the following four students passed 'B' certificate during March, 1984.

1. Mr. M. P. Rajanna, II B.Sc. (Agri.)
2. Mr. Nagaraju, II B.Sc. (Hort.)
3. Mr. Nagaraju, D.P.I. B.Sc. (Hort.)
4. Mr. Muniswamy Gowda, I B.Sc. (Agri.)



The following are the number of students that registered for Physical Education and N.C.C. during 1983-84.

Campus	Class	Strength		
		Boys	Girls	
1	2	3	4	
NCC				
GKVK Campus	All I year classes excluding the Vety. College (UAS COY. 1)	I	116	—
		II	116	—
		III	116	—
	First year B.V.Sc. (UAS COY. 2)	I	91	—
		II	87	—
		III	87	—
Dharwad Campus	All I year classes of Agril. College, Dharwad Campus	I	80	—
		II	80	—
		III	80	—
Physical Education				
GKVK Campus	All I year classes	I	104	33
		II	105	34
		III	105	34
Dharwad Campus	All I year classes of Agril. College, Dharwad Campus	I	69	—
		II	70	—
		III	74	—
	All I year classes of RHSc., College	I	—	43
		II	—	42
		III	—	23
Mangalore Campus	No. of students regd. for Swimming, Boating and Rowing	I	20	—
		II	20	—
		III	20	—
Raichur Campus	No. of students regd. for Phy. Edn. Course	I	15	—
		II	15	—
		III	15	—

### **Sports and Games**

The UAS Inter-Campus Athletic Meet for the year 1983-84 was conducted at Hebbal Campus during January 1984.

Dr. S. V. Patil, Dean, UAS inaugurated the meet on 28-1-1984. Dr. Jeevaraj Alva, Hon'ble Minister of State for Youth Services, Government of Karnataka was the Chief Guest on 29-1-1984.

The individual championship was secured by Mr. Viswanath, Agricultural College, Hebbal in men's section. Miss R. Jayanthi, College of Basic Sciences and Humanities, GKVK, secured individual championship from women's section.

The overall athletic team championship went to College of Basic Sciences and Humanities, GKVK. Late Mr. Mohan Hegde Memorial trophy for the overall championship in games and sports was presented to the Agricultural College, Hebbal.

Mr. Renuka Prasad, Final B.Sc. (Hort) of GKVK campus was awarded UAS Gold medal for the year 1983-84 for having represented Karnataka State in the Kho-Kho tournaments at the National Championships during 1982-83. He captained the State Kho-Kho team during the year 1983-84. The State team won the National Championship at Adilabad, Andhra Pradesh.

Mr. M. B. Ganapathy, II B.Sc. (Hort) of GKVK Campus, represented the Karnataka State Hockey Team in the Nationals at New Delhi during the year 1983-84.

Mr. C. Suresh Kumar, IV B.V.Sc. was selected for the Karnataka State Kho-Kho team during 1984.

Our UAS teams participated in the All India and South Zone Inter-University Tournaments conducted by the Association of Indian Universities, New Delhi.

Statement showing the calendar of events of tournaments conducted by the UAS teams for the year 1983-84, along with the winners and runners-up are as detailed in Table I.

The UAS Teams participated in the Karnataka State Inter-University Tournaments conducted at Gulbarga by the Gulbarga University during the first week of February, 1984.

The following teams participated in the tournament.

(1) Athletics (Men and Women), (2) Basket Ball, (3) Foot Ball, (4) Hockey, (5) Kabaddi, (6) Kho-Kho (Men and Women), (7) Table Tennis, (8) Tennis, (9) Shuttle Badminton and (10) Volley Ball.

The following were the positions secured by our teams :

1) Kho-Kho (Men) team secured runners-up position :

Mr. D. S. Hegde, IV B.V.Sc., represented the Karnataka Chess Team in the Nationals during 1983-84.

### **Medical Services**

Full-fledged university hospitals under the supervision of Medical Officers on wholtime basis are functioning at Hebbal, GKVK and Dharwad Campuses. For the present, part-time Medical Officers are serving the needy at Raichur and Mangalore Campuses. Efforts are being made to personalise the health services by maintaining an up-to-date health record with case history of each student so as to know the nature of illness and other details pertaining to students medical history. Our hospital facilities are provided not only to the students and staff but also to the labour working in the farms and also to the families of the staff.

The following are the details of patients treated by the Health Centres in various campuses during the year :

Name of the campus	Vaccinations done	Total No. of patients treated during the year	Daily average No.	Referred to major hospitals for specialists opinion
Hebbal	1974	32,528	90	1,852
GKVK	—	4,523	12	—
Dharwad	—	35,554	114.3	60
Raichur	45	4,617	13	15
Mangalore	—	4,074	11	—

### **Cafeteria**

A cafeteria was opened in the cellar portion of the 'Naik Bhavan' at GKVK Campus. To start with, light refreshments, cool drinks, coffee/tea are served during fixed times. Recently, plate meals was introduced at the Garden Cafeteria at GKVK. It is proposed to introduce other traditional items of eatables and also quick meals at Naik Bhavan Cafeteria during next year. The cafeterias at Dharwad, Raichur, Mangalore, Hebbal and GKVK Campuses continued to work satisfactorily. The Directorate of Food and Civil Supplies are kind enough to provide rationed provisions to our cafeterias.

### **University Employment Information and Guidance Bureau**

The Bureau provides information regarding the Scholarships, Fellowships and opportunities available for further studies both in India and abroad. The Bureau also provides information regarding the job opportunities in various Government and private agencies both in India and outside the country.

About 2691 persons visited the Bureau and availed the facilities provided in the centre during the year 1983-84. 265 persons including six women are on

the live register of the bureau, registered for favours job avenues. The following is the break-up of persons registered :

Total registered	SC	ST	BT	BCT	BCM	BSG	U/R	Rural	Urban
285	41	2	2	15	42	33	150	184	101

The Centre is regularly getting newspapers and other periodicals which provides information regarding educational and employment opportunities. This centre is also getting the Employment news bulletins of other Universities in India.

#### **National Service Scheme**

National Service Scheme sponsored by the Government of India financed by the Centre and State Government is being implemented by the universities through the colleges. The NSS intends to involve the students in the service of the community. Regular NSS programmes continued to work satisfactorily at our Agricultural College, Dharwad and Rural Home Science College, Dharwad. All efforts are being made to start regular NSS programme at our other campuses also. The University is also actively examining whether this programme could be introduced as a curricular programme.

The Rural Home Science College students are working with the families of Yettinagudda village. The individual NSS student is assigned to a family to educate them regarding family planning, child care and other home management activities like, mending the old clothes, kitchen gardening etc. The women are also informed about the evils of consuming liquor and also the ways and means to save money from their daily earnings for use during hardships.

The Agricultural College students have taken up the projects on the campus, like renovating the short range, tree plantation on either side of the road leading the Yettinagudda village, preparation of a picnic spot in the mango grove, working on the levelling of the open air theatre. They are also proposing to demonstrate to the farmers production demonstration on high yielding varieties of various crops, agricultural operations with improved agricultural implements, application of fertilizers, soil and water management, plant protection measures, repair and maintenance of agricultural implements, and also land development works.

#### **General**

The students are provided with a broad opportunities through many activities for enhancing academic, cultural and social maturity, so that they may share their responsibilities of community and National leadership commensurate

TABLE I

*UAS Inter-Campus and Inter-University tournaments conducted during the year 1983-84*

Game	Inter-Campus Tournaments			Inter-University Tournaments			
	Venue	Date	Winners	Runners	Venue	Date	Results
1	2	3	4	5	6	7	8
Volley Ball	Hebbal	8/9-10-83	Agrico. H	Fishco. M.	Osmania Univ. Hyderabad	24-10-83	UAS lost to Annamalai Univ.
Basket Ball	Hebbal	12/13-11-83	Agrico. H	Vetico. H.	Nagarjuna Univ. Guntur	25-11-83	UAS won against Kakatiya Univ. in first round and lost to Calicut Univ. in second round.
Foot Ball	Hebbal	24/25-9-83	Agrico. H	Fishco. M.	Calicut Univ. Calicut	17-10-83	UAS lost to Nagapur Univ.
Hockey	Hebbal	19/20-11-83	BS & H, GKVK	Vetico. H.	Team not sent		
Crieket	Dharwad	26/27-11-83	Agrico. Dwr.	Agrico. H.	Madras Univ. Madras	2/3-1-84	UAS lost to Bharatiya Univ.
Kho-Kho(M)	Hebbal	19/20-11-83	BS & H, GKVK	Vetico. H.	Bangalore Univ. Bangalore	7-1-84	UAS won against Agra. Univ. and lost to Indoor University.
Kabaddi	Hebbal	29/30-10-83	BS & H, GKVK	Agrico. H.	Vikram Univ. Ujjain	16-11-83	Lost to Baroda Univ.

1	2	3	4	5	6	7	8
Ball Badminton(M)	Hebbal	2/3-12-83	Agrico. H.	Vetico. H.	Annamalal Univ. Chidambaram	24-1-84	Lost to Annamalal Univ. Madras
Shuttle Badminton(M)	Dharwad	26/27-11-83	BS & H, GKVK	Fishco. M.	Kakatiya Univ. Warangal	22-12-83	Lost to Nagarjuna Univ.
Table Tennis(M)	Hebbal	2/3-12-83	Agrico. H.		Mysore Univ.	7-12-83	Lost to Amaravathi Univ.
Chess	Hebbal	12/13-10-83	Vetico. H.	Agrico. Dwr	Nagapur Univ. Nagapur	20/26-10-83	UAS won 3rd place in all India Chess Tournament Mr. Suresh Kumar got individual first board prize.
Kho-Kho(W)	Hebbal	10/11-12-83	RHSc. Dwr	Bangalore	Team not sent		
Shuttle Badminton(W)	Dharwad	26/27-11-83	Bangalore	Dharwad	Kakatiya Univ. Warangal	23-12-83	UAS lost to Osmania.
Table Tennis(W)	Hebbal	2/3-12-83	Bangalore	Dharwad	Mysore Univ. Mysore	7-12-83	UAS lost to Devi Ahalya Univ.
Athletics	Hebbal	28/29-1-84	Agrico. H.	BS & H, GKVK	Team not sent		

with their position as leaders in their profession. Independence Day, Republic Day and Ganesha festivals were conducted in a fitting manner in all our campuses. In addition to the celebration of National festivals, Youth festivals, Inter-Class sports, Cultural and Literary activities both at the college and hostel levels were also organised for the benefit of the students.

Concession orders for journeys to home town and back during holidays by train, air and buses are regularly issued from the Directorate of Student Welfare. Shopping facilities were also provided through Consumer Co-operative Societies at Hebbal, GKVK and Dharwad Campuses. Proposals are being sent for starting similar cooperative societies at Mangalore and Raichur campuses. The Directorate is also providing liberal grants to all colleges towards students' association activities like formation of various clubs and for other student activities like literary and cultural programmes. Subsidy is also provided for printing of individual college magazines of each institution.

This Directorate is fully aware that a lot more has to be done for a meaningful involvement of all the student community in activities for furthering the cause of academic, social and cultural life by providing better facilities. But the major limiting factor being the funds, we are not in a position to provide the latest facilities like cement playing surfaces for certain games, swimming pools and additional hostel accommodation and also a students' home for accommodating about 50 students (2 dormitories and about 6 rooms) for the visiting sports teams and also students from other campuses. However, the essential immediate needs are attended on top priorities as and when the funds are made available. This Directorate acknowledges its profound gratitude to all the Officers of the University and also to the Teaching staff who have been cooperating in organising student welfare activities. The undersigned takes this opportunity to thank the organizations of the University for the generous financial support and valuable guidance received. The Director of Student Welfare acknowledge his heartfelt thanks to the Vice-Chancellor, the Dean and the Directors of Instruction for the sustained encouragement and assistance provided to the undersigned in organising the student welfare activities in the University.

K. SUBBIAH

*Director of Student Welfare*

## PART III

### RESEARCH

The research infrastructure of the University is being strengthened under the National Agricultural Research Project through ICAR/IBRD assistance. The State has been divided into six regions and each region is headed by a Regional Associate Director who coordinates research, planning and implementation in the region. Each region has a Regional Research Advisory Council and a Regional Research Formulation Committee with Director of Research as the Chairman. Concerned scientists of the University and officers of the State Development Departments (Agriculture, Horticulture, Animal Husbandry, Sericulture, Fisheries, Forestry) and farmers representatives are on these two committees, which meet twice a year to identify the research problems in the region and also draw up research programmes. During April, 1984 the meetings of these two committees were held in each of the six regions and technical programmes for 1984-85 were formulated. One more Research Station, Balajigapade in Kolar district has been established during the year to concentrate research on potato.

There are 42 All India Coordinated Research Projects, 29 ICAR Ad-hoc Research Projects being operated in the University. Also there are 39 projects which are funded by U.S. held rupee projects, B.A.R.C., G.O.I., U.G.C. and several other agencies.

The following new crop varieties/animal breed/technology/implements were released :

<i>Crop/animal/implement</i>	<i>Variety/breed/technology</i>
(1) Wheat	DWR-39
(2) Groundnut	Dh-8
(3) Bidi-tobacco	PL-5 (Spoorthi)
(4) Sorghum hybrid	DSH-1
(5) Cashew	Ullal Cashew-1 and Ullal Cashew-2
(6) Cardamom	Mudigere cardamom clone-1
(7) Sheep	UAS Sheep
(8) Earth worm	(a) Technology for the production of earth-worms extrements that are useful as organic fertilizers.



- (b) Technology for the production of earth-worm meal as a source of protein for livestock feed.

(9) Implement

Tungabhadra Pedal-cum-Power Winnower.

The work on seed production and research investigation on various crops and management practice and several other new problems like control of Nephantis, studies on Areca Yellow Leaf disease and control of Uzi-fly silk-worm are being continued. The research report on Plant Science, Animal Science, Home Science, Fishery Science and Basic Science for the year 1983-84 is as follows :

## 1. Plant Science

### 1.1 Agronomy

#### 1.1.1 Rice

In the nitrogen varietal trial conducted during the *khari*f season at Mandya, it was observed that the variety KMS-5914-6 produced grain yield of 6433 kg/ha compared to IR-20 which produced grain yield of 6988 kg/ha at 120 kg N per hectare. In another trial, IET-5912 produced grain yield of 7000 kg/ha compared to 6415 kg/ha of IR-20. In a similar trial at A.R.S., Sirsi, variety KMS-5914-4-6 produced grain yield of 4175 kg/ha as compared to 3759 kg/ha of Pankaj.

In soil fertility vs crop response study, under continuous rice-rice culture at moderate levels of fertiliser application at Mandya, grain yield was not influenced either by P/K alone or in combination of both, but N with P and K produced maximum grain yield.

Nitrogen fertilisers efficiency trial in wet land rice under good water control indicated that deep placing of urea super granules at 29 kg N/ha at 7 days after transplanting produced higher grain yield of 6066 kg/ha as against application of urea in 3 splits at 87 kg N/ha (5617 kg/ha).

Chemical weed control trial in direct sown upland rice conducted at ARS, Mugad indicated that among herbicides tried, application of Butachlor at the rate of 1.5 kg a.i./ha followed by one hand weeding at 20 days after sowing gave significantly higher grain yield of 3670 kg/ha compared to weed free check which yielded 3006 kg/ha, indicating advantage with chemical weed control.

#### 1.1.2 Ragi

Studies on effect of split application of phosphorus on yield of ragi under rainfed conditions at Bangalore indicated that application of 75 per cent

recommended phosphorus at sowing *plus* remaining 25 per cent recommended phosphorus after 4-6 weeks from sowing gave yield on par with treatment receiving full recommended phosphorus at sowing (2206 kg/ha). Further application of  $P_2O_5$  in the form of rock phosphate 75 per cent recommended dose *plus* superphosphate 25 per cent recommended dose was found beneficial compared to single superphosphate 100 per cent.

The variety HR-1523 and HR-911 were found superior in grain yield over check varieties Indaf-8 and Indaf-5 respectively. 100 kg nitrogen per hectare was found optimum under rainfed condition.

Ploughing twice with mould board+2 harrowings before sowing was found essential for reaping higher ragi yields. Planting with 25 days aged seedlings at 100 kg nitrogen per hectare gave highest grain yield of 4582 kg/ha.

The trial on effect of *Azospirillum brasilense* on yield of ragi under rainfed conditions indicated that the seed inoculation and furrow application of *Azospirillum* mixed with FYM + 20 kg nitrogen per hectare gave significantly highest grain yield of 2768 kg/ha.

### 1.1.3 Sorghum

Studies on response of different sorghum genotypes for intercropping with pigeon pea showed that where pigeon pea was intercropped with sorghum, SPV-351 sorghum yielded maximum of 5490 kg/ha, closely followed by CSH-9 giving 5476 kg/ha, SPV-346, 5345 kg/ha and the lowest yield was by CSH-6, 3774 kg/ha irrespective of genotypes and population levels of pigeon pea at Dharwad. Intercropping ultimately increased grain yield by 154 kg and 662 kg/ha in case of SPV-346 and SPV-351, respectively, and reduced by 469 kg and 795 kg/ha in case of CSH-6 and CSH-9 respectively compared to their respective sole crops. The fodder yield was maximum with SPV-346 (15174 kg/ha) followed by SPV-351 (9588 kg/ha), CSH-9 (9118 kg/ha) and the lowest with CSH-5 (7960 kg/ha) in intercropping system, irrespective of pigeon pea varieties and population levels.

Studies on intercropping of fodder legumes in sorghum indicated that different fodder legumes tested did not influence grain and fodder yield of sorghum significantly. Sorghum with soybean produced the highest grain yield of 6416 kg/ha. Whereas dolichos and sunnhemp reduced sorghum yield to an extent of 13.70 and 3.75 per cent respectively. Sunnhemp had an adverse effect on fodder yield of sorghum. Similar was the case with clusterbean and dolichos.

Sunnhemp recorded the highest green fodder (138.58 q/ha) as an intercrop with sorghum giving the highest monetary returns (Rs. 11,760/ha) with an increase of 11.84 per cent over control. Intercropping of fodder legumes with

sorghum had no significant influence on the yield of succeeding crop of wheat. In a study on striga management, it was observed that pre-emergence application of Fenac at 0.25 kg a.i./ha reduced the grain yield of sorghum (1967 kg/ha) significantly than that of control (3375 kg/ha). Although rest of the treatments were on par, the highest grain yield (6002 kg/ha) of sorghum was produced by cultural weed control up to first 25 days + application of Na salt of 2,4-D at 2.0 kg a.i./ha around 30 days (before striga emergence), followed by Atrazine pre-emergence application at 0.5 kg a.i./ha + application of Na salt of 2,4-D at 2 kg a.i./ha around 30 days + application of paraquat at 1.0 lit a.i./ha around 50 days (5753 kg/ha) and cultural weed control (5574 kg/ha).

In the studies on entry  $\times$  rate of nitrogen  $\times$  plant density conducted at Dharwad it was observed that none of the sorghum genotypes tried (SPV-346, SPV-351 and CSH-5) differed significantly with each other in respect to their grain as well as fodder yield. Due to bold grain, SPV-346 recorded significantly higher 1000 grain weight (30.16 g) than CSH-5 (22.36 g) and SPV-351 (20.88 g) but these two were on par with each other. Application of nitrogen at 100, 50 and 0 kg/ha gave a grain yield of 50.06, 48.10 and 32.64 q/ha and fodder yield of 169.63, 147.73 and 121.62 q/ha respectively irrespective of genotypes and plant density. Plant densities of 1.5 and 2.4 lakh/ha did not significantly influence either grain or fodder yield.

No significant effect was observed with inoculation of biofertilizer, azospirillum, either to seed or to soil on the grain and fodder yield of sorghum at Dharwad.

In early sowing of sorghum (6th July) at Dharwad yield was 3958 kg/ha whereas in late sowing (23rd July) yield was 3238 kg/ha irrespective of cropping system. Grain yield was 3978 kg/ha with plant protection as compared to 3337 kg/ha without plant protection, irrespective of cropping systems and sowing dates.

#### 1.1.4 **Wheat**

The studies to assess the adaptability of new wheat varieties to different dates of sowing under irrigated conditions conducted at Bangalore showed that the varieties DWR-39 and APAU-1577 recorded the grain yield of 3234 kg/ha when sown during 3rd week of October. When the same varieties *i.e.*, DWR-39 and APAU-1577 sown during first week of November, they recorded the grain yield of 3704 kg/ha and 3672 kg/ha respectively, while the variety NI-8289 recorded the lowest grain yield of 3000 kg/ha. However, irrespective of varieties, sown during first week of November recorded the maximum grain yield of 3351 kg/ha followed by 3rd week of October (2783 kg/ha) and first week of December (2103 kg/ha).

Intercropping studies on wheat with soybean and blackgram showed that on an average wheat yield with soybean as intercrop was 2431 kg/ha as compared to 2804 kg/ha with blackgram as compared to sole crop yield of 3386 kg/ha.

A study on evaluation of new wheat varieties for different dates of sowing under irrigated conditions conducted at Dharwad indicated that among the varieties tested, varieties NI-8303 and NI-8272 produced significantly higher yield of 3800 kg/ha than other varieties (2900 to 3600 kg/ha) when wheat was sown during last week of October and second week of November. The yield was reduced when sown during December. However, the variety NI-8303 is found to be more suitable for normal as well as late sowing conditions as compared to other varieties. Varieties NI-5439 and NI-8188 appear to be promising under limited water supply conditions. Varieties NI-5439 and DWR-39 appear to be promising under limited nitrogen supply conditions.

Studies on the use of bio-fertilizers in economising the nitrogenous fertilizers conducted at Siruguppa showed that full recommend dose of NPK + seed treatment with *Azotobacter* gave higher yield of 4160 kg/ha than untreated control (full dose of NPK + no *Azotobacter* treatment) which yielded 4041 kg/ha.

#### 1.1.5 **Groundnut**

At Regional Research Station, Raichur, it was observed that split application of nitrogen at the rate of 20 kg/ha (10 kg at sowing and 10 kg at 30th day) + basal application of 40 kg  $P_2O_5$ /ha recorded the maximum pod yield of 1524 kg/ha when compared to no fertilizer application which yielded 1060 kg/ha.

#### 1.1.6 **Sunflower**

Experiment on sowing date of Morden variety of sunflower at GKVK revealed that sowing could be taken untill the second fortnight of September in *rabi* areas and under late sown conditions in *kharif*. A mixed cropping of sunflower (Morden) and horsegram in 2:4 would bring in higher returns than pure crop. In a mixed crop of groundnut and sunflower, recommended doses of fertilizers gave maximum benefit.

Good quality seeds in EC-68415 and Morden could be produced by applying a fertilizer dose of 80:80:30 NPK/ha with a spacing of 60 × 45 cm and 60:60:30 NPK/ha with a spacing of 45 × 45 cm respectively. Applying nitrogen in three splits – 50 kg at sowing and half the remaining nitrogen at button stage and the other half at flowering time resulted in higher seed weight.

### 1.1.7 Pulses

The studies on intercropping in redgram varieties with early sowing in May at Bangalore showed that the variety TTB-7 gave marginally higher yield (1674 kg/ha) over HYD-3C (1611 kg/ha) and the crop duration was longer. The yields of intercrops such as sesamum and cowpea were poor due to longer dry spell during June-July.

The studies on effect of fertilizers, weed control and plant protection of red gram revealed that plant protection is an important factor in redgram production which increased the yield from 491 to 955 kg/ha. One hand weeding at 40 days after sowing increased the yield from 511 kg to 935 kg/ha. The significant interaction of weed control and plant protection indicated that under good weed control, plant protection increased the yield significantly. The two years of this study revealed that plant protection is the important component in redgram production followed by weed control or fertilizer application depending upon the soil fertility and intensity of weeds.

The studies on response of cowpea genotypes to dates of planting and row spacing revealed that a variety V-16, V-37 and KBC-1 which were on par and gave significantly higher yield of 1594 kg, 1524 kg and 1433 kg/ha respectively over C-152 and RC-19 which yielded 1195 kg and 1275 kg/ha respectively. At Bangalore early August and middle of August sowing which was on par gave significantly higher yield over delayed sowing. Row spacing of 30 and 45 cm were on par and better than 60 cm. Further, the variety KBC-1 with 30 cm row spacing sown during middle of August was found to give maximum yield of 1935 kg/ha. However, there was poor yield with September sown crop which was due to severe moisture stress.

The studies conducted on response of horsegram genotypes to dates of sowing indicated that early sowing during middle of August gave significantly higher yield than delayed sowing. BGM-1 and IC-1195 which were on par gave significantly higher yield of 1214 kg/ha and 1139 kg/ha respectively over the local and short duration genotypes which yielded 975 kg/ha. With early sowing during middle of August, there was no significant difference among varieties tested. However, with delay in sowing BGM-1 and IC-1195 gave significantly higher yield over other varieties due to better plant growth resulting in higher number of pods per plant.

The studies on response of horsegram to phosphorus and inoculation with *Rhizobium* showed that at low fertility, soil application of phosphorus up to 40 kg/ha gave significant increase in yield of 708 kg/ha due to better plant

growth resulting in higher number of pods per plant. However, the *Rhizobium* inoculation did not increase the yield significantly.

Studies on mixed cropping on finger millet and redgram showed that opening of a furrow after 3 metres width of ragi crop increased the yield by about 200 kg/ha while the paired row of redgram on either side of the furrow decreased the ragi yield marginally. However, the redgram TTB-7 and HYD-3C compensated the decrease and gave marginal increase in ragi equivalent yields.

#### 1.1.8 Soybean

Studies conducted at GKVK, Bangalore on six different varieties of soybean, namely, PK-471, KHSb-2, KHSb-3, KHSb-5, Jupiter and JS-72-134 with 0.2, 0.4 and 0.6 million plants per hectare under rainfed conditions, revealed that the differences in varieties were not significant whereas plant populations and interaction were highly significant. Irrespective of the varieties 0.4 million plants per hectare has performed better when compared to 0.2 and 0.6 million plants per hectare.

Studies on performance of different herbicides on soybean in controlling the weeds indicated that the maximum yield of 2350 kg/ha was obtained when three hand weedings were given at 15, 30 and 45 days after sowing, followed by 2320 kg/ha when two hand weedings were given at 30 and 45 days after sowing. Among the herbicides tried, Basalin 48 EC at 1.00 kg/ha recorded an yield of 2000 kg/ha followed by Sencor at 0.25 kg/ha (1985 kg/ha) and Dual at 1.00 kg/ha (1950 kg/ha).

The performances of soybean varieties as an intercrop with ragi in different combinations revealed that intercropping of soybean with ragi was highly profitable when compared to the pure crop of ragi. In this treatment the yield of ragi was 3372 kg/ha and the yield of soybean was 1670 kg/ha, whereas the pure crop of ragi yielded 3877 kg/ha.

Studies on the performance of soybean varieties as an intercrop with redgram revealed that intercropping of soybean with redgram is profitable when compared to the pure crop of redgram. A gross return of Rs. 8278 was obtained when one row of soybean variety KHSb-5 was followed in between two rows of redgram at 60 cm compared to redgram alone. The variety KHSb-5 performed better both as intercrop and also as a pure crop.

The performance of soybean as an intercrop with ragi, redgram and hybrid maize revealed that a maximum gross return of Rs. 9817/ha was obtained when one row of soybean was taken in between two rows of ragi at 45 cms. The yield of ragi was 3384 kg/ha and the yield of soybean was 1233 kg/ha

whereas the pure crop of ragi yield 4444 kg/ha. In case of redgram, one row of soybean in between two rows of redgram at 60 cm was better when compared to the pure crop of redgram. Here the pure crop of redgram gave 1525 kg/ha *i.e.*, Rs. 4575/ha and as an intercrop, redgram gave 911 kg and soybean 1222 kg/ha with a gross return of Rs. 7010. In hybrid maize also, one row of soybean in between two rows of maize at 60 cm was better when compared to the pure crop of hybrid maize. Pure hybrid maize has yielded 4375 kg *i.e.*, Rs. 6563 per hectare and when soybean was introduced in between the yield of hybrid maize was 3528 kg and soybean yield was 1083 kg/ha with a total gross returns of Rs. 9083.

Under the performance of soybean and groundnut as an intercrop with sunflower and redgram, paired rows of sunflower at 45 cm, 42 rows of soybean in between two paired rows of sunflower at 30 cm gave a gross return of Rs. 6115/ha whereas pure crop of sunflower gave a gross return of Rs. 5511/ha and when groundnut was taken as intercrop return was Rs. 5571/ha. Similarly one row of soybean in between two rows of sunflower at 60 cm was equally better. In groundnut and sunflower combination the yield of sunflower was reduced considerably whereas it was not so when soybean was inter crop.

Studies on soybean with and without Rhizobial culture indicated that the maximum yield of 1578 kg/ha was obtained when the seeds were treated with Rhizobial culture.

#### 1.1.9 Sugarcane

Final yield trial of sugarcane varieties conducted at RRS, Mandya indicated that out of eight promising varieties CO. 62175 was adjudged as the best tonnage variety recording the cane yield of 222 t/ha closely followed by CO. 7804 (198 t/ha) and KHS-3347 (190 t/ha) while the rest of the varieties found to be more or less on par with the cane yields ranging from 148 t/ha to 189 t/ha.

Effect of some land layouts on yield and quality of cane showed that cane yield significantly differed with the treatments, ridges and furrows with no earthingup recorded the highest cane yield of 255 t/ha, followed by the normal practice (219 t/ha). The border strip method recorded the lowest cane yield of 200 t/ha. The varieties did not differ significantly in their quality parameters with treatments.

Studies on effect of herbicides on weeds, yield and quality of sugarcane (Var. CO. 62175) revealed that cane yield significantly differed with treatments, Atrazine 50 per cent commercial grade has recorded highest cane yield of 214 t/ha followed by Trashmutch 202 t/ha and Sencor 70 per cent (198 t/ha). Pol per cent in juice differed significantly with the treatments and Simazine 80 per cent

recorded highest pol percentage juice at harvest. Regarding weedicides, Sencor 70 per cent and Atrazine 50 per cent have proved better in controlling the weeds in comparison with other chemicals.

Response of early, mid-late and late sugarcane varieties of the region to 'N' fertilizer application, indicated that varieties did not differ significantly with regards to cane yield. Cane yield was increased with increased level of 'N' only up to 250 kg N/ha. CO. 419 recorded the highest cane yield of 110.25 t/ha followed by CO. 7804 which produced an yield of 106.75 t/ha. Quality parameters differed significantly with the varieties and did not differ significantly with the 'N' levels. CO. 7804 recorded highest pol percentage in juice followed by KHS 3347 and CO. 7708.

Varieties and plant population interaction studies showed that the varieties differed significantly with regards to cane yield. The variety CO. C.671 recorded higher cane yield of 135 t/ha than KHS-3296 which recorded 100 t/ha. The spacing of 75 cm gave highest cane yield of 125 t/ha as compared to 60 cm (118 t/ha) and 90 cm (112 t/ha). The seed rate did not differ significantly with the cane yield. The seed rate of 14,000/acre recorded the higher cane yield of 122 t/ha than 16000/acre (121 t/ha) and 12000/acre (111 t/ha).

#### 1.1.10 Cotton

Studies on the agronomic requirements of new varieties and promising pre-release genotypes, in relation to their plant densities and fertiliser levels at Dharwad showed that yield of seed cotton of different genotypes did not differ significantly and there was not much difference in their mean yields which ranged from 1783 kg/ha to 1899 kg/ha. The interspecific hybrid DCH-397 gave the highest yield of 1899 kg/ha followed by D.P. 452 (1848 kg/ha), LRA-5166 (1807 kg/ha), Sharada (1783 kg/ha) and CPD-11-1-2 (1690 kg/ha) respectively. DCH-397 was found to be highly susceptible to leaf reddening during this year.

Studies on response of cotton to higher levels of  $P_2O_5$  and  $K_2O$  indicated that application of 40 kg/ha N alone gave 2018 kg/ha as against 1557 kg/ha of no fertiliser application *i.e.*, an increase of 461 kg/ha or 29.6 per cent giving a response of 11.5 kg kapas per kg of nitrogen applied. 60 kg N/ha gave decreased yield (1687 kg/ha) while 80 kg N/ha gave slightly higher yield of 2097 kg/ha than 40 kg N/ha.

Application of  $P_2O_5$  and  $K_2O$ , whether at the present recommended levels of 20 kg/ha or at the higher levels of 40, 60 and 80 kg/ha did not increase the yield. However, 80-80-80 kg/ha NPK gave the highest yield of 2125 kg/ha *i.e.*, an increase of 568 kg/ha or 36 per cent over no fertilizer application.



At Siruguppa, application of 150 kg/ha N alone gave 4,333 kg/ha as against 3096 kg/ha of no fertiliser application *i.e.*, an increase of 1237 kg/ha nearly 40 per cent giving a response of 8.25 kg kapas per kg of N applied. There was no response to  $P_2O_5$  and  $K_2O$  either at the presently recommended levels of 75 kg/ha or at the higher levels of 150 and 200 kg/ha.

Studies on fertilizer requirement for cotton based mixed cropping systems at Arabhavi showed that all the intercropping treatments gave significantly lower yields of seed cotton, the reduction in yield varying from 273 kg/ha to 550 kg/ha (27 to 54 per cent).

Among the intercropping treatments, with fertilizer dose, cotton ( $1\frac{1}{2}$  times) + Maize ( $1\frac{1}{2}$  times) gave the highest yield of seed cotton (738 kg/ha) followed by cotton ( $1\frac{1}{2}$  times) + maize (full dose) with 700 kg/ha and cotton (full dose) + maize (full dose) applied combined with 645 kg/ha. The yield of seed cotton was lowest (461 kg/ha) in cotton (50 per cent) + maize (50 per cent).

Fertilizer requirement for the double cropping of cotton and wheat under irrigated condition at Arabhavi showed that treatment differences are highly significant for the yield of seed cotton. All the fertiliser levels gave significantly higher yield than no fertiliser application. Treatments with 100 per cent and 150 per cent recommended doses gave significantly higher yield of 1476 kg and 1547 kg/ha respectively than 50 per cent dose (1087 kg/ha) but there was no significant difference between 100 and 150 per cent levels. Grain yield of wheat differed significantly among the different treatments. At 150 per cent level of fertilizer dose both cotton and wheat gave the highest yields of cotton (1547 kg/ha) and wheat (3489 kg/ha).

#### 1.1.11 Tobacco

Effect of different sources of organic manures on the yield and quality of VFC tobacco at Shimoga showed that the different sources of organic manures had no significant effect on the yield of any kind of VFC tobacco. However, the presumed treatment has recorded the highest yield of cured leaf (1350 kg/ha), followed by Nemaure (1228 kg/ha).

Varietal-cum-fertilizer trials on VFC tobacco indicated that variety 1795 produced highest yield of green leaf (10,841 kg/ha) and varieties 2338, 1494 and 2359 were on par (9242 kg, 9593 kg and 9804 kg respectively) but significantly superior to KST-1 (8013 kg/ha). However this effect was not observed in production of cured leaf. Yield of brightleaf was also significantly superior over the variety KST-1.

Different doses of fertilizers had significant effect on yield of VFC tobacco. Application of higher dose (160 : 80 : 80 NPK kg/ha) resulted in the highest yield but did not significantly differ from 50:80:80 NPK kg/ha. The lowest yield was recorded with lowest dose *i.e.*, 30:80:80 NPK kg/ha. The variety 1795 with higher dose of fertilizer at 60:80:80 NPK kg/ha level produced highest yield of 1530 kg/ha, while the same variety at 30:80:80 NPK kg/ha level produced the lowest yield of 893 kg/ha.

Spacing cum fertilizer trials on VFC tobacco revealed that neither the spacing nor the fertilizer dose had significant effect on the yield of VFC tobacco. However, the highest yield was recorded at closer spacing and with a fertilizer dose of 40:80:80 NPK kg/ha.

Effect of ridge planting on the yield and quality of VFC tobacco showed that planting on the conical ridges has recorded significantly more yield of cured leaf (1265 kg/ha) than the other methods of planting. Planting on flat land without ridges recorded the lowest yield of cured leaf (1059 kg/ha).

#### 1.1.12 *Dryland Farming*

At Bangalore when cowpea and horsegram were grown as early season catch crops in May, cowpea gave an yield of 9.5 tonnes/ha as green manure and 8.5 tonnes/ha as green fodder. When harvested for grain, the yield was 7.2 q/ha. Corresponding yields for horsegram were 9.8 and 8.5 tonnes and 3.4 q/ha respectively. Yield of ragi sown in July (17.2 q) and transplanted in September (18.0q) were similar. Cowpea and horsegram as fodder legumes before transplanted ragi increased the yield to about 21.0 q/ha ; when the legumes were green manured the yield of ragi was 26.3 q/ha in horsegram as compared to 23.6 q/ha in cowpea. When these legumes were harvested for grain, the yield level remained on par with control plots.

One and a half meter width strips of either grasses with *Stylosanthus* or subabul at an interval of 6 m in ragi reduced the yield of ragi significantly. The yield reduction was more with grass strips than with strips of subabul. On gross area basis, the yield of ragi from plots having grass strips for fodder was 19.0 q/ha and from subabul strip cropped area 25.03 q/ha as compared to 39.66 q/ha with entire ragi.

Redgram sown in May gave 11.27 q/ha as compared to 3.65 q/ha in July sown crops. The highest monetary return was with pure crop of ragi (Rs. 5728/ha) compared to May sown redgram Rs. 4224/ha. Redgram yields were lower in the experiment due to extreme moisture stress at flowering and consequent flower drop.

An intercropping system involving maize and redgram in alternate rows was found profitable when maize crop was harvested for fodder after 60 days of planting. This system resulted in the highest monetary return of Rs. 7999/ha as compared to Rs. 6497.60 in entire maize or Rs. 4434 in entire redgram.

Azospirillum as a biofertilizer had no influence on the yield of ragi either in the presence or absence of crop residue. However, the nitrogen level itself had a significant effect on ragi yields. The highest grain yield of 40.36 q/ha was obtained with 50 kg N/ha followed by 37.94 q/ha with 25 kg N and 31.56 q/ha without any nitrogen application.

The highest yield of ragi (34.2 q/ha) was obtained with FYM at 10 t/ha along with the recommended level of fertilizers (50 kg N, 50 kg  $P_2O_5$  and 25 kg  $K_2O$ /ha). FYM with only half the recommended level of fertilizers gave higher grain yield (28.8 q/ha) as compared to the application of full level of NPK (25.6 q/ha). The variety used in the study was PR. 202.

No marked differences were observed in the potash status of soil after six years of cropping without potash application. The original level of 514 ppm of potash came down to 477 ppm (from 1977 to 1982) when double cropping of cowpea and ragi was adopted, whereas the potash level came down to only 500 ppm when ragi was grown as per local practices.

In the studies on land shaping, inter-terrace management, runoff water harvesting and recycling on small sized run off plots of 50 × 4 m with a gradient of 1.5 per cent, the least runoff was observed in maize plot (22.34 per cent) followed by ragi (28.83 per cent) and groundnut (35.70 per cent). Fallow plot recorded highest runoff of 43.40 per cent of the total rainfall for the year. Total soil loss for the year 1983 was 6.13 t/ha in fallow plot. Among the crops, the least soil loss was in maize (1.70 t/ha) and highest in groundnut (3.38 t/ha).

Studies on evaluation of crops and varieties indicated that out of the 20 varieties of cowpea tested, TVX-1836-9E gave the highest yield of 1779 kg/ha compared to the recommended variety C. 152 (1284 kg/ha). Other promising varieties were V-26 (1760 kg/ha) and KBC-1 (1641 kg/ha). Based on the results of last 3 years, V-26 has given the highest yield of 1336 kg/ha compared to 1006 kg/ha of C-152.

Among the 28 entries of sesamum, the highest yield was obtained with TC-25 (130 kg/ha) followed by E-8 (126 kg/ha). E-8 is the recommended improved variety from the University. Apart from the varietal trial there were 21 F3 crosses which have also been tested of which KLXE-8 cross has been found promising.

In a trial on groundnut with 21 genotypes, ICRISAT cultures ICGS-30 and ICGS-31 gave higher yield of 2966 and 2816 kg/ha respectively compared to the local improved variety DH-3-30 (2200 kg/ha).

Among the 12 varieties of horsegram tested, Hebbal Hurali-2 gave the highest yield of 1145 kg/ha closely followed by CODB-6 with 1008 kg/ha. However, when the total biomass was considered the long duration varieties like IC. 11095 and DPI-1236 gave very high yield of 9000 kg/ha.

## 1.2 Plant Breeding

### 1.2.1 Rice

At Bangalore, in the project, on the exploitation of hybrid vigour in rice utilising male sterile lines only three lines viz., Wu-10, M.S.-93 and V-20 of the five CMS lines received from IRRI, IR 46827A, IR 46829A grew more vigorously than any of the Chinese CMS lines. Methods of maintenance of parental lines like :

1) alternate plant method, 2) alternate row method and hand pollination were studied and alternate row method has given higher seed set. However, the hand pollination method is the best with regard to hybrid seed production. Supplementary pollination technique like rope pulling and beating with bamboo sticks have increased the hybrid seed set from 9 to 14 per cent in 5 : 1 and 6 : 1 female : male row ratios. It has been found that hybrids withstand drought and stress better than parents.

In an adhoc ICAR scheme on breeding for salt tolerance, crosses have been made with Kare Kagg, Bili kagg, Pokkali, Pragathi, S-317, Doddi, SR-26-B, Mangala and  $F_1$ s have been planted in 1984 dry season. The  $F_2$  will be grown in salt affected soils at RRS, Mandya. Seeds of Doddi  $\times$  S-317 also have been subjected to mutagenic treatments.

In a project sanctioned by Hindustan Liver Foundation on breeding for cold tolerance, CT-1351 ranked first as in previous years. IR-50 also proved better than the recommended cold tolerant checks.

In the various trials conducted under the all India Coordinated Rice Improvement Programme at Mandya, the following results are obtained :

In the preliminary varietal trial, highest yield was recorded by KMP-39 (5510 kg/ha) followed by IET-6074 (5482 kg/ha) and Intan (5364 kg/ha). In the medium duration varietal trial, highest yield of 5080 kg/ha was recorded by KMS-5914-4-6 followed by KHS-82-2 (5065 kg/ha), IET-6010 (5040 kg/ha), IR-20 (4923 kg/ha) and KMP-39 (4914 kg/ha).

In the red rice varietal trial, the local check Kaggali Kirwana was the highest yielder with 1585 kg/ha. In the uniform varietal trial II conducted at Mandya, Nagenahalli and Mugad, IET-7727 ranked first followed by 4507. In the uniform varietal trial No. 1, conducted at Nagenahalli and Mugad, the entries IET-7653, 7614, 7259 and 7254 were found to be promising.

In the uniform varietal trial No. 4, conducted at Mandya, IET-7591 (5204 kg/ha) was the highest yielder followed by 6686 (5127 kg/ha), 7251 (5126 kg/ha) and 7252 (5123 kg/ha) compared to Jaya (4104 kg/ha).

In the uniform varietal trial No. 2, conducted at Mandya, Honnaville, Mugad and Mangalore, the varieties IET-7431, 6010, 7301, 7302, 7884 and 7303 were found to be promising.

In the aromatic slender grain varietal trial conducted at Mandya, the cultures IET-8575 (4443 kg/ha), 8572 (4192 kg/ha) and 8574 (3991 kg/ha) were promising compared to 3564 kg/ha of Pusa-150 and 1883 kg/ha of Basumathi-370. In the blast resistance varietal trial, the variety IET-7296 was the highest yielder (5095 kg/ha) compared to 4995 kg/ha of Mahsuri.

#### 1.2.2 **Wheat**

A number of highly rust resistant and high yielding varieties have been developed. Among them : DWR-16, DWR-26, DWR-39, DWR-90, DWR-61, DWR-96, DWR-89 and 286-18-18-1 were found to be the best for irrigated conditions. The cultures DWR-137, DWR-94, DWR-92, DWR-71, DWR-59 and DWR-73 were found to be better under rainfed conditions. These varieties were found to give 15-25 per cent higher yield over the standard variety. Amongst them, DWR-16, Keerthi and DWR-39 for irrigated conditions, DWR-137 for rainfed conditions have been released for general cultivation. Besides, DWR-39 has been released on All India level for whole of the peninsular zone. This has given 20-25 per cent higher yield over HD-2189 and it is also found to be suitable for moisture stress and late sown conditions.

#### 1.2.3 **Maize**

During the year 30 yield trials were conducted. In the population improvement programme of the early composites, Hunis elite full sibs were evaluated in trial No. 6. Few of the full sibs were early and comparatively free from foliar diseases besides being high yielding. Hunis-Fs-4 (5932), Hunis MRS-4 (5705) and Hunis GFS-8 (5679) were found to be better than the original Hunis (4938) and local (4551).

Fifty introductions were evaluated for yield, maturity and disease reactions. Some of the CIMMYT introductions : Across 7822 (9790), ADC  $\times$  TU  $\times$  P (9468), Across 7844 (9001) and Across 7929 (8640) were very promising.

In stage-0 trial in maturity A and B Groups EA-40043 (6998) was the only entry which is marginally superior to Deccan-103 (6981). In trial 451 of full season hybrids developed at Dharwad, EH-452682 (6028) was the only superior hybrid to Deccan-103 (6015).

In trial 454, some of the dent-flint hybrids developed at Dharwad were tested. The hybrids FD  $\times$  FDD (6363) and FD  $\times$  DPD (6164) were found to be superior to Deccan-103 (5858).

In trial 706, some of the experimental hybrids like EH-5091 (8292), EH-4101 (7509), EH-5051 (7482) and EH-5081 (7269) were found to be superior to Deccan-103 (5891).

In trial 704, two new hybrids (CM 500  $\times$  CM 202)  $\times$  (P 102  $\times$  101) (7019) and (CM 105  $\times$  CM 500)  $\times$  (CM 202  $\times$  CM 111) (7000) were superior to Deccan-103 (6855).

In stage-I trials, maturity group A, 30 entries were tested. The entry P 6875 (9792) was found to be very promising compared to Deccan-103 (7655). In B maturity group trial, 38 entries were tried, the cultures WVA (MDR-21) 76 (7662) and EVA-605-80 (7256) were found to be highly promising compared to 5384 kg/ha of Tarun as check. In C maturity group trials with 35 entries, the cultures Ageti-76 (7852), E-21 (6928) and J-8022 (6464) were found to be better than Hunis (4703). In D maturity trial, CD pool MCU-16 (3430) and D-823 (3211) were promising than Hunis GFS-4 (2768).

In stage-II trials under B maturity group, ten entries were tested. The entries EVA 64-80 (6047), EH-200278 (5995) and EH-200778 (5856) were found to be better than check J-684 with 53 q/ha. In C maturity group, nine entries were evaluated. Ageti-76 the pre-released check (6505) and PIC  $\times$  Hunis (6047) were found to be better than standard check Hunis (5101 kg/ha). In D maturity group trial, very low yields were obtained. However, the entries VL-42, Hunis and MCU-508 were found to be promising.

In stage-III trials, under B maturity group, among the 11 entries tested, EVA-WFCO-78 (6852) and L-19 (5965) were found to be superior to standard check Tarun composite (6553 kg/ha). In C maturity group of 10 entries tested, the genotypes A-68 (5538) and D-791 (5008) were superior to the standard check Hunis (4556 kg/ha).

#### 1.2.4 Sorghum

In the project on testing new varieties and hybrids for yield and reaction to diseases and pests, advanced varietal trial and hybrid trial of AICSIP were conducted. In the advanced varietal trial with 15 entries, SPV-462, SPV-472

and SPV-475 were the highest yielders with 7204, 7101 and 7089 kg/ha compared to CSH-5 (6437 kg/ha). In the advanced hybrid trial, SPH-232 (6656), SPH-196 (6452) and MSH-50 (6145) were the highest yielders compared to CSH-9 (5809 kg/ha). In the preliminary varietal trial with 49 entries, PSV-609 (6164), SPV-597 (5963) and SPV-615 (5706) were the highest yielders compared to CSH-5 (4311 kg/ha). In the preliminary hybrid trial with 36 entries, SPH-62 (7449), SPH-298 (7339) and SPH-263 (7293) were the highest yielders compared to CSH-9 (5889 kg/ha).

In the parent line trial, MR-379 (7168 kg/ha), PSV-350 (6963 kg/ha) and PVK-16 (6727 kg/ha) were the highest yielders compared to 6617 kg of CS-3541.

In the project on developing high yielding varieties and hybrids with wide adaptability and desirable characters, DSH-1 (6777), 2219 A  $\times$  2418 (6293 kg/ha) and 296 A  $\times$  SB 2407 were the highest yielders compared to CSH-6 (5913 kg/ha), based on the data of two locations. In the multilocation varietal trial, SB-4601 (5395 kg/ha), SB-5501 (5246 kg/ha) and SB-2407 (5080 kg/ha) were superior compared to SB-905 (4931 kg). In the varietal trial-1, only one entry *i.e.*, SB-1113 gave better yield (6271 kg/ha) compared to CSH-1 (4715 kg/ha). In varietal trials 2 and 3, the entries SB-2433 (5061) and SPV-387 (6097 kg/ha) were the top yielders. Fresh crosses have been effected during 1983-84 involving the desirable agronomic types and the exotic lines with desirable characters with the objective of transferring the resistance to downy mildew, stem borer and charcoal rot, seven  $F_1$  progenies were raised.  $F_2$  population of SB 905  $\times$  DMRS-1 was studied under artificially inoculated conditions for downy mildew and large number of selections were made. In advanced segregating material of various crosses, the selections have been made for characters like resistance to grain molds, pests, charcoal rot, striga and midge.

In the advanced sorghum hybrid trial SPH-218 gave highest yield (39.2 q/ha) followed by SPH-203 (27.8 q/ha) compared to 5-4-1 (20.5 q/ha). In the initial varietal trial, the culture Swarna  $\times$  RCR-408 (31.94 q/ha) and Aispuri  $\times$  RCR-408 (31.9 q/ha) were the highest yielders compared to Hagari-1 (21.18 q/ha).

In the large scale varietal trial, the cultures RCR-408 was the highest yielder (32.22 q/ha) followed by IS-84  $\times$  SPV-405 (30.55 q/ha) compared to SPV-86 (29.3 q/ha) and H-1 (24.3 q/ha).

In the new *rabi* sorghum hybrid trial, the hybrid 19A  $\times$  3R (26.38 q/ha), M 31-2A  $\times$  LSR-1 (25.91 q/ha) and 296A  $\times$  LSR-1 (24.2 q/ha) were the highest yielders than 5-4-1 (22.2 q/ha) and SPV 86 (23.1 q/ha).

In the other hybrid trial conducted at Hagari, the maximum yield was recorded by the hybrid 7A × 7R (35.63 q/ha) followed by 7A × 4R (35.17 q/ha) compared to SPV-86 (31.5 q/ha), 5-4-1 (29.5 q/ha) and H-1 (25.6 q/ha). In another trial, the hybrid M 31-2A × IR (35.6 q/ha) and M 31-2A × IR (32.6 q/ha) were the highest yielders, compared to 30.1 q of SPV-86, 26.6 q of 5-4-1 and 25.5 q of H. 1. In the advanced varietal trial, the check 5-4-1 gave the highest yield of 24.6 q. In the advanced hybrid trial, SPH-218 gave the highest yield of 25.27 q/ha compared to 23.77 q/ha of 5-4-1.

### 1.2.5 Millet

1.2.5.1 *Ragi*: Several crosses were effected at Bangalore centre, to develop high yielding, blast resistant varieties to suit varied conditions. Early and advanced generation material was studied and promising selections were made. In the preliminary evaluation trial with 20 entries, the strain No. 26-27-1-1 gave the highest yield of 33.16 q/ha followed by HR-911 (31.8 q/ha) and Indaf-5 (30.3 q/ha) compared to Indaf-9 (23.19 q/ha) and Indaf-8 (26.28 q/ha).

In the multilocation trial with eight ragi varieties conducted at Bangalore, Arasikere, Shimoga, Chintamani, Madenur and Siruguppa, variety HR-911 recorded the highest yield (40.46 q/ha) followed by 37.4 q/ha of 7-30-2-2 and 34.7 q/ha of 23-16-12. The check variety Indaf-8 recorded an average yield of 29.83 q/ha.

✓ Ten adaptive trials were conducted in 1982-83 summer and the strain HR 911 gave the maximum yield of 42.47 q/ha followed by 41.11 of Indaf-9, 36.97 q/ha of Indaf-5. Thus, it is established that HR-911 has given 14.15 per cent more yield than Indaf-5, 31.4 per cent more than Indaf-9 and 14.5 per cent more than Indaf-8. Hence this has been proposed for release.

✓ Totally 7 experiments were conducted at Mandya centre. In the pre-final varietal trial with 20 entries, cultures Indaf-15 (30.95 q/ha), Indaf-1 selection (26.01 q/ha), Indaf-5 selection (25.42 q/ha) and Hamsa × 927 (25.27 q/ha) were found to be promising. In the initial yield evaluation trial with 30 entries MR-3 (40.8 q/ha), DR-K-PS-1 (40.49 q/ha) and PR-202 (37.27 q/ha) were found to be promising. In the coordinated trials PES-400 (36.6 q/ha), HR-374 (22.55 q/ha) among early group; Indaf-5 (43.59 q/ha), TNAU-256 (38.59 q/ha) and PES-176 (38.55 q/ha) among medium group, were found promising.

✓ In the advanced yield trial of white ragi cultures with 12 entries, the cultures WR-6, Indaf-11, PR-202 and WR-9 were found to be promising with an yield of 35.9, 35.05, 33.57 and 31.7 q/ha, respectively.



At Nagamangala centre, in the ragi varietal trial with 14 entries, PR-202 (20.20 q/ha) and HR-911 (19.37 q/ha) were superior to Indaf-5 (18.04 q/ha).

1.2.5.2. *Bajra* : Among the bajra populations studied in different trials the performance of the cultures WV 20-4-1-1, 200 × 560, WV-4-1-7-6, APC × J-934, BYL-2, BYL-2 × J-934, BYL-1, D-174 × RB-56 and ICI-7517 were consistently superior confirming the results of the last year.

In the bajra multilocation population trial at Hagari the culture ICI-7517 was found superior to local and at Gulbarga 700 × 560 was superior.

In the initial evaluation trial, culture HBC-11-72 was the highest yielder with 23 q/ha followed by HBC-11-66 with 22.46 q/ha compared to local (18.36 q/ha). In the pearl millet hybrid trial, the hybrid ICMH-423 gave the highest yield (23.75 q/ha) followed by HHB-48 (20.55 q/ha), HHB-47 (20.24 q/ha) compared to local (13.64 q/ha). In the advanced pearl millet trial, hybrid MBH-116 gave the highest yield of 31.76 q/ha followed by MBH-132 (22.03 q/ha) and TECH-440 (23.5 q/ha) compared to BJ-104 (13.2 q/ha).

1.2.5.3 *Setaria* : In the multilocation trial conducted over three locations, *i.e.*, Hagari, Hiriyur and Siruguppa, the culture RS-61-60-5-1 gave the maximum yield of 17.12 q/ha followed by RS-645 (16.32 q/ha) compared to H<sub>1</sub> (16.3 q/ha) and K 22-1-1 (10.4 q/ha). In the advanced setaria trial at Dharwad the cultures SIC-5 gave the maximum yield of 9.95 q/ha followed by SIA 842 (9.51 q/ha) and ISA-1142 (8.39 q/ha) compared to Arjuna (4.11 q/ha) and CO-1 (8.2 q/ha). In *Echinocloa* trial at Dharwad, the culture TNAU-43 gave the highest yield (25.33 q/ha) followed by TNAU-25 (21.81 q/ha) and VL-30 (23.44 q/ha) compared to 15.5 q/ha of local. In paspalum trial at Dharwad CO-3 gave the maximum yield of 23.4 q/ha comparable to 23.3 q/ha of PSC-5. In *Panicum miliare* trial, the culture PRC-12 was the highest yielder with 7.44 q/ha followed by PRC-8 (7.22 q/ha) compared to local (5.83 q/ha).

## 1.2.6 Pulses

1.2.6.1 *Cowpea* : At Bangalore Centre intensive hybridization work was undertaken on cowpea. Thirty four various F<sub>0</sub> crosses were made. 23 F<sub>2</sub> crosses were advanced to F<sub>3</sub>. Two promising crossed material developed at this centre *viz.*, C-152 × 1G-2-1 and 1G × PG-3-6 are in multilocation testing. Recently 116 new lines of cowpea germplasm were added to the already existing stock of 1230 lines.

In the cowpea coordinated trial conducted at GKVK during *khariif*, the entries V-16 (2108 kg/ha), KBC-1 (2061 kg/ha) and CO-VU-2 (2033 kg/ha) were found to be promising over C-152 (1500 kg/ha).

In the cowpea multilocation trials conducted at 5 locations, the genotypes APC-36, APC-68, C-152  $\times$  IG-2-1 were found to be promising.

A promising genotype KBC-1 is accepted for farm trials in late *khariif* which gives 41 per cent increased yields over C-152.

In cowpea varietal trial with 20 entries in the dryland project at Bangalore the varieties TVX-1836-9E, V-26, Kbc-1, 3008, 3217, 3303, 3274 and TVX-944-02E gave maximum yield ranging from 1779 to 1497 kg/ha compared to 1284 kg/ha of C-152. Based on the three years data (81-83) it is observed that performance of varieties like TVX-1836-9E, 3217, TVX-944-02E are consistently superior to C-152. They are also found tolerant to bacterial leaf blight and rust diseases, while C-152 is susceptible to both.

1.2.6.2 *Greengram* : Pusa-115 (1065 kg/ha), Pusa-108 (1016 kg/ha) and UPM-79-3-4 (987 kg/ha), Pusa-104 (987 kg/ha) were found to be promising.

1.2.6.3. *Blackgram* : In the coordinated trial, JU-77-41 (1490 kg/ha) and UPV-80-5-6 (1472 kg/ha) yielded on par but significantly superior over the check K-3 (1244 kg/ha).

1.2.6.4 *Redgram (Pigeon pea)*: In the extra early maturing group, two coordinated trials were conducted, one at Bangalore and another at Arasikere. The entry DL-82 (22.5 q/ha) and H-76-11 (20 q/ha) performed better. In the medium maturity group coordinated trials conducted at Bangalore, ICPL-295 (1847 kg/ha), MA-162 (1780 kg/ha) and LRG-36 (1690 kg/ha) were found to be promising against the check HY-3c (1619 kg/ha).

At Gulbarga centre, breeding for improvement of medium maturity (160-190 days) genotypes of pigeon pea is the major emphasis. Pigeon pea is grown as intercrop with low inputs. The major breeding objectives for increasing yield in such production systems are incorporation of disease resistance, lower level of susceptibility to pod borers and increased genetic potentials of high yields. 1100 single plant selections were made in  $F_2$  populations involving crosses with dwarf and early types. Crosses have been made to transfer wilt resistance to the adapted cultures and individual plant selections were made in segregating material in the wilt sick plots. Extra earliness with dwarfness (90-95 days) and

60-70 cm height in pigeon pea progenies have been incorporated from crosses between PD-1  $\times$  Plant and A-2. They are found useful for the double cropping programme.

In multilocation trials of 8 medium maturity lines, GS-3 (1621 kg) and GS-21 (1583 kg) were superior to the check GS-1 (1414 kg).

In the multilocation trial of pigeon pea conducted at Bijapur, Bheemara-yanagudi, Bidar and Gulbarga, GS-1 and GS-3 recorded the highest yield at Gulbarga. The cultures BDN-1  $\times$  GS-3 performed better at Bijapur and appears to be promising with bold white seed. It is also immune to wilt under field conditions.

In the large scale yield trials, the cultures Perennial, GS-2-15 and C-9-45, recorded the yields of 1604, 1542 and 1504 kg/ha respectively compared to GS-1 (1222 kg/ha). In the small scale trial, the variety GS-1-21 recorded the highest yield of 1560 kg/ha followed by C-1-151-1 (1450 kg) and IC-7328 (1427 kg) compared to 1240 kg of GS-1. In the initial yield evaluation trial, the cultures GS-2-421 (1840 kg) and C-3-513-1 (1832 kg) were found to be superior over GS-2 with 1480 kg.

In *rabi* trials the released variety GS-1 topped the list with 1122 kg followed by C-24-95 with 1000 kg/ha compared to T-29 (495 kg/ha) and BDN-1 (828 kg/ha).

1.2.6.5 *Bengalgram* : The results of bengalgram multilocation trial have confirmed the superiority of 2375, A-1-95, GBS-2 over A<sub>1</sub> consistently during the last three years.

In the multilocation trial with 8 cultures, the culture 18-7-2-1 gave the maximum yield (1586 kg/ha) followed by A-1-1 (1556 kg/ha) and 2374 (1537 kg/ha) compared to A<sub>1</sub> (1352 kg/ha).

In the small scale trial, the variety IC-73129-16-13 gave the maximum yield (1797 kg/ha) followed by U24  $\times$  A-69411 (1789 kg/ha) compared to Annigeri-1 (1611 kg/ha).

Several new crosses have been effected to incorporate disease resistance, high pod number, bold seed size and multipod numbers. Twelve different F<sub>2</sub> populations were studied. From 4000 F<sub>3</sub> progenies, 40 promising lines were selected. 400 new germplasm collections were made from ICRISAT and other centres.

1.2.6.6 *Horsegram*: In the multilocation trial on horsegram with 12 entries in the dryland project at Bangalore the variety HH-2 (Hebbal Hurali No. 2) gave the highest yield of 1145 kg/ha compared to 1008 and 985 kg respectively of CODB-6 and IC-11095 which however gave higher biomass production of 7825 and 8824 kg/ha respectively compared to 3010 kg/ha of HH-2.

1.2.6.7 *Soybean*: In the elite varietal trial, conducted at Dharwad, variety KHSB-5 and KHSB-2 were high yielders giving 22.01 and 22.12 q/ha respectively. In the advanced varietal trial, the variety KHSB-2 which is the local check itself was the highest yielder with 22.12 q/ha. In the initial evaluation trial, the strain Kb-18 from Bangalore was the highest yielder (1978 kg/ha). It is early maturing in 95 days. It yielded 625 kg more than KHSB-2. It is followed by Kb-8 which yielded 1714 kg/ha.

In NARP trial conducted at Mandya under irrigation, the variety Jupiter yielded 38.61 q/ha. At GKVK, KHSB-2 yielded highest (1366 kg/ha). However, at Chintamani, the variety Hardee (730 kg/ha) was the highest yielder.

In the national screening nursery, out of 144 varieties tested KSHB was the highest yielder (317 g/plot). 28-0 germplasm collections were collected and maintained. Fresh crosses have been effected involving local black soybean, Jupiter, Hardee, KHSB-2, *Glycine formosona* and *Glycine weightii*.

#### 1.2.8 *Groundnut*

There were 5 groundnut trials (ICAR) conducted, three at Dharwad and two at Sankeshwar. The entries which gave highest yield in respective trials were DH-8 (4624 kg) in LET (SB), ICG 1697 (4292 kg) in CVT (SB), ICG 7882 (4792 kg) in FDRV (SB), C 364 (1134 kg) in IET (VR), Egret culture (1551 kg) in EET (VB).

A multilocation trial of 10 groundnut cultures was conducted at Bailhongal, Bagalkot, Chintamani, Dharwad and GKVK, Bangalore. The average yield indicated the superiority of DH-8 (2033 kg/ha) over other entries. Apart from these trials, 5 large scale, 6 small scale trials were conducted and promising culture EC-6875, culture 1-16, DH-56, CT-8, CT-7 from LYT and cultures DH-8T, DH-8, culture 217, 147 from SST have been identified as superior. The outstanding cultures will be included under multilocation testing. Crosses have been effected to incorporate disease resistance, and earliness in the ruling varieties. In the ICRISAT Peanut trial-1, ICGH-30, ICGH-31 and AG-8174 gave the maximum yield of 2966 and 2816 kg respectively against 2200 kg of DH-3-30 at Bangalore.

At Chintamani, in the initial evaluation trial with 20 entries, DH-8 recorded the highest yield of 3063 kg followed by JL-24 (2702 kg) compared to 1239 kg of Bagepally local. In the coordinated varietal trial, Dh-12 gave the highest yield of 2324 kg followed by CGC-4018 with 2162 kg, compared to 1603 kg of JL-24 and 1272 kg of Bagepally local. In the initial evaluation trial of Virginia runner with 12 entries, the culture C-336 recorded highest yield of 2434 kg/ha followed by JSP-6 with 2280 kg compared to 1274 kg of Bagepally local. In the national elite trial with virginia bunch, TG-17 gave the highest yield of 1527 kg followed by TG-9 (1349 kg) and TG-19A with 1342 kg/ha.

### 1.2.9 Sunflower

In the coordinated varietal trial conducted at Bangalore with 8 entries TNSUF-4 with 1595 kg/ha of seed yield ranked first followed by KSF-3 with 1570 kg. In indigenous hybrid trial-1 conducted with 12 entries, MSEH-8 gave the highest yield of 2355 kg followed by KBSH-4 and BSH-1 with 2340 and 2281 kg/ha respectively. The indigenous hybrid trial-2 was conducted with 9 entries and in this BSH-1 with 2192 kg/ha of seed yield topped the list followed by PVKSH-11 with 1921 kg of seed yield. In the indigenous hybrid trial conducted with 10 entries, MSFH-1 gave the highest yield (2266 kg) followed by BSH-1 and APSH-11 with 2088 and 2059 kg/ha respectively. Besides these, two trials were conducted one each on single and 3-way cross hybrids. Out of 29 entries tested on single cross hybrids 16 hybrids surpassed BSH-1 for seed yield ranging from 2033 to 2733 kg/ha as compared to 1988 kg/ha of BSH-1 and two hybrids gave significantly higher seed yield compared to BSH-1. An experiment conducted with 20 entries under three way cross hybrids, 8 entries surpassed BSH-1 for seed yield in the range of 2677 to 3000 kg/ha compared to 2588 kg/ha of BSH-1.

At Raichur centre in IET-1, MSFH-8 gave the highest yield of 2108 kg/ha followed by MSFH-9 (1907 kg/ha) compared to the check BSH-1 (1159 kg). In IET-2, the hybrid MSFH-4 (1859 kg/ha) occupied first place followed by MSFH-5 (1585 kg/ha) and BSH-1 (1079 kg/ha).

In super-elite and elite seed production scheme of sunflower variety EC 68415, 2208 individual plant selections were made. The mean single plant yield was 67.45 g and oil content was 46 per cent. In the progenies grown with these plants, 432 lines were selected. In Morden, 1500 individual plant selections were made. The mean yield was 33 g per plant with an oil content of 32.47 per cent. From these, 78 progenies were selected. A new population CGP-1 which was entered in coordinated trial has been performing well. Among the hybrids developed 308 × RH-801 gave the highest yield (2903 kg/ha) while the combination CMS-239 A × RH-801 is also promising. In the varietal

renovation programme from 1977 to 1982 an increase in 5 per cent in oil content of EC-68415 has been achieved. In the sunflower germplasm maintenance, 444 collections were evaluated. Oil content ranged from 21.9 to 51.2 per cent while the 100 seed weight ranged from 3.21 to 11.7 g with a mean of 4.76 g. During 1983-84 eleven accessions from Bulgaria, 26 from Hungary, four from East Germany and three from Italy have been added including two wild species *Helianthus decapetulus* and *H. trachelifolius* and they are being used in the breeding programme.

#### 1.2.10 Safflower

The breeding work on safflower is being carried out at Annigeri. In IET-2, CVT-1 and CVT-2, A-1 stood first and was significantly superior to other entries. In the station trial, B-3-15 gave significantly higher yield (1660 kg/ha) over A-1 (1304 kg/ha). B-3-15 recorded an oil content of 34 per cent while A-1 had an oil content of 28.9 per cent. Promising lines have been selected from the segregating material of the cross of Annigeri-1 × Royal.

#### 1.2.11 Sesamum

About 1256 germplasm collections were evaluated at Raichur. In IET trial conducted with 50 entries, it was found that JT71-H was the highest yielder followed by GS-12, RCR-4, GS-38, HT-6 and US-2. Among 30 entries included in CVT, TC-171 topped the list with 9.9 q/ha followed by PDP-1-2 with 9.5 q/ha compared to 9.1 q of Raichur local. In the multilocation trial, conducted with 15 entries PDP-1-2 (5.8 q) was the highest yielder compared to E-8 (5.1 q) and Kanakapura local (5.6 q). In the ICAR ad-hoc project on sesamum in the coordinated varietal trial conducted with 9 entries Co-1-1(ZC) gave the highest yield (6.78 q) followed by C-6 (5.4 q). In the national elite trial, the cultures C-7 recorded the highest yield of 6.8 q/ha followed by C-6 (5.5 q). In the station trial conducted with 6 entries, the culture EB-7-4 gave the highest yield (5.84 q) followed by EB 13-1 with 5.38 q. Out of 29 lines screened for powdery mildew resistance, 7 cultures were found to be highly resistant.

Four trials of sesamum were conducted at Dharwad. The results indicated that E-8 performed better in the trials CVT (306 kg), NWT (504 kg) whereas RCR-4 (345 kg) in IET and PDP-1-2 (524 kg/ha) in MLT proved better. Line × tester analysis of sesamum including 5 ruling varieties as lines and 22 tester has been initiated to combine high yield with disease resistance and earliness.

At Dharwad in the IET, culture Tilothama was the highest yielder (3.93 q/ha) followed by RCR-4 (3.83 q/ha) compared to E-8 (2.94 q/ha). In the multilocation trial, PDP-1-2 gave the highest yield of 5.24 q/ha followed by

Dharwad local (3.83 q/ha) and E-8 (3.74 q/ha). In national elite trial with four cultures, E-8 gave the highest yield (3.03 q/ha) followed by C-7 (2.05 q/ha).

#### 1.2.12 *Linseed*

Linseed breeding work was conducted at Raichur. 49 entries of linseed were tested in the initial evaluation trial. KRL-1 with 7.77 q gave the highest yield followed by KRL-2 with 6.14 q/ha. In the coordinated trial with 22 entries, the culture RS-77 gave the highest yield of 5.3 q followed by Gulbarga local with 4.63 q. In the national elite trial conducted with 8 entries, Gulbarga local gave the highest yield of 6.36 q followed by S-36 and T-397 with 6.31 and 6.02 q/ha, respectively.

#### 1.2.13 *Niger*

There were four trials at Dharwad. In all the trials No. 71 performed better than others.

#### 1.2.14 *Castor*

Cultures SH-25, SH-41 and 48-1 were quite promising compared to EC-8 at Dharwad. Among the hybrids SHB-12, SHB-34 and BHB-13 were quite promising compared to GAUCH-1 and RC-8.

#### 1.2.15 *Cotton*

Studies on intra-hirsutum hybrids conducted at Dharwad indicated that out of 6 intra-hirsutum hybrids tested, DCH-337, DCH-397 and T6 × M7 recorded yields ranging from 26.3 to 27.4 q/ha as against 22.1 q/ha of Sharada and 18.2 q/ha of Laxmi. The yield increased were of the order of 20 per cent over Sharada. These three hybrids were distinctly early with GOT ranging from 36.2 to 38.4 per cent. DCH-397 has the biggest bolls (6.23 g/boll). This is in conformity with last year's observations.

Out of 5 *G. hirsutum* strains tested, CPD-11-1-2 and DO-225 gave yield of seed cotton of 24.8 and 23.7 q/ha respectively as against 24.3 q of Sharada, 24.1 q of LRA-5166 and 20.1 q/ha of Laxmi. DP-225-1 was the earliest with compact plant type with probably the highest harvest index. Fibre quality needs to be reassessed on second random sample of DP-225 since its trend is contrary to previous 3-4 years. However, strains CPD-11-1-1 and DP-225 are superior to rest and Sharada since they possess additional plus points of crop maturity and boll size.

In coordinated varietal trial on *G. hirsutum* strains, 10 strains were tested out of which RAS-53-257, DP-445 and DP-452 gave increased yield by 7 to 8 per cent over Sharada recording around 24.9 q/ha. Out of them DP-452

and DP-445 are better in GOT and fibre parameters. In addition, UAS-48-4 and DP-336 gave yields equal to Sharada (22.97 q/ha), while the latter was better in fibre quality. RAS-53-257 had the highest ginning, boll size and shortest fibre. The performance of DP-445 and DP-452 are in conformity with that of last season.

Preliminary varietal trial on *G. hirsutum* strains indicated that out of 17 strains tried, DRC-6, MESR-24, DP-1773, RKR-4145 and JK-258 have recorded yield on par with Laxmi and Sharada and the yield of seed cotton ranged from 23.0 to 24.4 q/ha as against 22.6 of Laxmi and 21.5 q/ha of Sharada. All these five strains are earlier to Sharada and Laxmi, beside possessing better fiber parameters. Strain RKR-4145 combined high ginning outturn (43.2 per cent) and longer lint (23.6 mm). DP-1773 is next in order for combination of characters *plus* larger boll size. The performance of DRC-6 was better last year.

Initial evaluation trial on *G. hirsutum* strains showed that out of 16 strains tested, 14 strains gave increased yields by 15 per cent and above than high yielding check, Laxmi. Their yield ranged from 27.7 q/ha to 19.7 q/ha as against 17.1 q/ha of Laxmi and 16.7 q/ha of Sharada. All of them were earlier to Sharada. High ginners about 38 per cent are DRC-91, DRC-67, DRC-17, DRC-82, DRC-30, DRC-25 and DRC-22. Most of these strains also possessed boll weight of 5 g and above. The best combinations with significantly higher yields are DRC-68, DRC-91, DRC-67, DRC-17 and DRC-82.

Performance of *G. arboreum* × *G. herbaceum* hybrids under rainfed conditions has revealed that out of 5 desi hybrids (*G. herbaceum* × *G. arboreum*) tested, DDH-2, DH-71, DDH-1 and DH-22 gave seed cotton yields ranging from 12.1 to 17.3 q/ha as against 6.29 q/ha which indicates potential scope to exploit desi cotton hybrids for increasing medium staple cotton production under rainfed conditions. Out of the four, DDH-2, DDH-1 and DDH-22 were high ginners ranging from 31.4 to 33.9 per cent.

Out of 3 strains of *G. herbaceum* tested under rainfed conditions DB-3-12 recorded highest yield of 11.33 q/ha as against 19.29 q/ha of Jayadhar and is in conformity with the findings of last season. DB-3-12 with distinct advantage in seed cotton yield, ginning outturn, earliness and plant type has been released to desi cotton belts of Jayadhar, R-51, Westerns and Suyodhar in 1982.

In coordinated varietal trial on *G. herbaceum* strains, 7 strains were tested out of which DB-3-12-4 recorded equal yields to Jayadhar. Similar trend was observed at Dharwad in 1981-82 with higher ginning outturn of DB-3-12-4.



Study on preliminary varietal trial on *G. herbaceum* strains indicated that out of 11 strains tested, R-51 × HK-86-3, RDF-7-13-12, DB-3-12-6 and CPD-5284 recorded yields ranging from 11 to 12 q/ha which are on par with Jayadhar and DB-312 checks. Earliness and ginning outturn of these four strains are better than Jayadhar.

In initial evaluation trial of *G. herbaceum* strains 18 strains were tested, out of which DB-3-12-5-116 and MDS-56 gave equal yields to Jayadhar but with distinctly higher ginning outturn and early crop maturity.

At Siruguppa centre, based on the tests of five seasons, DS-70-4-80 gave seed cotton yield of 31.1 q/ha compared to local check Hampi (24.4 q/ha). Besides it is better in ginning (38.2 per cent) and hallow length (26.4 mm) compared to Hampi (35.2 per cent) and (23.1 mm). This variety is under adaptive trial. The entry JGL-14515 gave 32.9 q/ha compared to Hampi (28.6 q/ha) and DS-56 (27q/ha) over the seasons. In the interspecific hybrid cotton trial, the hybrid LHB-22 gave the yield of 37.4 q/ha followed by H-134 (35.9 q), H-64 (34.5 q), Jayalaxmi (32.4 q) and Varalakshmi (29.9 q/ha). In the project on breeding for improvement of *Gossypium hirsutum* cotton for river valley project area, the cultures SRG-534, SRG-659, SRG-531, 530, 153, 629, 155, 519, 591 and 586 were found promising.

#### 1 2.17 *Sugarcane*

Under trial on high yielding midlate and late varieties, 13 replicated varietal trials were conducted at centres namely Mandya, Sankeshwar, Bidar, Siruguppa, Nagenahalli and Kathalgere. The promising clones identified are KMS-1459, KMS-2084, KMS-2262, KMS-2295, KMS-2300, KMS-2301, KMS-2302, KMS-2375, KMS-2381 and CO-7804 at Mandya Centre, KMS-1975 at Kathalgere centre, CO-7318, CO-7219 and CO-1295 at Bidar Centre, CO-7219 and MS-7438 at Sankeshwar centre as well as MS-7455, CO-70, A-465 and CO-7527 at Siruguppa Centre. In short duration varietal trials planting one in May and other in February have conducted at Mandya. L-61-52 an exotic variety matured at 9 months age in both planting seasons suggesting its highly heritable short duration maturability. Other varieties behaved as early varieties by maturing at 11 months. In May planting season, CO 419 (150 t/ha) and CO-62175 (132 t/ha) recorded highest cane yield while in February planting season CO-A-7601 has recorded highest cane yield of 113 t/ha as against 100 t/ha of B-17172 and KHS-3296.

KHS-3296 sparsely arrowing cane variety has been approved for farm trials with CO-419 of CO-62175 as check in Mandya area (Zone 6 × 8). CO-7219, a rich early cane variety with moderate resistance to smut and high degree of

drought tolerance has been approved for farm trial with CO-740 as check variety in Northern Karnataka (Zone 7 × I).

#### 1.2.18 *Bidi Tobacco*

Nippani Station has released two varieties of tobacco, *i.e.*, S-20 and NPN-190. Another culture PL-5 because of its consistent performance both in yield and quality was recommended for release by the IX Tobacco Workshop. Recently in the State Variety Evaluation Committee, this variety has been released.

In the final yield trial, the highest yield of 1386 kg/ha was recorded by Line 633-53-8-5 followed by L-633-33-36-7 (1299 kg/ha). PL-5 gave 1008 kg/ha whereas A-119 and NPN-190 recorded 875 and 940 kg/ha, respectively.

Some of the promising lines which are undergoing testing at various stages are S-20 × 14-103-39-28-28, A-119, 360-92-25-11 and 148-110-28-28. The yield recorded were 3080, 2940, 2770 and 2745 kg/ha, respectively compared to 2550 kg/ha of PL-5.

In the preliminary yield trial, the promising lines in order of merit were 344-37-15-19 (1558 kg), 348-3-35-14 (1300 kg), 386-106-9-18 (1250 kg) and 344-37-15-31 (1205 kg). The checks PL-5 and A-119 gave 939 and 915 kg/ha respectively.

#### 1.2.19 *Chilli*

In the project on improvement of chilli at Dharwad for yield and improvement of resistance to murda and mosaic diseases several individual plant selections have been made which are found resistant to all viruses and insect pests like thrips and mites.

#### 1.2.20 *Fodder Research*

In the evaluation of fodder cowpea with six cultures, the varieties (Chinese red × Iron grey)–24 gave significantly higher green forage yield of 41.47 t followed by (Chinese red × Russian giant)–6 with 37.71 t/ha. In the trial on horsegram cultures with six entries the entry IC-10982 (33.25 t/ha), IC 14995 (33.25 t/ha) produced significantly higher yields over the rest of the entries. The local check gave 29.96 t/ha. In the project on development of forage sorghum with 115 cultures, it was observed that the cultures 1395 × 1079 (27.72 t/ha dry matter) and 1080 × J-Se-4-3 (26.86 t/ha) were the highest yielders followed by 26.72 t of J-set-3.

In the project on linkage studies on cowpea at Dharwad, genetics of qualitative characters were studied. Inheritance of pigmentation is complex one. In view of the possible association with duration, it was subjected to the

detailed genetic analysis. The different patterns of pigmentation such as solid and scattered were controlled by complementary and inhibitory genes respectively, while on the secondary and tertiary branch it was controlled by threshold dominant gene interaction. Pigmentation on the stalk is monogenically controlled, while the peduncle surface is controlled by threshold dominant gene interaction. Triplicate genes are responsible for the inheritance of calyx, while the standard petal, stipules and pod surface are governed by three complementary, duplicate genes and monogenic, respectively.

### 1.3 Crop Physiology

#### 1.3.1 Rice

Mixtalal, a growth regulator trial on growth and yield of rice, conducted at Mandya indicated that Mixtalal spray at 2 ppm and 5 ppm recorded the significant yield increase over the control. But at 10 ppm there was reduction in yield. NAA at 10 ppm has recorded highest grain yield.

Studies on synchrony of flowering and its effect on yield and yield attributes indicated that both dwarf and tall cultivars have more number of primary and tertiary tillers. The spikelet sterility increased progressively from main tiller to tertiary tiller, thus reducing the grain number markedly. As a result, the grain weight decreased with different types of tillers. However, the grain weight of primary tillers was more due to increased number of filled grains, thus suggesting the possible increase of productivity/plant/unit area of any genotypes by increasing primary tillers.

Studies on assessment for potential grain filling showed that among all the varieties, Prakash has recorded the maximum per cent of good filled grains (76.66%) with minimum per cent of chaffy grains (8.77%). Sita and IET-5656 have shown the next higher per cent of good filled grains. The lowest per cent of good filled grains (61.84%) and highest per cent of chaffy grains (21.5%) were noticed in Ratna. Sita and Jaya have produced higher per cent good filled grains.

In a trial on evaluation of herbicides for weed control in paddy, six herbicides were applied immediately after transplanting, butachlor, benthocarb and pendimethelin were found to be more effective in controlling the weeds.

In a study on effect of CCC and ethrel on plant growth and productivity in rice, two growth regulators were applied as foliar spray 30 days after transplanting. Ethrel 600 ppm spray recorded 6.2 per cent increased grain yield over control which was due to reduced chaffyness (8.4%).

In a comparative trial on growth pattern of Echinochloa and paddy, two species of Echinochloa namely *E. glabrescens* and *E. oryzoides* were compared with paddy (Jaya) for relative growth rate and dry matter production. Initially both species of Echinochloa maintained superiority in leaf area and in dry matter till 57 days after sowing in relative and absolute growth rate. Paddy was superior to Echinochloa species between 20 and 37 days after sowing whereas between 38 and 57 days after sowing this differences narrowed and *E. glabrescens* showed its superiority.

Butachlor at 0, 10, 50 and 100 ppm were used to know the uptake of the herbicides through cucumber root growth bioassay and direct effect on shoot and root growth of paddy (Rasi) and *E. glabrescens*. Increasing the concentration of butachlor decreased the root and shoot length of paddy and Echinochloa. The relative decrease was more marked in shoot growth. Paddy showed lesser per cent decrease of shoot when compared to Echinochloa. Ethylacetate extract showed higher amount of butachlor in seedling of Echinochloa than in paddy as evident through reduction in root growth of cucumber bioassay. Further, the inhibition increased with increase in concentration.

In an allelopathic study of *Trichodima zeylanicum* different plant parts of this weed were collected from well grown plant at flowering and dried. The aqueous extract of the plant was tested for presence of inhibitory substances on the root growth of cucumber seeds. The young leaves showed some inhibition than other plant parts indicating the presence of higher amount of inhibitory substance in leaves.

### 1.3.2 Sunflower

Experiments on growth and yield analysis in sunflower showed a direct relationship between leaf area per plant and seed yield, and between total dry matter per seed yield. Dry matter accumulation and seed yield were found to be increased with leaf area increase. Increasing LAI increased the total canopy photosynthesis and this resulted in the higher seed yield.

Studies on genotypic variation in leaf expansion rate under stress conditions with sunflower genotypes showed variation in the leaf expansion rate under non-stress and moisture stress conditions. Under non-stress condition, EC-68415, BSH-1, 89 × 801 and SUF-4 showed relatively high leaf expansion rate. Under moisture stress conditions SUF-4 showed relatively high leaf expansion rate. Under moisture stress conditions SUF-4 and 89 × 801 showed lesser reduction in leaf expansion rate. Under severe stress conditions all the genotypes tested showed reduction in leaf area. The reduction in leaf area was less in the varieties EC-68415 and CGP-1.

In a study on effect of cycles of stress on rate of water loss and membrane integrity in sunflower genotypes; it is indicated that when the leaves of the plant which had a previous history of stress were allowed to loose water, the rate of water loss was less in all the genotypes compared to the leaves of the plant which had not received early moisture stress. Genotypic variation was observed in this parameter. Hybrid BSH-1, variety EC-68415 and CGP-1 showed relatively very less water loss.

Membrane damage as determined by the per cent of solute leached into the medium of water after stress treatment was also less in the leaves of the plant which had previous history of stress. In EC-68415 and BSH-1, the solute leaching from the leaves was less under moisture stress conditions.

Studies conducted on dormancy in sunflower seeds showed that the dormancy in the early stages up to 10 to 15 days after harvest was due to the inhibitors present in the seed coat as well as in the kernel. The dormancy from 10 to 45 days after harvest was mainly due to water soluble inhibitors present in the seed coat.

Studies on storing the seeds at different relative humidities showed that if the RH in the storage conditions is about 85 per cent, the seeds loose viability within 45 days and the germination per cent reduced to less than 10 per cent.

#### 1.3.4 Pulses

Effect of growth regulators on growth and yield of mung bean (*Vigna radiata* (L.) Wilczek) is showed that mung bean variety (Jawahar-45) was selected to see the effect of two commercial growth regulators viz., Atonik and Triacotinol. The former was sprayed at 1000 ppm and 500 ppm, whereas, the later at 5 ppm and 2.5 ppm at 50 per cent flowering. The results revealed that both of them did not have any significant effect on different parameters such as plant height, number of pods per plant, total pod weight, pod length, seed number per pod, seed weight per plant and 100 seed weight. Six promising varieties each of redgram (Hyd-eC, TTB-7, MA-162, MTH-1, ICPL-295, ICPL-2 and cowpea C-152, S-488 (W), APC-68, TVX-944-02E and KBC-1) were tried for seed germination test in paper bag technique. The objectives were to screen them for seed dormancy and to know the physiological machanism involved in the loss of seed viability. Germination percentage was from 78 to 95 per cent in all these varieties.

In tissue culture study, callus tissue was initiated from two week old hypocotyl explant of cowpea CV-C-152 and successfully maintained on white sand Mur-ashige and Skookys basal media supplemented with different growth

regulators. It was further differentiated into roots, shoots and complete plantlets by varying the concentrations of growth regulators in different combinations. Meristem tips were also cultured on these basal media from interspecific hybrids of horsegram to obtain plantlets free from horsegram yellow mosaic virus.

#### 1.3.5 *Sorghum*

Studies on growth and yield analysis of sorghum genotypes at Dharwad indicated that generally with increase in leaf area at 50 per cent flowering stage, there is increase in yield but a few genotypes were identified having low leaf area but still producing high dry matter and yield (SPV-126, SPB-46B, SB-2432, SB-3304, SPV-387, SB-3307, SPV-475, SB-2431 and SB-3407).

Trial on yield levels of rainfed *rabi* sorghum indicated that grain yield was higher in early sown crop as compared to late sown crop. The highest yielder was CSH-8R followed by SPV-86, RV-1 and M-35-1. Early sowing resulted in higher grain number/ear and 1000 grain weight was higher at lower population levels. In early sowings, total dry matter (TDM) accumulation and leaf area index was higher as compared to late sown crop.

Physiological studies on the causes of charcoal rot incidence in sorghum genotypes showed that in varieties CSH-8R and SPV-86, spraying of urea has given the highest grain yield because of greener leaves at harvest and slower rate of senescence. Treatment with Cytokinin (CK) gave highest threshing percentage in genotypes E-36-1. The incidence of charcoal rot was heavy in entries CSH-8R and SPV-86 and in E-36-1, the incidence was least. The grain number/ear was higher in the treated entries as compared to control.

#### 1.3.6 *Cotton*

During the current year, the experiment on physiological and biochemical aspects of seed development was continued and the data were obtained for Laxmi and Jayadhar at three flowering phases (Early I, Middle II and Late III) under both rainfed and irrigated conditions. In general, irrigating the crop enhanced boll set, boll period, seed number, seed weight, test weight and seed growth rate, particularly in Laxmi than in Jayadhar. In both cases all the components were higher at I phase, with considerable decline at later phases of flowering. Fertilizer application to the crop particularly N alone, had significant effect on the parameters studied than in combination with P or P and K.

#### 1.3.7 *Cardamom*

Twelve clones have been planted under uniform shade of coir matting in a complete randomised design. Techniques to measure stomatal index frequency are being standardised at Mudigere.

### 1.3.8 **Water Management Scheme (ICAR), Dharwad**

Experiments conducted on chemical control of weeds in maize indicated that Terbutryn at 0.25 kg ai/ha and Simazine at 1.0 kg ai/ha were found effective in controlling the weeds in maize. Terbutryn at 0.25 kg ai/ha though produced the highest yield of 69.65 q/ha it was on par with 2,4-D at 1.0 kg ai/ha (68.29 q/ha) when used as post-emergence spray especially on parthenium which is the major weed.

Studies on iron chlorosis in groundnut indicated significant differences among various  $\text{FeSO}_4$  treatments. Maximum yield of 1004.9 kg/ha was obtained in the treatments receiving foliar application of  $\text{FeSO}_4$  (0.5 per cent) + Urea (1.0 per cent) at 30, 60 and 90 days after sowing (DAS) and it was significantly superior to all other treatments. The increase in yield was to the tune of 25.5 per cent over control.

Under Saline Water Scheme (ICAR) Dharwad, the three maize genotypes were tested for salinity tolerance. Deccan-101 was found to be more tolerant than GS-25 and Arabhavi local. The sensitivity decreased in the following order of the growth stages viz., presowing > vegetative > throughout the growth stages > reproductive stage in all the genotypes. Presowing salinisation reduced the growth as well as yield and yield components significantly at 6 EC and 12 EC saline water application over control. The potassium and sodium content (K : Na ratio) worked out among the genotypes showed significant differences and the genotypes Deccan-110 showed more potassium uptake as well as higher K:Na ratio when compared to Arabhavi local.

In a trial on effect of saline water irrigation at different growth of safflower, four genotypes viz.,  $A_1$ , A300,  $S_{144}$  and  $B_3$ -16-56 were tested to find out the most sensitive growth stage for saline water application at 0, 6 and 12 mmhos/cm. Genotypes differed significantly in their yield and yield components. The genotype  $A_1$  showed comparatively better tolerance over other genotypes. The least tolerance was found in  $S_{144}$  genotype. Among the growth stages tested, presowing salinisation was most sensitive for saline water application followed by flowering stage as compared to bolting stage. The potassium and sodium content in the leaves showed that  $A_1$  recorded highest potassium uptake and highest K:Na ratio whereas the reverse was the case with  $S_{144}$ .

### 1.3.9 **Weed Control**

In the study on translocation of foliar applied 2,4-D in solanum and parthenium, two separate studies were made to know the effect of varied additives (2,4-D alone, with triton at 0.1 per cent and with citrate phosphate buffer

of pH 2.6) under sucrose and non-sucrose conditions on the pattern of foliar (single leaf) applied 2,4-D translocation. After 24 hours of application, counts were recorded in different plant parts. The fed leaves showed higher activity in both the species. In solanum application of 2,4-D along with triton or lowering the pH enhanced the translocation to the roots from the fed leaf. Addition of sucrose increased and translocation to the roots from the fed leaf. Addition of sucrose increased and translocation further to the roots. The distribution of 2,4-D was better in all plant parts in triton+sucrose treatment. In parthenium, translocation to the other leaves were enhanced by application of 2,4-D along with triton and triton+sucrose. The roots and stem showed less activity in all the treatments.

#### 1.3.10 *Yellow Leaf Disease of Areca*

The experiments initiated during the year 1981-82 were continued during the year 1983-84 at Hosabale and Talvata (Sagar). The treatments included are :

- 1) Emissan - 6 (0.2 per cent) 5 litres/palm.
- 2) Paushamycin (200 ppm)
- 3) Urea 140 g ; S. Phosphate-500 g ; M. Pot. 150 g ; Agriline-85 g/palm
- 4)  $T_3 + ZnSO_4$  8, 5 g.
- 5)  $T_4 + Emissan$  (-2 per cent) + Furadon granules 60 g, and
- 6) Neam cake 5 kg/palm.

The arecanut palms with YLD symptoms receiving the treatments 3, 4 and 5 showed slight improvements in the visual symptoms at Karimane and Herur. Similarly the above treatments seem to evince response at Hosabale and Talavata where the palms are suffering from Sagar syndrome. The observations are continued.

#### 1.3.12 *Sucker Control in Tobacco*

A field trial conducted at Navile (Shimoga) and Nippani have shown that ILTD mixture and acetyl alcohol (1 per cent) effectively controlled the suckers both in FCV and bidi tobacco.

#### 1.3.13 *Tissue Culture Studies in Selected Crops*

Combinations of 2,4-D, NAA, kinetin with amino acids, GA3 and vitamins were tried for the culture of cardamom moristeur explants. The media containing NAA supported the maintenance of explants green and healthy.



## 1.4 Agricultural Chemistry and Soils

### 1.4.1 Minerology

The analysis of clays of vertisols revealed their siliceous nature ( $\text{SiO}_2$ ) ranging from 51.2 to 56.5 and fine clay  $> 0.2\mu$  constituted 80–84 per cent of the total clay and the coarse clay of 2 to  $0.2\mu$  amounted to 12–16 per cent.

### 1.4.2 Pedology

Genesis and classification of two series of soils in Dyavapatna and Bidare series of Karnataka consisting of four soil profiles each revealed the existence of oeric epipedon and well developed argillic horizon. Petrographic studies showed the granite gneiss content. Topography and climate played the dominant role over parent material. Dyavapatna series were formed *in situ* while Bidare series were transported and deposited soils. X-ray diffraction studies indicated the presence of kaolinitic and mica in both the soils.

### 1.4.3 Soil Chemistry

In an effort to evaluate the efficiency of insoluble phosphatic fertilizers in acid soils of Karnataka, it was tested on superphosphate compared with musso-rie rock phosphate (MRP), Udaipur rock phosphate (URP) and nitro-phosphate (NP) on acid soils of Bangalore and Mangalore under incubation studies. Rapid dissolution of phosphorus was pronounced initially in superphosphate which declined with time. But the trend was reversed in case of other sources of phosphorus. In general, the rate of phosphorus availability was greater in soils of Mangalore than at Bangalore. It was due to low pH in Mangalore soils. Pot culture studies at Bangalore on maize revealed the superiority of superphosphates and nitrophosphate. However, musso-rie and Udaipur rock phosphate caused greater residual effect of the succeeding crop.

Laboratory investigations on toxic effects of nickel and chromium on coriander and amaranthus was noticed at 10 and 100 ppm of chromium respectively. Chromium appears to be more toxic than nickel. Amaranthus was more tolerant to chromium and nickel than coriander.

### 1.4.4 Soil Fertility

Experiment conducted on vertisols at Siruguppa to assess the yield and quality of safflower through application of nitrogen, phosphorus, sulphur and boron revealed that 150 kg N, 75 kg  $\text{P}_2\text{O}_5$  and 5 kg of sulphur with 2.5 kg of boron resulted in high seed yield, oil yield and also on certain quality attributes of safflower. The increase in seed yield was of the order of 6.2 q/ha over control. Oil content improved by 2.06 per cent and protein by 17 per cent.

Experiment on the response of hybrid maize to direct and residual effects of P from superphosphate (SP), nitrophosphate (NP), mussorie rock phosphate (MRP) and Udaipur rock phosphate (URP) revealed that SP and NP were superior to others in increasing the dry matter yield and uptake of nutrients and MRP and URP were superior sources to SP and NP in their residual effect on yield and uptake in the succeeding maize crop.

The study conducted on red soils of Hebbal indicated that the optimum ratio of soluble Ca-Mg-K to groundnut would be in the order of 11 : 5 : 1 in recording the highest pod yield. Ca-Mg antagonism was also noticed which was similar to the one as observed in Ca and K.

The influence of lime and FYM on the available phosphorus content and its transformation of native and available phosphorus on cowpea on red soils of GKVK revealed marked improvement in the available phosphorus content. FYM application not only enhanced the available soil P but it added synergistic influence on the availability and uptake. Transformation of native and applied P into Al-P also increased by the application of lime and FYM. The efficacy of iron carriers on sorghum, wheat, bengalgram and redgram as test crops grown on vertisols of ARS, Siruguppa revealed that Fe-pressmud, Fe-OM and Fe-DTPA were superior in improving the grain and seed yield as well as the uptake of iron. The residual effect of these carriers on the succeeding crop of sorghum was of high order. The uptake of N, P, K, Fe and native Zn was also enhanced.

The significance of seed dressing with different iron carriers was reflected on the yield of sorghum. The dosage of 75 kg N and P each per ha with 2.5 ppm of Fe-pressmud/Fe-OM/Fe-DTPA was effective in obtaining the economic yields.

Dressing Bengalgram seed with Mo at 2 g/kg seed as ammonium molybdate and 4 and 8 g of  $\text{ZnSO}_4$ /kg seed respectively not only improved the yield but also the uptake of P, K, Zn and Fe as well. The beneficial effects of applied selenium and cobalt at 2 ppm level with fertilizers to forage crops of napier grass, maize and cowpea were marked in improving the forage yield and uptake of phosphorus and cobalt indicating their significance on animal nutrition.

The effects of effluent containing heavy metals like chromium and nickel in industrial discharges at Bangalore were studied simulating similar conditions of pure concentrations of chromium and nickel. The adverse effects of applied chromium up to 10 ppm and 100 ppm for nickel were quite evident through significant depression in yield and accumulation of these metal ions. Amaranthus was tolerant to these metal ion concentration than coriander.

#### 1.4.5 *Micronutrient Studies*

The response of wheat crops to applied zinc at 5 ppm as  $\text{ZnSO}_4$  with 62.5 kg  $\text{K}_2\text{O}$  ha along with normal application of N and K was highly significant in improving the grain yield as well as crude protein content. This experiment was conducted at ARS, Siruguppa.

Jayalaxmi cotton (DCH-32) grown on black soils under irrigated conditions at Raichur did not gave significant response to micronutrients application viz., Zn, Mn, Fe, B and Mo.

Efficient use of iron on groundnut crop in black soils revealed the superiority of foliar spray with iron sulphate.

The response of paddy on irrigated alluvial soil of Cauvery basin at RRS, Mandya due to zinc application through soil and foliar sprays was noticed. Further, the study was extended to copper and iron in red and black soils at Raichur. It was noticed that application of copper increased the yield of paddy and uptake of zinc, copper and Mn in black soils and decreased zinc and iron in red soils.

Studies on response of groundnut to iron, zinc, manganese and molybdenum using different cultivars such as TG-9, DH-3-30, DH-8 and TG-17 at Raichur revealed that the iron and zinc application enhanced the yield and crude protein content. The maximum response obtained was in Ah-8446 followed by TG-9, DH-3-30, DH-8 and TG-17. For Mo, AH-8446 gave maximum response and least in case of DH-8. The percentage increase in oil content ranged from 0.6 to 0.7 for iron and zinc application and for molybdenum it was from 0.4 to 2.2 per cent. Nutritive value of groundnut could be improved by application of micronutrients such as iron, zinc and molybdenum apart from increased yields and oil content.

#### 1.4.6 *Quality Assessment of Tobacco*

Varietal evaluation for quality of VFC tobacco revealed that nicotine varied from 1.68 per cent (MDC-27) to 2.12 per cent (KST-11) and reducing percentage varied from 16.58 per cent (GSH-3) to 19.90 per cent (MDC-28). The quality ratio of reducing sugar to nicotine was significantly low in GSH-3 (8.31) as compared to MDC-28 (10.82). The chemical composition and quality ratios due to different sources of organic manures were not affected.

#### 1.4.7 *Saline-Alkali Sodic Soils*

Salt-affected soils from Ghataprabha Left Bank Canal (GLBC) and Malaprabha Right Bank Canal (MRBC) were saline and sodic with underlying layer of non-saline sodic in nature. These soils need gypsum application. The ESP

values calculated from SAR using USSLE equation were found to be lower than the observed ESP. The prediction of ESP from SAR values improved, when these values were corrected for ion pair formation.

#### 1.4.8 *Soil Physics*

Hirekumbi and Hanchinal soil series in Malaprabha Project area indicated negligible differences in moisture retention capacities between these two series. In both the series, the moisture retained at various tensions increased with depth.

#### 1.4.9 *Soil Test and Crop Response Studies*

Follow-up experiments on ragi at 6 locations revealed the existence of a narrow range on yields even though P and K values varied considerably. The N applied in targeted yield treatment is lesser than 100 per cent treatment. Similar was the case with phosphorus. The general recommendations for N and P seem to be on higher side with little scope to improve yields further.

Similar experiments on maize at three locations revealed that the yield at lower targets, exceeded the targets.

#### 1.4.10 *Studies on Residue Analyses*

Studies on adsorption, persistence, degradation of dimethoate and carbendazin in soil water and their residues in greengram at harvest in some soils of Karnataka revealed that adsorption of both pesticides was higher on Ca-montmorillonite than on Ca-kaolinite. Adsorption was higher at lower pH and decreased with increase in pH. Persistence of dimethoate decreased with increase in moisture content. The half-life of dimethoate in black, red and laterite soils was 21.8 and 21.05 days respectively at field moisture capacity while under flooded conditions it was 11.6, 16.9 and 16.1 respectively.

The residues of both pesticides deposited in greengram crop at harvest increased with the number of sprays. The residues of dimethoate was lower when sprayed with carbendazin and however, during harvest period, the contents were below the tolerance limits specified by FAO and WHO.

#### 1.4.11 *Weed Control*

The studies on the nutrient composition and uptake by paddy as influenced by herbicidal treatments and fertility levels at Hebbal revealed that the usage of suitable weed control measures by pre-emergent application of herbicides or hand weeding reduce NPK uptake through weeds by three-folds.

In a similar study on maize, atrazine at 1 kg/ha or hand weeding reduced not only the uptake through weeds but improved the crude protein yield by 25 to 34 kg/ha than unweeded control.

## 1.5 Horticulture

### 1.5.1 Fruit Crops

1.5.1.1 *Mango—Clonal selection* : Clonal selection in Alphonso and in Pairi varieties have started bearing, and they are being evaluated for fruit quality and yield. Among the 25 other varieties introduced, certain hybrids/varieties like Mallika, Deshehari and Langra have been found to perform well and bear good quality fruits under Bangalore conditions. Mallika variety besides showing tendency for regular bearing, is found to be fairly free from bacterial canker unlike in the north Indian conditions.

At the Regional Research Station, Raichur, mango varieties Khader (Alphonso), Baneshan, Alampur Baneshan, Neelgoa and Neeluddin have been found to perform well.

*Midget gardening* : During 1983-84, project on midget orcharding in mango has been initiated; Hybrids such as Neeleshan, Neelgoa, Rumani, Neeluddin, Swarna Jehangir, Mallika and Amarapali identified as outstanding performers with respect to yield, tree morphology, bearing habit and other aspects, are being collected for grafting on polyembryonic rootstocks.

*Irregular bearing* : In further studies on irregular bearing in mango, it has been observed that flowering could be induced in the 'off year' on the fruited shoots of the 'on year' by spraying TIBA or ethrel at 100 ppm in 2 per cent  $\text{KNO}_3$ . Application of NAA at 1000 ppm resulted in partial deblossoming and reduction in crop load in the 'on year' with consequent cropping in the following 'off year'.

1.5.1.2 *Citrus fruits—Rootstock trials* : Under Raichur conditions for Coorg mandarin, rough lemon rootstock has been found to be superior in respect of yield and trifoliate orange rootstock for better fruit quality. At the RRS, Mudigere, trifoliate orange has been found to be a better rootstock with respect to yield and production of quality fruits.

*Drip irrigation in sweet oranges* : Vegetative flush and flowerings are governed by climatic factors and not by irrigation alone. Vegetative flush was highest in all the four growth periods, where drip irrigation was given at the rate of 12 litres/day at one location under the drip region. The growth rate of fruits was increased and fruit drop reduced due to drip irrigation as compared to control.

1.5.1.3 *Sapota—Improvement of varieties* : At Dharwad centre, over 550 hybrid seedling resulting from intervarietal hybridization involving the parents

Kalipatti, Cricket ball, Calcutta Round and Oval have been under observation since 1972. Some hybrids have come to fruiting precociously. All the hybrids having Kalipatti as one of the parents, have been observed to be tolerant/resistant to *Cercospora* leaf spot.

*Nutritional studies :* In the nutritional trial on sapota cv. Kalipatti laid out in the year 1979 with four levels of N (0, 200, 400 and 600 g/plant), three levels of P (0, 100 and 200 g/plant) and four levels of K (0, 200, 400 and 600 g/plant), growth dynamics, quality and yield of fruits as influenced by different treatments are being studied.

*Horti-silviculture inter-planting system :* Even at the initial stage of growth with forest species such as casuarina, the growth of sapota appear to be favourably influenced.

1.5.1.4 *Grapes—Improvement of bud fruitfulness :* In Anab-e-shashi variety of grapes bud fruitfulness was improved by two sprays of ethrel at 250 ppm given at weekly intervals 45 days after back pruning.

*Studies on the effect of time and different doses of N and K on growth, yield and quality in Thompson Seedless variety of grapes :* Application of nitrogen in April resulted in increased pruning weight. Higher pruning weight was associated with reduced number of bunches per vine. The internodal length in December was negatively related to the cane and vine productivity and bulk yield. A cane load of 50 to 60/vine was found to be optimum for vines spaced at 3 m x 3 m. An annual dose of 500 kg each of N,  $P_2O_5$  and  $K_2O$ /ha was found to be optimum. Split application of either N or  $K_2O$  during the growing season was not found to be favourable.

*Induction of bud burst :* Bud burst in grapes cultivar Thompson Seedless was significantly increased by the application of thiourea at 20,000 ppm. The highest increase in bud burst (58.69 per cent) was recorded by the application of thiourea at 20,000 ppm and ethrel at 400–500 ppm.

In vines pruned in October, highest percentage of bud burst was recorded whereas in vines pruned on 14th November, lowest bud burst was recorded at the 10th node as compared to other bud positions on the cane.

The application of thiourea at 20,000 ppm also increased the size and T.S.S. content of the berry.

1.5.1.5 *Papaya—Regulation of bearing :* In the regulation of bearing in papaya by fruit thinning in the cultivar 'Solo', better sized fruits with increased yield was obtained when 9 fruits per 10 cushions were maintained.

*Soil moisture and nutrient uptake* : Irrigation once a week resulted in increased yield and heavier fruits. Lack of phosphorus adversely affected the growth of plant, irrespective of the level of nitrogen in combination with phosphorus.

1.5.1.6 *Guava—Nutritional studies* : At GKVK in an experiment on the nutritional studies under the All India Coordinated Fruit Improvement Project, application of N, P and K each at 239 g/plant was found to increase the yield.

*Improvement of 'Navalur' guava* : At Dharwad centre, three clones, C.I.W.-2, C.I.W.-4 and C.I.W.-5 have been selected from the local 'Navalur' variety on the basis of fruit size and soft seededness. These are being evaluated in multilocation trials at different centres of the University.

1.5.1.7 *Pomegranate* : Studies on the growth dynamics, flowering and fruit development in pomegranate selection GKVK-1 and its propagation by cuttings were carried out. The trees put forth two growth flushes in May-June and in October. The production of floral shoots outnumbered the vegetative shoots.

The plants flowered thrice during the year in June, October and January. The flower buds took three weeks for complete development. The percentage of hermaphrodite flowers was higher (58 per cent) as compared to staminate and intermediary flowers. The anthesis took place between 8 a.m. and 6 p.m. with the peak at 2 p.m. The anther dehiscence was highest between 2-3 p.m. The receptivity of the stigma lasted for three days and the highest stigmatic receptivity was recorded on the day of anthesis.

The development of the fruit followed single sigmoid curve. The highest fruitset (80 per cent) was recorded during June. The fruits took four months from set to maturity.

The quick dip application of IBA at 5,000 ppm to hardwood cuttings resulted in improved rooting (66 per cent) while soaking in 50 ppm IBA resulted in 75 per cent rooting.

## 1.5.2 Vegetable Crops

1.5.2.1 *Onion* : Among the genotypes evaluated, N-53 genotype was found to be outstanding (43 t/ha) followed by N-2-4-1 (40 t/ha) and Bellary Red (37 t/ha). Junagadh White has been found to have highest T.S.S. (16.17 per cent) followed by Telagi Light Red (15.69 per cent) and Junagadh Red (15.27 per cent).

Selection N-53 and N-2-4-1 can be popularised and also used in breeding for varieties with higher yield and T.S.S. for export.

In studies on heterosis, combining ability and gene action for qualitative characters in bulb onions involving nine parents diallel crosses, the heterosis over the best parent was noteworthy in the cross combinations of N-53  $\times$  Bellary Red, N-2-4-1  $\times$  Bellary Red, and Hissar-2  $\times$  Bellary Red for bulb yield and yield attributes; Junagadh  $\times$  Pusa Ruby for T.S.S., Junagadh White  $\times$  Bellary Red for dry matter content; Telagi White  $\times$  N 257-9-1 for strong pungency and Junagadh Red  $\times$  Bellary Red for low storage losses.

Studies on combining ability indicated that N-53 was the best general combiner for yield and components, while Junagadh White was the best combiner for three important characters viz., T.S.S., dry matter content and pungency.

At Dharwad Campus, the seedlings raised from the Bellary Red onion seeds collected from A.R.S., Hagari have been classified into different groups based on size, number and T.S.S. of the bulbs for future improvement.

1.5.2.2 *Brinjal* : In the studies on the physiological aspects of breeding for bacterial wilt resistance in brinjal and tomato, characters such as phenolic content, low dry matter and bark : wood ratio (stem) have been observed to be suggestive of using them as selection indices for bacterial wilt resistance. In the evaluation of  $F_3$  population, several wilt resistant and high yielding genotypes have been advanced for further study in the  $F_4$  generation.

The six generation mean analysis of the cross WCGR 112-8  $\times$  Pusa Kranti revealed that back crossing  $F_1$  to superior parent resulted in superior progeny.

All the three types of gene effects viz., additive, dominance and epistasis were significant for death counts, days to first flowering, days to fruit maturity and fruit yield per plant.

The chi-square test indicated good fit for monogenetic segregation for *Pseudomonas* wilt resistance.

The correlation studies between survival count and other physiological and biochemical parameters suggested the possibility of considering high total phenols and low bark to wood ratio in  $F_2$  generation and low dry matter content in parental lines as selection indices for resistance to bacterial wilt.

1.5.2.3 *Tomato* : A wilt resistant hybrid has been evolved from the cross between the wilt resistant AVRDC line and NTDR-1. This is being further purified.



1.5.2.4 *Chillies* : Considerable increase in fruit set and concurrent yield in chillies have been found by spraying 1500 ppm of CCC in Gowribidanur variety of chillies.

1.5.2.5 *Musk melon* : In the studies on improvement of qualitative and quantitative characters in musk melon (*Cucumis melon* L.) among the 20 characters studied, yield per plant showed highest variability followed by average weight per fruit, main stem length, internodal length and ascorbic acid content. High estimates of genotypic coefficient of variation was observed for fruit netting, sutures and shape index.

The diallel analysis indicated the importance of both additive and non-additive gene action for the 23 characters studied except titratable acidity for which non-additive gene action was important. The findings of this study indicated that reciprocal recurrent selection and biparental mating could be successfully used. Parents "Arka Rajhans", "Hara Madhu" and "Arka Jeet" were good general combiners for most of the characters. The cross between 'Arka Jeet'  $\times$  UFG-515 recorded highest per cent (114.4) of heterosis over better parent.

1.5.2.6 *Turmeric* : In the varietal evaluation carried out at Raichur, the cv "Armour" has been found to be outstanding in respect of yield with a spacing of  $30 \times 15$  cm and NPK dose of 30-30-50 kg/ha given in two split applications.

### 1.5.3 *Indigenous Vegetables (Ridge gourd, Bitter gourd and Drumstick)*

1.5.3.1 *Ridge gourd* : A short fruited genotype (3-15-15) has been found to have high yield (2.63 kg/plant) followed by a long fruited genotype (4-12) with 2.23 kg of fruit per plant. These two selections have been proposed for multilocation testings.

1.5.3.2 *Bitter gourd* : Two long green genotypes (3-4 and 2-4) have been found promising and they have been recommended for multilocation testings.

1.5.3.3 *Drumstick* : A pink fruited type (GKVK-1) and a green fruited type (GKVK-2) have been identified for multilocation trials as these have been found to be quite prolific in bearing.

1.5.3.4 *Ashgourd* : From the sixth generation mean analysis carried out using South Kanara Local (Small fruited parent) B1, B2 and F2 populations have been developed. These three segregating populations are under evaluation for selecting a type with medium sized and high yield potential.

### 1.5.4 *Weed Control in Vegetable*

TOK-E 25 at 10 liters/ha and Lasso at 8 litres/ha were effective in controlling the weeds.

### 1.5.5 *Multiple Cropping in Vegetables*

Crop sequences of radish-beans-cabbage, radish-brinjal-cluster beans and cowpea-radish-chillies were found to be most economical in this order. The first two combinations have been proposed for multilocation testings in the Dharwad region.

### 1.5.6 *Vegetable Improvement, Voluntary Centre, GKVK*

Varietal evaluation of 16 genotypes of French beans have been made during *kharif* and *rabi* seasons, genotype V<sub>1</sub> and V<sub>2</sub> recorded the highest yield (14,000 kg/ha) followed by S-9 (12,930 kg/ha). These selections have been recommended for multilocation trials.

### 1.5.7 *Potato Improvement Scheme, Madenur Centre*

*Nutritional studies* : In the micronutrient trial involving 12 micronutrient and other treatments, soil application of ferrous sulphate at 10 kg/ha gave the highest yield (347.5 q/ha), followed by foliar spray Agromin (chelated plant nutrient) at 1 kg/ha after 20 days of germination (335.8 q/ha). Soil application of 20 kg/ha zinc (water soaking) recorded the lowest yield (275.7 q/ha).

In the trials carried out during the *rabi* season (1983-84) on the effect of micronutrients, the highest yield (377.4 q/ha) was recorded due to treatment with Agromin at 0.05 per cent (tubers soaked for 3 hours), closely followed by the treatment where tubers were soaked in ferrous sulphate solution at 0.05 per cent for 3 hours (367.2 q/ha). The lowest yield (146.2 q/ha) was due to soaking the tubers in MnSO<sub>4</sub> solution at 0.05 per cent for 3 hours.

*Yield trails* : In the preliminary yield trail (early maturing cultures) highest yield was recorded by culture JI-1808 (396.2 q/ha) closely followed by culture JG-657 (387.2 q/ha). The lowest yield was recorded by culture JG-224 (146.2 q/ha).

In case of medium maturing cultures, the highest yield was obtained with culture FR/B-105 (401.4 q/ha) followed by culture FR/B-4 (343.4 q/ha). The lowest yield was recorded with culture JH-516 (258.7 q/ha).

In the adaptability trial with early maturing cultures, the highest yield was obtained with culture K-4486 (354.2 q/ha) and the lowest with culture JF-5106 (228.5 q/ha).

In respect of medium maturing cultures, the highest yield was recorded by cultivar K. Badshah (360.8 q/ha), followed by cultivar Lalima (333.0 q/ha).

In late maturing cultures, the highest yield was recorded in culture JI-1804 (367.2 q/ha) followed by JH-544 (329.6 q/ha). Culture JI-1857 recorded the lowest yield (303.6 q/ha).

In the trial with 8 medium maturing cultures or varieties, the highest yield was harvested in K. Badshah (557.6 q/ha) followed by FR/B-105 (503.3 q/ha).

In the adaptability trial in medium maturing cultures, K. Badshah recorded the highest yield of 431 q/ha and JF-27 the lowest (151.4 q/ha).

Among the late maturing cultures, JI-1857 recorded the highest yield (483.1 q/ha) and the lowest in K. Sindhuri (265.3 q/ha).

*Entomological studies—Potato tuber moth* : Among the various plant protection chemicals tried, phosphomidan 100 KC at 400 ml/ha gave maximum control resulting in the highest yield (363.9 q/ha). The least effective was Fenitrothion — 50 EC given at 1.25 t/ha, which recorded the lowest yield of 240.1 q/ha.

*Cutworm* : Endosulphan 35 EC at 1.25 q/ha gave the highest yield of 387.3 q/ha followed closely by BHC 10 per cent dust at 35 kg/ha (386.9 q/ha).

*Other studies* : Growth regulating proprietary product Mixtalol (I-Tri-acontanol) was tried on two of potato cultivars, Up-to-date and Kufri Jyothi. Of the four concentrations of 1.0, 2.0, 5.0 and 10.0 ppm, Mixtalol at 1 and 2 ppm increased the plant height, number of leaves and total tuber yield. A significant increase in starch, reducing sugars, non-reducing sugars and protein content of the tubers in both the varieties was also obtained.

*Sub-centre, GKVK, Bangalore* : In the evaluation of the cultures (early/medium maturing) with the known potato cultivars, cultures JF-4864 and JI-547 (early cultures), JF-27 (medium culture) have been found to give good yield over 220 q/ha. Among cultivars, Kufri Lalima has been found to give the highest yield (over 260 q/ha).

Studies on surveillance of aphids of potato for raising a healthy crop revealed lowest count in the second week of February to first week of March (8.32/100 leaves). Lowest incidence of aphids was recorded in 1983-84 as compared to the previous years. Planting of potato in November to mid December resulted in higher yield than planting in last week of December or early January.

### 1.5.8 Plantation Crops

1.5.8.1 *Cashewnut* : Improvement through introduction and selection for evaluation of cashew clones and hybrids : Twenty six superior clones were

procured from different cashew research centres in India, and they have been multiplied for future planting and field evaluation at Ullal, Mangalore.

Among the 50 selections collected and evaluated so far, 12 outstanding selections yielding more than 20 kg/tree are being multiplied at Ullal, Mangalore on a large scale for supply to growers. Among these 12 selections, the best two viz., 8/46 Taliparamba-Kerala and 3/67 Guntur/Andhra are being released under the name Ullal-1 and Ullal-2 respectively. The 10-year average yield of the selections is 17.54 and 17.95 kg/tree, respectively.

At the RRS, Mudigere, cashew clones are being evaluated for up-ghat areas. Among the 13 Ullal selections 4/63 Chrompet-Madras, 4/61 Alangudi-Madras, 1/63-Chrompet-Madras and 5/61 Alangudi-Madras have been identified as promising for this region.

In studies on the standardization of various vegetative propagation techniques, the highest percentage of success was obtained in epicotyl grafting (80 per cent) followed by softwood grafting (70 per cent) when grafting was done in March.

Rooting was considerably increased (45 per cent) in difficult to root cashew types by application of 100 ppm IAA while it was about 25 per cent in the untreated control.

Application of N, P and K at 27, 181 and 109 g/plant gave the highest yield (4.24 kg/tree), while the control recorded the lowest (1.8 kg/tree) at Ullal, Mangalore.

**1.5.8.2 Oil palm:** Oil palm plants belonging to Dura, Tenera and Pisifera groups have been introduced and established at Dharwad campus for evaluation of their performance in transition zone. Four year old plants have started bearing satisfactorily.

**1.5.8.3 Betel vine:** At RRS, Dharwad, some varieties have been collected and established for comparative study of their performance.

#### **1.5.9 All India Coordinated Projects**

**Coconut—ARS, Arsikere — Evaluation of germplasm collection:** In a study on the performance of 13 varieties in the germplasm collection, cultivars like Zanzibar, Gonthebli and Jamaica have been observed to be outstanding.

Selection of high yielding palms and evaluation of their progenies to identify pre-potent palms has been initiated and such progenies are being evaluated in multilocation trials.

**Nutrition of coconut:** Studies on the nutritional requirement of high yielding varieties and hybrids have been initiated in 1983.

**Inter-cropping in coconut:** Inter-cropping in coconut has given highest returns (Rs. 21,226/ha) with potato grown as *kharif* crop, as compared to coconut alone or coconut with French beans, cowpea, ragi, redgram or chillies (Rs. 13,492, Rs. 9992, Rs. 9060, Rs. 10,942 and Rs. 14,280 respectively).

**Irrigation-cum-fertilizer trial:** Irrigating the palm at 340 litres of water once in 8 days (80–100 per cent available soil moisture) with a fertilizer dose of 1000:660:1500 g of N,  $P_2O_5$  and  $K_2O$  has resulted in the best performance as compared to 16 other treatment combinations.

**Cardamom — RRS, Mudigere:** Evaluation of high yield clonal selections at RRS, Mudigere since 1967 has resulted in the selection of an outstanding clone P-1 with potential yield of 856 kg/ha. The selection is being released this year under the name KMCC-1 or Mudigere-1.

### 1.5.9 Medicinal and Aromatic Plants

1.5.9.1 *Isabgol*: In a trial on nutrition-cum-sowing dates under Bangalore conditions, starting this crop in the last week of October has been found to be most favourable for growth and yield. Further, application of N, P and K at 50, 25 and 30 kg/ha was optimal.

1.5.9.2 *Solanum khasianum*: Inter varietal hybridization and induction of autotetraploids in steroid bearing *Solanum* species was initiated. Using generation analysis, the mode of gene action was studied for solasidine yield, berry yield and leaf spininess. Significant differences were observed for number of berries per node, fresh and dry weight and number of spines per leaf. Useful recombinants combining high berry yield and solasidine content with fewer curved spines was isolated.

A comparative study of diploid progenitors and their autotetraploids showed that differences in specific leaf weight, pollen fertility, pollen size and hundred seed weight constituted diagnostic characters for identification of autotetraploids.

### 1.5.10 Flower Crops

1.5.10.1 *Jasmine*: Under the project on introduction, selection and improvement, all the important species have been introduced.

In a study on nitrogen requirement, foliar spray of nitrogen at 120 g given in 6 split doses considerably increased the flower yield (10.56 t/ha).

1.5.10.2 *Chrysanthemum*: Application of N, P and K at 120, 150 and 75 kg/ha has given the highest yield (7.470 t/ha). Significant effect of  $N \times P$  interactions was also observed.

1.5.10.3 *Hibiscus*: Inter-specific hybridization has been initiated and a large number of crosses (568) have been made. However, very poor seed set has been observed.

Treatment of cuttings with IBA at 7500 ppm and IAA 5000 ppm + NAA 5000 ppm and IBA 7500 ppm + NAA 7500 ppm have been found to increase rooting to the extent of 171 per cent, 171 per cent and 246 per cent respectively over control.

1.5.10.4 *Rose*: Under the improvement programme, 1850 crosses involving the best parents have been made, and the hybrid seedlings are under evaluation.

1.5.10.5 *Champaka*: Studies on vegetative propagation in Champaka (*Michalia champaka*) by air layering and grafting showed that approach grafting is the most successful method (75 per cent) followed by *in situ* soft wood grafting (65 per cent). The lowest success was recorded with veneer grafting (5 per cent).

In air layers, girdling followed by etiolation and application of 5000 ppm IBA in talc powder recorded the highest percentage of rooting (93.30). The rooted air layers on separation and planting in the field recorded the highest percentage of survival (92.13). There was no rooting in the untreated shoots.

1.5.10.6 *China asters*: Significantly higher number of flowers (86.3) and yield (16,568 kg/ha) were obtained due to application of 50 kg N and 30 kg each of P and K. Application of P and K increased the vase life of cut flowers.

#### 1.5.11 *Post-harvest Technology*

In studies on extension of shelf-life of vegetables (Beans, bell pepper, carrot and tomato) pre-packing was found to extend the shelf-life of all these vegetables. The thickness of polythene bags and the extent of ventilation required differed with the vegetables. Generally, the ascorbic acid content of fruits decreased with extended shelf-life. Hydro-cooling and waxing of the fruits before prepacking improved the shelf-life.

In another study on the extension of storage life in mango (Dusheri and Mallika varieties) treatment of fruits with TALPROLONG at concentration of 1.5 per cent delayed ripening in both the varieties and treatment with 1.0 per cent concentration improved the colour of fruits.

## 1.6 Entomology

### 1.6.1 Rice

Pest control trial with dipping of seedlings in chloropyrphos and application of furadon as standard check indicated that among the chemicals tested, FMC 35001 at 25 kg ai/ha, recorded the maximum yield of 5555 kg/ha followed by Monocil at 0.5 kg ai/ha (5476 kg/ha) as compared to 4950 kg/ha for untreated check. The per cent of white ears ranged from 0.35 to 5.53 in treated plots as against 16.60 per cent for untreated check.

Brown Plant Hopper Screening trial showed that two varieties namely, RP-1579-1901-82-57 and RP-1579-1962-72-31-52 recorded the least number of BPH/hill (2.53 and 2.57/hill respectively) indicating their resistance to BPH while T(N)-1 exhibited hopper burns recording 24.97 BPH/hill at the pre-harvest.

### 1.6.2 Sugarcane

Insecticidal test to control the sugarcane seedling borer conducted at Mandya showed that Coroban 50 FC at 0.05 and 0.1 per cent was found to be effective, recording 13.11 and 10.87 per cent dead heart, respectively, as against 33 to 96 per cent for untreated check. The next best chemical in merit was Monocrotophos 40 EC at 0.1 per cent which recorded 19.32 per cent dead hearts.

### 1.6.3 Sorghum

Under All India Coordinated Research Project at Dharwad, promising entries were retested for multiple resistance to different pests. Entry E-109 proved less susceptible to shootfly and stem borer infestation and E-404 and EU-55 proved tolerant against army worm, whereas entry E-103 was found to be less susceptible. Among 42 entries tested for shootfly resistance, entries IS-5566, IS-5470, SPV-491, IS-18584 and IS-22121 were found promising.

Out of 30 entries tested for stemborer reaction, entries IS-1151, IS-5538, IS-18573, IS-18677, PB-8272, PB-83366-1, SPV-605, CSH-1 and local (Nandyal) were found to be promising. Less tunnelling was observed in local (Nandyal), PB-8272, IS-18573, IS-18578, PB-8313 and IS-18551.

Among 20 entries tested against earhead midge, PM-7061, DJ-6514, PM-7279, SPV-526 and PM-7422 were found to be less infested.

Studies on seasonal incidence of shootfly indicated that the crop sown on 15-6-1983 recorded least incidence and the incidence reached its peak on the crop sown on 15-9-1983. The peak incidence of shootfly coincided with a mean

minimum temperature of 18.7°C and a maximum of 31.7°C with low rainfall and high humidity of 82 per cent.

Among the insecticides tested carbofuran seed-dress was found very effective against the shootfly. Other promising insecticides were UC-542293-G, Carbofuran 3G and OK-174 (oncol).

The observations made on the seasonal incidence of midge indicates that the crop sown in the second week of June recorded least incidence. The incidence was maximum when the flowering coincides in the month of October. This may be due to the minimum range of temperature *i.e.*, 12.3 to 26.1°C with a high humidity range (77 to 92 per cent).

Twenty five entries tested as new sources of resistance to midge indicated that DJ-6514, AF-28 and TAM-2566 recorded least incidence.

Among the pyrethroid insecticides screened against the control of midge, decamethrin was found quite effective. Other pyrethroides under test were on par with decamethrin.

Twenty six entries in the advance yield trial were screened against the headworm, Local(Nandyal), SPV-462, SPV-459, SPV-386, SPH-196 and CSH-6 were found promising.

Among the 26 entries screened in advance yield trial to armyworm, IS-2312 and SPV-386 recorded the lowest incidence.

#### 1.6.4 Pulses

A new pest, *Psidia tikora* (pod borer) which was serious only in North Karnataka has become severe on cowpea and arhar at Bangalore centre. It was recorded for the first time from Bangalore centre whose infestation level was up to about 60 per cent.

Screening of cowpea germplasm against different insect pests indicated that leaf minor infested almost all varieties tested. But APC-439, 565, 566, 651 and 652 were comparatively tolerant than other varieties. APC-1066 was the only variety which was tolerant to the jassids attack.

In another study it was observed that CG-104, CG-28, Gujarath cowpea-2, V-16 and V-37 are fairly resistant to *Heliothis* and *Maruca*. Other tolerant varieties for these two pests are V-87, CG-7, Co-Vu-2 and MG-171.

Whereas none of the varieties were tolerant to new pest *P. tikora*, except RC-48 and KBC-1 which had comparatively low incidence of the same.



Studies on the effect of intercropping of various pulses on the incidence of insect pests showed that the incidence of pod borer (*H. armigera*) remains the same either as pure or a mixed crop.

#### 1.6.5 Cotton

Screening of cotton genotypes for tolerance/resistance to jassids showed that six cultures viz., 13340, 13316, 13323, 13157, SRG-519 and SRG-153 were found to be highly tolerant. 18 cultures – 13107, 13108, 13109, 13111, 13112, 13113, SRG-536, SRG-586, SRG-584, SRG-591, SRG-530, JK-285, JK-345, JK-301, MESR-16, JK-286 and JK-308 are highly susceptible indicating 'hopper burn' injuries on entire plant canopy.

In the trial on comparative efficacy of synthetic pyrethroids for the control of bollworms, it was observed that FMC-65318, at 25 g ai/ha and 50 g ai/ha has recorded highest yield of 37.44 and 37.58 q/ha respectively as compared to 4.59 q/ha of untreated control. FMC at higher dosage i.e., 50 g ai/ha has not indicated any significant increase in yield as compared to 25 g ai/ha. There is no significant difference in yield among different pyrethroids included in this test. But as compared to monocrotophos, all pyrethroids are significantly superior. All pyrethroids indicated significantly more number of good open bolls. As compared to 1.88/plant of untreated control, Flucinthrinat has recorded maximum of 11.41/plant good open bolls followed by Cypermithin (10.04) and FMC (10.8). Decamithin recorded highest percentage (84.88) of good open bolls as compared to 57.36 of untreated control. All pyrethroids gave between 77.26 and 84.30 per cent good open bolls effective control than the other chemicals tested.

#### 1.6.6 Tobacco

Field evaluation of insecticides for the control of *Laphygma exiqua* of FCV tobacco indicated that Fenvelarate was the most effective of all the chemicals tested. It recorded 7.5 per cent damage followed by 9.9 per cent for phenthoate and 13.0 per cent for quinalphos 43 EC (a new formulation) and chlorophyriphos. However, significant differences were not evident between Phenthoate, Quinalphos 45 EC and Chloropyriphos. Exalux 45 EC, though tried at lower dosage proved significantly superior to quinalphos 25 EC. quinalphos 45 EC registered highest cured leaf yield of 1490 kg/ha followed by 1366 kg/ha for Fenvelarate and 1344 kg/ha for Chloropyriphos. Control plots recorded 51.7 per cent incidence and 834 kg of cured leaf yield per ha.

The studies on evaluation of certain chemicals both as soil drench at sowing and seedling root dip at planting and both for the control of tobacco stem borer indicated that quinalphos was found to be superior to rest of the

chemicals. The efficacy of chemicals were Quinalphos, Chloropyriphos, Monocrotophos and Endosulfon in that order. Regarding method of application, combination of both soil drench at sowing and seedling root dip at planting was found to be most effective. However, it did not differ significantly with that of soil drench treatment at sowing. Seedling root dip method at planting was least effective. Studies on evaluation of new chemicals as soil drench for the control of *Agrotis ypsilon* in bidi tobacco at Nippani indicated that Quinalphos both as EC and dust formulation recorded nil incidence of cutworms, followed by Endosulfon and Phosphomidon, Carbaryl and Chloropyriphos.

#### 1.6.7 Biological Control

Rearing and release of larval parasites like *Perisierola nephantidis* and *Bracon brevicornis* against coconut black headed caterpillar at Mandya, Arsikere and Shimoga are in progress.

#### 1.6.8 Sericulture

Studies on Muscardine disease of silkworm at Bangalore (Hampalaghatta village) indicated that the disease occurred from September to February with highest per cent disease incidence in December-January (5 to 8 per cent) and the lowest in February (1.5 per cent). Disease prevailed both in rainy and winter seasons and worms were free of disease in summer.

The role of application of leaf litter waste to mulberry garden as manure indicated that the leaf litter serves as a source of inoculum. Its application to garden spreads the inoculum and increases the disease incidence by contaminating the lower leaves during rainy season through flashing of spores from soil on to the leaves.

### 1.7 Plant Pathology

#### 1.7.1. Rice

Under National Screening Nursery-1 for leaf blast, neck blast and brown spot diseases, out of 328 entries screened, the 10 entries viz., IET-8716, 8819, 7575, 8859, 8862, 8879, 8880, 8897, 8814 and 8922 exhibited good tolerance to leaf blast as well as neck blast and have been found superior to the check varieties viz., Cauvery, Jaya, Pankaj and HR-12 not only in their disease tolerance but also in their yielding ability.

Studies on evaluation of an economic spray schedule for the chemical control of rice blast on the highly blast susceptible variety HR-12 indicated that three sprays of Bavistin at initial tillering, heading and after flowering proved to be superior in controlling the blast disease.

### 1.7.2 Sugarcane

Bavistin (1 g/lit) and Blitox (2.5 g/lit) proved to be quite effective in reducing *Helminthosporium* leaf spot disease incidence. Further, Hinosan (1 ml/lit) was also found to give satisfactory reduction of the disease incidence.

Under the study on screening of sugarcane varieties for various diseases, a total of 63 sugarcane varieties under preliminary varietal trial, zonal varietal trial, pre-final varietal trial, short duration varietal trial and final yield trial were screened for *Helminthosporium* leaf spot, cercospora leaf spot, brown stripe, grassy shoot and mosaic diseases. Only 39 varieties showed combined resistant reaction for all the above said diseases. Varieties namely CO. 62175, KMS-946, KMS-2083, C-11, C-12, C-13, C-26 and IC-225 showed moderately susceptible reaction to *Cercospora* leaf spot. Varieties CO. 7804 and CO. 419 showed susceptible reaction to the same. KMS-2118 showed susceptible reaction to brown stripe disease. Varieties CO-419, CO-7614, KMS-615, KMS-3383, C-18, CA-7601 and L-61/52 showed moderately susceptible reaction to grassy shoot disease. Moderately susceptible reaction to mosaic disease was exhibited by the varieties CO-7905 and TS-1. Varieties namely CO-8020, 8023, 8025 and M-10 showed highly susceptible reaction to the same.

Among the tetracyclines viz., Terramycin, Achromycin and Ledermycin at 500 and 1000 ppm tested could not suppress the grassy shoot disease (GSD) incidence till 10th month. However, Terramycin and Ledermycin at 500 and 1000 ppm and Achromycin at 1000 ppm in combination with hot water treatment (50°C for 2 hrs) could check the GSD incidence up to 10th month where the incidence was 19.44 per cent in the treatment only with hot water at 50°C for 2 hours.

### 1.7.3 Sorghum

Among the sorghum varieties tested, SPV-386 showed high level of resistance to Downy mildew disease, followed by SPV-459, 462, 475, 346 and 351. Hybrid MSH-50 showed multiple resistance to all foliar diseases and was on par with CSH-6 for charcoal rot. SPH-196 was found to be completely free from lodging both in artificial and natural conditions. Further, for many of the foliar diseases SPV-565, 542, 598, 601, 606, 615, 617 and 622 were found to possess multiple resistance. For Ergot disease, SPH-232 showed least infection followed by SPV-472 and CSH-6. The seed germination studies revealed that IS-1432 and IS-3443 showed good germination of 86.67 per cent and 85.0 per cent respectively indicating that they are less susceptible to grain mold infection.

### 1.7.4 Pulses

Under multilocation trial, 10 cowpea varieties were screened and all of them showed moderate resistant reaction to *Cercospora* leaf spot while varieties

V-16, CG-104 were free of bacterial blight and C-152 was highly resistant to powdery mildew. RC-8 was free of rust while C-152 was highly susceptible to rust.

Greengram variety Pusa-104 and J-45 were found to be resistant to powdery mildew disease.

#### 1.7.5 **Wheat**

Survey and surveillance programme of wheat rust has revealed that rust inoculum survives during the off season on wheat in Chickmagalur and Chitradurga Districts. The two virus diseases of wheat viz., Bellary yellow dwarf and wheat streak viruses have been identified for the first time in Karnataka.

#### 1.7.6 **Tobacco**

Studies on effect of mycorrhiza in control of soil borne fungal pathogens in VFC tobacco nursery showed that mycorrhiza was effective in control of soil borne fungal pathogens over control in both the stages of seedlings i.e., 30th and 60th days. However, there was no difference between the treatments on seed germination.

Trial on screening of tobacco varieties against Frog eye leaf spot disease indicated that out of six varieties screened, three cultures viz., 4-1-12, 6-6-17 and 22-5-1 showed moderately resistant reaction.

Testing of powdery mildew resistance and yield in pre-release varieties both under field and controlled conditions revealed that out of ten varieties tested for powdery mildew resistance, three varieties namely 1494, 2338 and 2359 were classified as resistant, L-626 as moderately resistant, 6-617 as moderately susceptible and the rest were classified as susceptible. Cured leaf and bright leaf recovery was more in resistant lines except in case of 1795 and 6-6-17.

#### 1.7.7 **Cotton**

Fungicidal control of Alternaria disease on cotton indicated that Rivrol at 0.2 per cent appeared to give best control followed by Daconil 0.2 per cent and Daconil 0.25 per cent. Copper oxychloride 3 per cent, Captafol 0.2 per cent, Delton 0.2 per cent, Topsin 0.1 per cent and Rivrol 0.3 per cent.

Studies on control of root rot of cotton through chemicals and soil amendments showed that among 5 fungicides tested as seed treatment and soil drench, PCNB has given the best control of root rot followed by Bavistin, Captan, Foltta-F (in all three fungicides, percentage of mortality was 1.1) and Vitavax.

Among soil amendments, FYM reduced the disease considerably, neem cake and paddy straw amendments were ineffective in reducing the mortality due to root rot.

For the first time the role of oospores of *Phytophthora palmivora* in the disease cycle of quick wilt of pepper by using the snails to induce the oospore germination was successfully investigated.

The survey conducted regarding the beetle vine disease in major beetle vine growing districts has indicated that foot rot, bacterial leaf blight, powdery mildew, anthracnose, sclerotium and root knot nematode were found to occur in different degree of severity. Remularia leaf spot is becoming a limiting factor for safflower cultivation when grown as entire crop under irrigated conditions. This disease can be effectively controlled by spraying carbondazin at the rate of 0.05 per cent.

### 1.8 Agricultural Microbiology

In a study on isolation and screening for efficient strains of *Rhizobium* for forage legumes from various agroclimatic regions of Karnataka, it was observed that the *Rhizobium* isolates which were positive for nodulation were tested for their efficiency in nitrogen fixation and parameters like average nodule number per plant and dry weight of plant (g) were recorded. Further testing was done for acid production. Majority were found to be slow growers and non-acid producers.

Studies on response of cowpea to dual inoculation with VA mycorrhiza and *Rhizobium* indicated that *Rhizobium* and mycorrhizal inoculation increased the number of nodules and dry weight (18.7 and 31.7 mg/plant). P application also increased the nodule number and nodule dry weight. Dual inoculation increased the shoot weight (194.75 g/plant) when compared to single inoculation of *Rhizobium* (177.50 g/plot). This effect was more pronounced at lower P levels. Mycorrhizal inoculation alone resulted in higher grain yield of cowpea both at 0 level P and 50 per cent level of P application (294.75 and 338.25 g/plot). Further, response of cowpea to *Rhizobium* inoculation was noticed only at 100 per cent P level.

Interaction between *Azotobacter* and VA mycorrhizal fungi with P application on the response of finger millet showed that inoculation with *Azotobacter* did not increase grain yield. Symbiotic interaction was observed at high levels of P application (748, 1005 and 1248 g/plot and 0, 50 and 100 per cent P levels). Spore number in root zone soil was observed to be dependent on mycorrhizal inoculation.

Studies on enrichment of mechanical compost with commercial fertilizers showed an increase in ammoniacal nitrogen with increasing concentrations of N within 40 per cent and 50 per cent moisture levels. Increased ammoniacal nitrogen was noticed on 7th day in all the treatments both in 40 per cent and 50 per cent moisture levels compared to control.

A gradual increase in  $\text{NO}_3\text{-N}$  in all the concentrations of nitrogen was observed. In case of 7.5 per cent and 10 per cent with 50 per cent moisture level drastic decrease in  $\text{NO}_3\text{-N}$  on 28th day was observed. The rate at which the  $\text{NO}_3\text{-N}$  was found at different intervals for different concentrations did not correspond with  $\text{NH}_4\text{-N}$ .

In a study on evaluation of mechanical compost and its effect on crop yields, significant difference in straw yield was seen with the recommended dose of fertilizers, whereas all other treatments were not significant. However, 7.5 t/ha of mechanical compost gave as 13.91q/ha as compared to the control. Significant grain yield increase was observed where 7.5 per cent + 7.5 FYM and recommended dose of fertilizers were applied.

Effect of *Rhizobium*, mycorrhiza inoculation and phosphorus application on nitrogen fixation in redgram indicated that inoculation of *Rhizobium* and mycorrhiza singly or in combination significantly increased nodule number, nodule weight, shoot weight, nitrogen and phosphorus contents of redgram (Hy. 3c) over uninoculated plants in a low fertile red soil under pot culture greenhouse conditions. Inoculation of mycorrhiza alone was superior over inoculation of *Rhizobium* alone. Dual inoculation showed synergistic effect on nitrogen fixation and growth of redgram. Application of phosphorus at the rate of 40 kg  $\text{P}_2\text{O}_5$ /ha resulted in significant increase in nodule number, nodule weight, shoot weight, and N and P contents over no P application. Application of phosphorus at the rate of 80 and 160 kg/ha also further increased nodulation. But reduced infection per cent and spore count of mycorrhiza.

Effect of *Rhizobium* and mycorrhiza inoculation on nitrogen fixation and yield of redgram showed that under field conditions dual inoculation of redgram with *Rhizobium* and mycorrhiza significantly increased nodule number, nodule weight, plant height and grain yield, and N and P contents over no inoculations or single inoculation. Inoculation with *Rhizobium* alone gave increase in plant dry weight, nitrogen and phosphorus contents over control but not in nodulation and grain yields. Inoculation with mycorrhiza alone significantly increased nodule number, nodule weight, plant weight, grain yield, N and P contents over control.

In a study on interaction of soybean cultivars with different strains of *R. japonica* at 30 and 60 days of plant growth indicated that significant

difference in nodulation was observed compared to control at both periods of observation. No statistical significant difference within the rhizobial strains was observed on 30th day. However, on 60th day, there was significant difference in nodulation caused by different strains of rhizobia in different varieties. In uninoculated plots negligible number of nodulation was observed. The nodule number varied in inoculated varieties from 22 to 38 per plant whereas in control plots the nodule number varied from 2 to 3.

The data on dry matter content of plant tops recorded at 30 days of plant growth did not differ significantly due to different rhizobial strain inoculation for varieties. However, the dry matter content of plant tops significantly differed compared to uninoculated control. But within the rhizobial strains there was no significant difference.

The data obtained on bean yield indicated that due to inoculation all strains increased the yield significantly compared to uninoculated control. In varieties, Jupiter and KHSb-2 all the strains increased the yield. In variety KHSb-5 only UASb-144, UASb-165 and UASb-127 increased yield significantly over the control. The yield in control varied from 14.75 to 16.25 as against 16.93 to 20.98 q/ha in inoculated treatments.

Studies on the nitrogen fixation by *Azolla* and *Chlorella* in paddy under green house conditions indicated that in all the treatments dry weight and protein content were found increased up to 4th week. A maximum dry weight of 11.59 of *Chlorella* per 100 ml of sterilized growth medium supplemented with nitrogen, was found on 4th week of incubation with a protein content of 45 per cent. The growth in the nutrient solution was lower (7.90 g/100 ml). In unsterile medium the growth was only 6.5 g/100 ml.

In a study on screening of *Azolla* for different soils of Karnataka, 5 isolates of *Azolla* viz., Aduthurai, Bidadhi, Mangalore, Vietnam and Mudigere were screened for growth rate using mineral medium. The results showed that the growth rate ranged from 210 g/sq. m/15 days in case of Aduthurai isolate to a maximum of 353 g/sq.m/15 days in case of Bidadhi isolate. Similarly studies on nitrogen fixation by these isolates indicated that Bidadhi isolate was found to be superior to other isolates.

Under factors affecting VA mycorrhiza plant symbiosis phosphate response curve for onion have been studied. It is indicated that the lower levels of P application did not reduce but increased the per cent mycorrhizal colonization of root by *Glomus fasciculatum* (at 0 kg P/ha – 50.6 per cent, at 4.73 kg P/ha – 70.1 per cent). Application of 18.86 kg P reduced the extent of colonization but not significantly. Application of 37.84 and 75.86 kg P/ha reduced the mycor-

rhizal colonization significantly, compared to control. Application up to 18.86 kg P/ha increased the shoot weight of inoculated plants and application up to 9.43 kg P/ha increased the root weight of inoculated plants. Dry weight of inoculated plants without P application (shoot 275.16 mg and root 79.2 mg) was equivalent to the weight of uninoculated plants supplied with 18.46 kg P/ha (shoot 246.8 mg and root 78.0 mg) showing that onion is extremely dependent on VA mycorrhiza. Mean bulb diameter increased due to VA mycorrhizal inoculation at all levels of P application. The shoot to root ratio was more in mycorrhizal plants indicating faster shoot growth. Inoculation with *Glomus fasciculatum* did not have any effect on per cent P concentration of plant tissue (at 0 kg – 0.254 per cent and 75.68 kg – 0.290 per cent). Only application of 75.68 kg P increased the per cent P in shoot of uninoculated plants (0.004 per cent in control and 0.229 in plants supplied with 75.68 kg P). Inoculation with *Glomus fasciculatum* increased the phosphorus uptake by onion at all levels of P application.

Under the study on blue green algae in rice fields, 23 soil samples were collected from different paddy growing places of Cauvery Command Area. From these samples, 16 blue green algae isolates were obtained following enrichment method. All these isolates characterized and screened for growth rate and nitrogen fixing ability using N-free laboratory medium. Based on their response to variation in pH, inorganic nitrogen, phosphorus concentration and pesticides, three isolates viz., *Ananabaena variabilis*, *Colothric* sp., *Hapalosiphon welwitschii* were found to be superior to other isolates.

The above three isolates were then used for crop responses in pot culture studies. The results indicated the potentialities of using BGA as biofertilizer for paddy crop production.

## 1.9 Seed Technology

### 1.9.1 Rice

The farmer's seeds of Jaya collected from Bangalore and Kolar districts were compared with certified and breeder seeds both under laboratory and field conditions. One of the ten farmer's seeds sample had as low as 19 per cent germination; so also the field emergence was lowest in one of the farmer's seed lots (47 per cent against about 90 per cent of others).

Among the five CMS lines received from China through IRRI, only Wu-10, MS 93 and V 20 put up nearly normal growth. Among new CMS lines received from IRRI, IR-46827A and IR 46829A grew more vigorously than any of the Chinese CMS lines. Methods of maintenance of parental lines have been studied for one season: (i) alternate plant method, (ii) alternate row



method and (iii) hand pollination. Alternate row method has given higher seed set and the hand pollination the highest.

Various CMS sources (Pankhari, WA, KMS) are being used to develop CMS (A) lines for varieties like Pragathi, Intan-Mutant, Jaya and Intan-Mahsuri. The material is in BC 1 and BC 2 generations.

In regard to hybrid seed production, the supplementary pollination techniques *viz.*, Rope pulling and beating with bamboo stick have increased the seed set on out-crossing from 9 to 14 per cent, in 5:1 and 6:1 female male ratios. It has been found that hybrids withstand drought stress better than parents (1983 summer) and that some hybrids ratoon with more vigour than parents.

Under the adverse soil tolerance studies, crosses have been made with Karikagga, Pokkali, Bilekagga, Pragati, S-317, Doddi, SR-26B, Mangala involving elite lines of F1 hybrids and planted in 1984 dry season. The F2 seeds are being collected for screening and genetic studies at the RRS, Mandya in 1984 wet season under field conditions (salt affected soils). Seeds of Doddi and S-317 have also been subjected to mutagenic treatments and the M1 grown for further study by producing M2 pedigrees.

Under cold tolerance studies at Hebbal, CT-1351 ranked first as in the previous years particularly in the most critical stage of planting *i.e.*, September end. IR-50 also proved better than the recommended cold tolerant checks. Twelve out of the 200 genotypes tried in the International Rice Cold Tolerant Nursery (IRCTN) have been rated as cold tolerant and are advanced to replicated yield trial in the next season. Fresh crosses involving cold tolerant varieties S-317, Mangala, Telhamsa, Doddi and IR 50, CT-1351, CT-19 have been made. At Mandya, CT-97, Adokkan 27, CF-12, CT-19, Adokkan and CT-1351 produced double the yield of checks.

In the routinely raised bed (dry), rice nurseries at the Main Research Station, Hebbal, it was noticed that certain varieties suffered from Fe deficiency leading to high seedling mortality due to iron chlorosis, whereas certain others showed tolerance. By repeated testing of about 50 genotypes of rice in the dry and wet seasons of 1982 and 1983, the following reactions were noticed :

<i>Tolerant</i>	<i>Sensitive</i>
C.T. 103	CT 12, CT 51
Basumathi	Pusupa, Pusa 150-9-3-1
Basumathi 370	Seethasil, Gansali
Mangala	IR 20, Krishnaleela

Performance of crop varieties for seed yield and quality under rainfed conditions in Bangalore area for the year 1983 showed that sowing at the end of July is good from the point of view of seed yield and seed quality in crops like, ragi, setaria, echinoclova, blackgram, horsegram, redgram and sunflower. However, in the crops like soybean, there are varietal differences. For instance, Hardee variety was good in both seed yield and quality. Whereas Jupiter was inferior in both the respects.

In view of the breakdown of blast resistance in Intan rice, the seeds of another blast resistant variety 'MINGOLO' which resembled Intan in all agronomic characters as tested at RRS, Mandya and Mudigere during 1979-82 and at Hebbal during 1983-84 were multiplied and studied at Hebbal, and seeds were also supplied to Ponnampet and Mudigere. "MINGOLO" showed moderate blast resistance as rated by the Pathologists at Hebbal and Ponnampet. The Intan-mahsuri derivatives have been further evaluated both at Mandya and Hebbal.

#### 1.9.2 *Ragi*

Farmer seed samples of Indaf-8 ragi variety were collected from the farms located in Bangalore, Kolar and Mandya districts. Ten such samples were compared for various seed quality attributes in both laboratory and field. The farmer seed sample No. 4 showed the lowest seed weight and sample No. 3 lowest germination (26 per cent). The sample No. 1 showed higher field emergence (61 per cent) than even breeder seed (58 per cent).

#### 1.9.3 *Safflower*

Studies on the effect of sulphur and zinc levels on safflower seed production under irrigated conditions conducted at Dharwad indicated that safflower responded significantly to the application of sulphur and zinc. The highest seed yield (1669 kg/ha) was recorded with the combined application of 10 ppm sulphur and 10 ppm zinc. The increase in the seed yield over control was 19.50 per cent.

Storage of safflower seed in cloth bags under ambient conditions of Dharwad for 8 months and 20 months reduced seed germination and vigour. The loss in germination of stored seed was 17.28 per cent for 8 months and 35.17 per cent for 20 months.

Pre soaking of stored safflower seed in different electrolyte solutions had beneficial effect in restoration of seed viability and vigour.

#### 1.9.4 *Sorghum*

Study on the effect of seed treatment and storability of male sterile and of sorghum 2077 A K CK-60 showed that seed germination was influenced by the

fungicides and insecticides in both the parents from four months to nine months of storage. Dithane M-45 + malathion treatment combination recorded higher germination followed by dithane M-45 + quinolphos and bevistin + malathion. Seeds were treated with bevistin at the rate of 2 g/kg of seed, dithane, M 45 also at 2 g/kg seed ; Quinolphos at 10 g/kg of seed and malathion at 10 g/kg of seed.

CK 60A seed can be stored up to nine months without hampering the viability by treating the seeds with dithane M-45 + malathion or by dithane M-45 + quinolphos. 2077A seed can be stored up to six months without damaging the viability by treating the seed with dithane M-45 + malathion or by dithane M-45 + quinolphos or by bevistin + malathion treatment combination.

#### 1.9.5 Maize

Effect of shelling methods and seed moisture content on seed quality and effect of shelling parameters like seed moisture, cylinder speed, retardable gate opening with power operated sheller on seed quality in maize Cv. South African maize, was studied.

Out of four seed moisture contents, 16.47 per cent seed moisture resulted in significantly higher germination (95.00 per cent) and field emergence (90.67 per cent). Hand shelled seeds resulted in higher germination (95.42 per cent) and field emergence (91.42 per cent) followed by hand operated sheller (93.58 per cent and 88.66 per cent respectively). Abnormal seedlings were significantly higher with power operated sheller (4.67 per cent) at 24.83 per cent moisture content while it was lowest (1.00 per cent) with hand shelling at 16.47 per cent moisture content. In power operated sheller, significantly lower seed breakage, microscopic damage to seeds, abnormal seedlings and seed wastage were recorded at 15.30 m/sec. cylinder speed and wider retardable gate opening (22.50 mm) at 16.47 per cent moisture.

Effect of presoaking treatment of seeds with chemicals on germination, seedling vigour and growth was studied using maize Deccan 101 seed. Treatment combinations were three different quality seeds soaked in distilled water, ascorbic acid (50 ppm), calcium chloride (1 per cent), indole acetic acid (10 ppm), magnesium sulphate (1 per cent), potassium chloride (1 per cent) and thiourea (1 per cent) for 24 hours with unsoaked seeds as control.

It was observed that the presoaking treatment of different quality maize seeds Cv. Deccan 101 (low, medium, high) with 10 ppm indole acetic acid had improved germination by 26.00 per cent, 20.00 per cent and 12.00 per cent over control respectively in low, medium and high quality seeds. This treatment also improved the seedling vigour of seeds. Thiourea (1 per cent) inhibited the seed-

ling vigour, germination and growth. Ascorbic acid (50 ppm) treatment also showed beneficial effect with regard to germination, seedling vigour and growth.

To study the effect of zinc and iron on yield and quality in Alfalfa, the crop was sprayed with 0, 0.25 and 0.50 per cent each of zinc sulphate and ferrous sulphate at 30 days and 45 days after second cutting.

There were significant effects of zinc application on plant height, number of green leaves, total dry matter accumulation, number of vaccines per shoot, number of pods per raceme, number of seeds per pod, thousand seed weight, pollen germination, pollen tube length, protein content in seeds, seed yield, germination percentage, root length and seedling dry weight, but number of shoots per one meter row length did not differ significantly due to zinc application. The seed yield, number of shoots per one more row length, total dry matter accumulation, number of pods per raceme, thousand seed weight, pollen germination and pollen tube length, protein content in seeds were significantly influenced by iron application, but the plant height, number of green leaves, number of racemes per pod, number of seeds per pod, germination percentage, root and shoot length did not differ significantly.

## 1.10 Agricultural Engineering

### 1.10.1 Farm Machinery

1.10.1 Under CADA UPK financed project, following equipments have been developed and tested.

- i) *Modification of blade harrow*: The existing blade harrow has been provided with a metallic strip of 0.20 m width with folded ends to enhance its capacity as land levelling equipment.
- ii) *Modification of soil scoop*: To overcome drudgery for the operator, commercially available soil scoop has been provided with long handles which helps him to load and unload the scoop without bending.
- iii) *Soil scoop on wheels*: By providing long handles, though the drudgery to the operator was reduced, it did not help bullocks who were loaded continuously during transport of the soil. To overcome this problem, wheels have been provided which have reduced draft from 60-80 kg to 20-25 kg. This indicated the possibility of increasing the capacity of buck scraper by 2-3 times. The modified scoop also helps in uniform unloading of soils.

All these equipments have been tested at UAS, Raichur farm and now they are with the farmers in CADA UKP region for trials at farmers field.

1.10.1.2 *Evaluation of Tropiculcor and Krishi Ratna*: The study has shown that tropiculcor requires about 100 kg draft for pulling a single bottom plough as against about 50 kg required for country plough.

The total time required to plough 1 ha plot was observed to be 22 hrs against 18 hrs by country plough, which was mainly due to low speed.

#### ***Improvement of Preparatory Tillage Implements and Land Shaping Equipment***

1.10.1.3 A concave blade harrow was found superior to indigenous blade harrow in removing cotton stalks. The concave blade harrow removed 94.19 per cent of stalks with field efficiency of 71.30 per cent against 89.75 per cent plant removal and 56.54 field efficiency of blade harrow. There was no significant difference in the draft requirement.

A four tyred cultivator was evaluated for tilling in medium to deep black soil and found to perform better than indigenous blade harrow. The depth of penetration of the cultivator was nearly 48 to 55 per cent more than that of indigenous blade harrow. There was no significant difference in the draft requirement of both the equipment.

1.10.1.4 *Evaluation of bullock drawn land levelling equipment*: A buck scraper and a float were used for developing one hectare land having slope of about 2 per cent with marked gullies and ridges into contour border strips. The study indicated that nearly 10 bullock hours and 100 man-hours are required for different farm operations in developing the land. The total cost and the volume of the earth moved by the implement worked out to Rs. 626/ha and 188.92 cu. m per ha respectively. The degree of precision achieved in levelling was about 68 to 70 per cent.

1.10.1.5 *Modification, testing and evaluation of multipurpose farming tool bar*: A simple and multi-purpose implement suitable for sowing wide range of crops, fertilizer placement and covering in single operation was fabricated and evaluated. Its performance was found to be quite satisfactory.

1.10.1.6 *Testing and evaluation of seed drill for groundnut crop under irrigated condition*: Under this study, Raichur seed drill, Royalguru seed drill, Local Raichur seed drill and Local Bellary seed drill were compared with country plough with draw tube. The study indicated the superiority of Bellary local seed drill over the other seed drills.

1.10.1.7 *Cycle power for farm operation* : Using commercially available bicycle, Tungabhadra power-cum-pedal winnower and low head water lifting pump were operated. The output for winnower was 159/hr which is the highest output obtained while operating by pedal. The pump can lift 1400 liters of water per hour when operated by bicycle power as compared to 500 liters per hour at the same head when operated manually.

#### 1.10.2 **Agricultural Process Engineering and Post Harvest Technology**

1.10.2.1 *Tungabhadra pedal-cum-power winnower* : This machine has been developed and released for quick and efficient winnowing of threshed crops. It requires a fractional HP motor of equivalent engine power. In case of non-availability of any of them or their failure, it can also be operated by pedal.

It has provision of feeding through. When power operated, the machine gives an output varying from 10 to 35 q/hr depending upon the crop and the power unit. The capacity for manual operation is about 5 to 15 q/hr. The cost varies from Rs. 1,800 to Rs. 4,500 depending upon the source of power.

1.10.2.2 *Pedal operated groundnut pod plucker* : After successfully developing power operated groundnut pod plucking machine, now a pedal operated paddy thresher has been modified for groundnut pod plucking to meet the demand of small and medium farmers. This equipment with one man can pluck 12-14 kg of pods per hour from freshly harvested (1 to 2 days after harvesting) crop against 8 to 10 kg while plucking manually.

1.10.2.3 *Evaluation of groundnut decorticator for seed purpose* : Two manually operated (Kirloskar make and CIAE, Bhopal make) and two power operated (Karnataka Engineering Works, Hiriya and Elahi Engineering Works, Hiriya) decorticators were tested. The study indicated that both manually operated decorticators are suitable for decortication of groundnut for seed purpose. In power operated decorticators, the Karnataka Engineering Works make was found to be superior than Elahi Engineering Works.

1.10.2.4 *Studies on storage parameters of onion* : The study indicated less sprouting of bulb as a result of application of maleic hydrazide at 30 days before harvest of onion crop.

1.10.2.5 *Evaluation of groundnut stripper* : Three types of groundnut strippers, viz., comb type, drum type and loop type were evaluated. Among them, drum type and loop type were found to be more efficient.

#### 1.10.3 **Soil and Water Conservation Engineering**

1.10.3.1 *Evaluation of different soil and water conservation structures in medium and deep black soils* : Study revealed that the performance of the

border strips was superior to contour bunds with and without land shaping and graded bunds.

1.10.3.2 *Studies on zingg conservation terraces*: The study revealed that crop yield was maximum for the treatment levelled to unlevelled proportion of 2:1 followed by 1:1.

1.10.3.3 *Studies on inter-terrace land management for better soil and water conservation*: The study revealed that ridges and furrows performed better compared to broad furrow and ridges.

1.10.3.4 *Studies on contour border strips for conservation of soil and water*: In general, it was observed that: (i) for any given length of the strip the grain yield increased with decrease in the grade from 0.4 per cent to 0 per cent, (ii) for any given grade of the strip, the grain yield increased with increase in the border length from 60 m to 120 m and (iii) for any given grade the percentage of rainfall as runoff decreased with increase in the length of border strip.

1.10.3.5 *Studies on suitable materials to prevent erosion in the water ways*: Water ways constructed with size stones, rubbles and red sand were found to be efficient in preventing erosion in the water ways as compared to Cuddappa slabs, burnt bricks and murrum.

#### 1.10.4 **Agro-Energy**

1.10.4.1 *Evaluation of solar water heater for domestic purpose at Raichur*: Two solar water heaters one with 90 litres capacity with water film thickness 10 cm and another 20 litres capacity with water film thickness 1½ cm have been evaluated. Results indicated that 90 litres capacity heater takes 7 hours (10 a.m. to 5 p.m.) to provide 90 litres hot water at an average temperature of 50°C in winter and 60°C in summer at Raichur whereas 20 litres capacity heater will provide 150 litres of hot water at 60°C in winter and 250 litres of hot water at 60°C in summer during the same period.

#### 1.10.5 **Modification, Testing and Evaluation of Bullock Drawn Harrows and Cultivators at Bijapur**

A concave blade harrow fabricated earlier (1982) was evaluated for uprooting of cotton stalks with indigenous blade harrow. The plants removed (94.19 per cent) and the field efficiency (71.30 per cent) achieved by the concave blade harrow appear to be more than that of indigenous blade harrow and the corresponding values of indigenous blade harrow were: 89.75 per cent (plants removed) and 56.54 per cent (field efficiency). The differences between the draft energy (5.04 and 6.25 hp-hr/ha) and

the human energy (0.9 and 0.7 hp-hr/ha) requirement of harrows did not vary appreciably. A 4-tined cultivator fabricated earlier (1982) was evaluated for tilling in medium to deep black soils and compared with blade harrow. The depth of penetration of the cultivator was nearly 48 to 55 per cent more than that of indigenous blade harrow. The quality of work also appears to be superior. The draft energy (5 to 6 hp-hr/ha) and manhours requirement (5.3 to 6 hr/ha) of the cultivator were comparable with that of indigenous blade harrow (4.5 to 5 hp-hr/ha and 4.5 to 4.9 hr/ha) respectively. The cost of operation worked out to Rs. 19 to 21/ha and the unit draft observed during the field test was 0.25 kg/cm<sup>2</sup>.

#### **1.10.6 Development, Testing and Evaluation of Bullock Drawn Land Lay-out Implement at Bijapur**

A simple and low cost bullock drawn land layout implement developed and fabricated earlier (1982) to form broad bed and furrow (BBF), broad furrow and ridge (BFR) with seeding attachment was evaluated to open the above *in situ* moisture conservation land management treatments in deep black soils and compared its performance with Balram plough and bund former to open ridges and furrows at 60 cm interval and to form 4.5 × 4.5 m compartment bunds, respectively. The area covered by the implement ranged from 1.38 to 2.02 ha and 1.68 to 2.88 ha, for ridging and furrowing (bedding), respectively. The size of the ridges formed by the implement was on par with the ridges formed by the bund former and Balram plough. The layout cost was maximum (Rs. 42/ha) for Balaram plough and minimum (Rs. 12/ha) for bund former, whereas the layout cost for BBF and BFR worked out to Rs. 20 and Rs. 24, respectively. The draft energy and human energy requirement for ridging (BFR) observed as 3.96 hp-hr/ha and 0.88 hp-hr/ha, and for furrowing (BBF) these values were 6.12 hp-hr/ha and 0.72 hp-hr/ha, respectively.

A weed removal attachment for removing the weeds germinated in the BFR land management treatment was fabricated (1983) and evaluated. Its field performance appeared to be satisfactory.

The seeding attachment (2 coulters, 60 cm) was evaluated for sowing jowar. The depth and seed placement varied from 4.2 to 5.8 cm. No appreciable variations in germination count between the coulters were noticed.

#### **1.10.7 Modification, Testing and Evaluation of Bullock Drawn Land Levelling Equipment at Bijapur**

Based on the previous year field evaluation trials of different land levelling implements, buck scarper (120 × 30 cm) and float (120 × 360 cm) were evaluated to layout (develop) the field (one hectare of land) having a slope of about 2 per cent with marked gullies and ridges was



chosen for evaluation indicated that, nearly 110 bullock hours and 100 man-hours were required for different farm operations. The draft energy and human energy requirement for land levelling, grading and ridge shaping excluding the energy required for ploughing and harrowing worked out to Rs. 84 hp-hr and 10 hp/hr ha, respectively. The total cost and the volume of earth-work moved by the implements worked out to Rs. 626/ha and 188.92 cu.m respectively. The degree of precision achieved in levelling was about 68 to 70 per cent and cost of earth work removal per cu. m worked out to Rs. 3.31 which is within the reasonable limit.

#### 1.10.8 *Modification, Testing and Evaluation of Bullock Drawn Seed-cum-fertilizer Drill at Bijapur*

A simple covering attachment was fabricated for the indigenous seed-cum-fertilizers drill and its field performance was evaluated with local method of seeding. It was noticed from the field trial that the differences observed in germination count (plant count) between the implements did not vary significantly. The cost of sowing with this implement worked out to Rs. 17/ha and about 40 per cent in operating time could be saved over the local method of seeding. The depth of seed placement ranged from 4.1 to 5.2 cm. The draft and horse power requirement was observed at 55.20 kg and 0.74, respectively which were within the reasonable limit.

A simple, low cost and adjustable bullock drawn top dresser (drill) was fabricated (1983) and evaluated for top dressing of urea in *rabi* sorghum with the conventional practice (Para method) as control. It was possible to cover 1.8 to 2 ha/day (6 hr of operation) by the implement and the fertilizer was placed little deeper than (5.5 to 7.5 cm) the conventional para method (2.5 to 3.5 cm). The field efficiency achieved was about 76.25 per cent. The draft energy and the total man-hour requirement of top dresser ranged from 1.02 to 1.41 hp-hr/ha and 2.9 to 3.2 hr/ha, respectively, whereas the total man-hour requirement of para method varied from 30 to 32 hr/ha, and about Rs. 12/ ha, could be saved by the top dresser over conventional method.

### 1.11 **Agricultural Economics**

#### 1.11.1 *Performance Appraisal of "Bangalore Grape Growers Marketing and Processing Cooperative Society Ltd., Lalbaugh, Bangalore, Karnataka"*

The various financial ratios worked out indicated that the society has utilised its resources efficiently over the operational period which is a good sign of efficiency in maintaining its inventory position. The grower and non-grower members expressed great satisfaction regarding the working of the Society. Majority of the users of the society comprising of the retail consumers and bulk buyers such as hospitals, hotels, canteens of industrial establishments and hostels

expressed happiness about the quality and prices charged to the products. The household respondents felt the need for more retail outlets in proximity as they were getting fresh fruits/vegetables at seasonal prices. Looking into the improved performance of the society as also its profitability, the government should extend more financial support to construct cold storages and establish marketing societies (of its own) with sufficient manpower at different districts and taluk levels so as to reduce high margin involved in marketing of horticultural crops.

#### **1.11.2 *An Evaluation of Agricultural Market Information System and its Impact on the Farm Economy of Shimoga District, Karnataka***

Personal attempt and market media were the most important sources of market information to the farmers. In general, 28 per cent of the farmers and 32 per cent of market intermediaries relied upon the price information provided by the mass media such as radio and the newspapers as only 17 per cent, 9 per cent and 11 per cent of producers received the price as indicated by the above sources for paddy, areca and for other crop respectively. Market information provided by the official sources were termed as stale news by the users of market information. Thirty eight per cent of farmers growing paddy obtained seasonwise information on product prices, while a small proportion (10 per cent) obtained daily and weekly information. About 13 per cent of producers never obtained any market information and 22 per cent of them obtained information occasionally for paddy.

In the case of tobacco, chillies, jowar and cotton, seasonal price information was sought by 24 per cent of farmers after harvesting (19 per cent obtained information before harvesting).

**Wholesalers:** 86.7 per cent wholesalers sought information on the demand for the produce in the market, 53 per cent on prices operating in the market, 40 per cent on trend in supply and 20 per cent on supply conditions in the market. 27 per cent of wholesalers obtained market information through bulletins, 20 per cent of them obtained from brokers, 13 per cent through post card and 13 per cent from wholesalers.

**Commission Agents (CAS):** The market information system in Karnataka is still in the infancy and the information collected is inadequate. Hence, the system should widen the areas of collection of market information and disseminate to the audience in the language and at the correct wave length they can understand.

#### **1.11.3 *An Economic Analysis of Intensive Cotton Development Programme in Dharwad District: Study of Development Programme Impact***

The ICDB farmers borrowed 133 per cent more production credit. They used 36 per cent and 57 per cent more quantity of FYM and fertilizer respec-

tively. The total cost of production per acre of ICDP farm was higher by 30 per cent, but the cost per quintal of output was lower by 15 per cent. The average yield, employment of human labour, average gross returns and net returns per acre in ICDP were higher by 53, 25, 58 and 188 per cent, respectively.

Results of decomposition analysis suggested that with the same level of inputs of labour, chemical and capital as under non-ICDP situation, about 33 per cent more output could be obtained because of the impact of the ICD programme.

#### 1.11.4 *A Comparative Study of Patterns of Income, Investment and Savings in Irrigated and Non-irrigated Farm—A Case Study in Arkalgud Tq., Hassan*

A large proportion of gross household income was derived from crop production in all farms. A substantial portion of the income was also derived from hiring out and sale of farm assets on large farms which was conspicuously absent on small farms. Per adult annual consumption expenditure was higher on large farms where food articles and clothing claimed a major share.

The findings of the study would help in suggesting policy measure for effective investment as for example on minor irrigation, water lifting devices and creation of the necessary infrastructural facilities for judicious and efficient utilization of water. It would throw light on the direction of investment, savings and consumption under the influence of modernization and commercialization consequent upon the provision of irrigation.

#### 1.11.5 *Farm Financial Management by Farmers in Sibsagar District, Assam*

This study was taken up by one of the postgraduate students under P. G. Research Programme. The objective of the study was to assess the credit facilities to farmers and to suggest an optimum cropping pattern of resource use including short term loans in Sibsagar district of Assam. The results revealed that rational use of the presently available resources enables the farmers to increase net farm returns between 72 and 113 per cent for borrowers and between 8 and 70 per cent for non-borrowers. The increased loan facilities did not show any impact on cropping pattern, net farm returns and borrowing in the case of medium and small farmer borrowers, while the large farmers could realise an increased net return of 126 per cent. The variation in interest rate by 25 per cent over the existing limit did not change the borrowings, cropping pattern and net farm returns. The inadequacy of funds during *kharif* was clearly reflected through no surplus cash availability for transfer in all the categories of borrower and non-borrower farmers. The marginal productivity

analysis indicated the scope for increased cash use among large and all categories of non-borrowers. The shadow prices of land indicated an ample scope for converting the dry land into irrigated land.

#### **1.11.6 *An Economic Evaluation of Investment in Tractors by Farmers in Hoskote Taluk of Bangalore District, Karnataka***

The primary objective of this study was to examine the economic feasibility of financing and purchase of tractors, tractor utilization and its consequent impact on income and employment among farmers in Hoskote taluk of Bangalore District. The major findings of the study were that the tractor farmers belong to large farmer category. The gross return from crop sales of tractor farmer (Rs. 1,22,209) was higher than that of non-tractor farmer (Rs. 1,01,089). The tractor farmers unlike the non-tractor farmers realised a net income of Rs. 2150 per year by hiring out tractors. The net incremental income of the tractor farm was Rs. 12,808. The results indicated that tractors were put into use for 701.14 hours which is little lower than the recommended 1000 hours. The net present worth was Rs. 11,593, the benefit-cost ratio 1.18 and the internal rate of return 21 per cent, at a discount rate of 15 per cent. On the whole, based on the results of the study it can be inferred that the investment in tractor is economically feasible and financially sound.

#### **1.11.7 *An Analysis of Performance of Primary Agricultural Credit Societies in Different States of India***

This study was taken up by the P. G. student under P. G. Research Programme. The main objective of the study was to assess the progress and performance, disparity in the growth of cooperatives and relationship between agro-economic and cooperative developments. The results indicated based on the selected indicators that the inequality increased between 1968 and 1978 among credit cooperatives in different States. However, the inequality in the loan per borrower had decreased. The canonical correlation value of 0.7926 reflects the positive and significant association between cooperative and agro-economic development in India.

#### **1.11.8 *Growth Dimensions of Agriculture in Karnataka***

The results indicated 'irrigated' and 'rainfed' farming as the major underlying dimensions of agricultural performance. The levels of use of inputs, extent of services in terms of institutions and infrastructure and the cropping pattern depended upon these two dimensions. There was improvement in the versatility of regions as well as crops and reduction in the inequality among districts in the productivity of major crop-groups over the period consequent to the implementation of irrigation and other projects, particularly in favour of the less rainfall backward districts of northern Karnataka. It was

heartening to observe productivity-led growth of the major field crops of the State. There was almost a package approach in the less progressive parts of the State which registered higher growth rates in general performance. In the more progressive regions, the existing irrigation facilities were supplemented with other projects during the period of study and therefore the process of growth was in phases.

### 1.12 Farm Forestry

Under the studies on compatability and yield in an agro-forestry system under dryland conditions at Bangalore, Subabul (*k<sub>s</sub>*) *Sesbania grandiflora*, casuarina, *Melia azadirach*, *Acacia nelotica* var. *cuppressiformis* and eucalyptus hybrid were planted in rows spaced 80 ft. apart during 1982 and dryland agricultural crops such as maize, ragi and cowpea were grown during 1983. Among the tree crops, eucalyptus hybrid has grown up to 12 ft. height followed by subabul, casuarina, *Melia azadirach* M. and *Acacia nelotica* var. *cuppressiformis* respectively. *Sesbania grandiflora* is not surviving in spite of repeated plantings and hence, it will be replaced by silveroak during 1984 rains.

The study on natural ground flora in eucalyptus plantations of different ages was undertaken to know the existing natural ground flora, number of species and density of ground plants in eucalyptus plantation and compared with ground vegetation of casuarina, silveroak and *Acacia auriculiformis* plantations in order to find out the effect of these tree plantations on ground flora, if any and also to identify the useful plant species which are adopted to grow beneath eucalyptus plantation.

The study has revealed that eucalyptus hybrid trees affect ground vegetation to a greater extent when compared to other tree plantations. Silveroak is the most favourable species for the growth of maximum number of ground species under dryland conditions. In case of eucalyptus plantation only *Cymbopogon caesius* (lemon grass) and *Aristida setaces* are found to be commonly growing and these species are recommended for growing in eucalyptus plantations. Further, it is also found that the deep rooted condition in silveroak is responsible for the growth of a large number of ground plants. It is also suggested that in order to improve grass growth in eucalyptus plantation and provide grazing land for cattle it is necessary to provide wider spacings.

A preliminary study was undertaken to identify suitable plant species and seed treatments for developing vegetation on rocky hills in drier tracts by aerial seeding method. The study has revealed that seeds of *Sesbania grandiflora*, *Acacia nelotica*, *Cassia fistula*, tamarind, subabul and *Prosopis juliflora* germinated and successfully established into seedlings during rainy season when they

were aerially broadcast over soil surface along with the seeds of more than 40 species of trees. Further, the seeds coated with a mixture of tank silt and cowdung gave better germination results in case of subabul, *Acacia nelotica*, *Sesbania grandiflora* and *prosopis* than the untreated seeds.

There is a belief that the land once grown with eucalyptus hybrid may not be fit for subsequent growth of any plant after harvesting. The study has revealed that natural regeneration is good in the clearfelled eucalyptus plantation over a period of 6-8 years when left to itself and a large number of thorny species of shrubs and trees which are light demanders develop naturally. Nearly 55 species of plants have been recorded in the open clearfelled forest area and 25 species were recorded in the adjacent existing eucalyptus forest. This study has indicated that even eucalyptus will improve soil condition over a period of time especially organic content of the soil and thus provide favourable conditions for natural regeneration of a forest after clearfelling. The present study has shown that it is possible to improve the chances of revegetation in areas once grown with eucalyptus hybrid.

Studies on the seed size and seedling vigour in eucalyptus hybrid revealed that large seed have better germination and seedlings housed from large seeds have higher growth vigour than the seedlings developed from small seeds.

A comparative study was made in the two distinctly small leaved and large leaved forms of sandal tree with regard to leaf water content, transpiration rate, number of stomata, internal photosynthetic tissue built up and correlated with the presence of early heartwood. It was revealed that these two forms differ markedly in the aspects mentioned and it is seen that the small leaved sandal trees seem to be better adopted for water stress conditions. It is also interesting to note that the presence of heartwood is not related to these vegetative characteristics.

Under the preliminary studies on chemical weed control in eucalyptus hybrid nursery, Basoline at 1.5 kg/ha was found to be most effective in controlling both dicot and monocot weeds.

## 2. Animal Science

A study on body weights and reproductive traits of 10 genetic groups revealed the usefulness of Nellore halfbred rams for improvement of Nellore breed of sheep. A study on Hb type revealed lack of relationship between the milk yield and haemoglobin type in Jersey cattle.

Lactation studies resulted in development of equations for predicting 300 days milk yields from the part yields in Surthi buffaloes.

A study on incidence of gastro-intestinal parasites of cattle in 159 villages of 8 districts in KDDC area has revealed 29 per cent infection. The epidemiology of these diseases has also been studied to evolve effective package of practices, for the control.

A complete mortality of *lymnaea*, *vipinara*, *indoplanorbis* and *Melania* spp. of snails can be achieved at different concentrations of eucalyptus under laboratory conditions. These results suggest possible biological control of snails which act as intermediate hosts for large number of fluke infestations of cattle and sheep.

A new drug Coxiban has been tried against poultry Coccidia and found to be highly effective in not only the prevention of the disease but also useful in weight gain in broilers.

A ribosomal vaccine using *Leptospira pomona* serover ribosome has been standardised. The challenge studies in hamsters have indicated that this vaccine is superior to formaline or heat inactivated vaccines.

As a result of few years on sheep breeding research at Dharwad campus a new breed of sheep nomenclatured as "UAS Sheep" has been evolved and was released for field adoption during this year. This breed having parentage of 25 per cent of Bannur, 25 per cent of South Down and 50 per cent of Deccany blood, is white in colour which can be dyed to any desired colour in textile industry, the growth rate is faster than in the original Indian parent breeds and the wool is of improved type, softer and more crimped. It is also medium in size, polled with an average body weight of 17.30 kg in females and 18.46 kg in males at 6 months of age. The meat quality is very good, soft tender and acceptable. The dressing percentage of carcass is 40.72. The lambing interval is 8.5 months. The average green fleece weight is 355.18 g. The staple length is 6.07 cm. The breed is very popular and has an extensive demand from the farmers around Research Stations where they are reared.

Egg drop syndrome is a disease syndrome of poultry caused by an Adenovirus and of economic importance. The infection causes a steep fall in egg production. A survey conducted in this regard has shown that the infection is widely prevalent. So far, three isolates from different outbreaks have been recovered and characterised.

The studies on experimental allergic encephalitis (EAE) has opened up new venue for detailed study of immunopathological lesions in nervous system especially towards obtaining the type of responses in several species of animals including birds.

The results of tumour regression pattern, clinical haematology, enzymology and biochemical changes indicated that clofibrate administration at 100 mg/kg body weight was effective in causing regression of transmissible venereal tumour with tolerable toxic effects which could be overcome by appropriate medication. The results of evaluation of cell mediated immunity (CMI) with 2-4 DMCB indicated that there was no detectable variation in CMI response attributable to clofibrate thereby.

In broiler poultry, a recurrent reciprocal selection programme involving a synthetic meat line and a White Plymouth Rock line revealed the suitability of the meat line as the male line and Rock line as the female line for the production of commercial crossbreds. The crossbreds were ideally suited for tandoori chicken preparation at six weeks of age.

A specialised strain-cross Cornish line has been developed and is being evaluated for its suitability as a male parent line. This line has the added advantage of producing multi-coloured progenies resembling desi plumage pattern. Similarly, a strain cross White Plymouth Rock female line has been evolved to produce broiler chicken on cross-breeding with the above Cornish lines.

In order to reduce the cost of feed inclusion of subabul leaf meal in poultry diets produces a favourable effect on both egg production and growth rate. Two new species of poultry viz., Japanese Quail and Turkey have been introduced in the University farm. Japanese Quails with red meat are table delicacies. These Quails could be economically raised on deep litter system.

### 3. Fisheries Science

#### 3.1 Fishery Biology

Survey of estuarine mullet resources of Dakshina Kannada coast revealed *Valmugil seheli* dominated the catch throughout the year (40 per cent) followed by *V. spegleri* (28 per cent) and *M. cephalus* (15 per cent). Others mostly represented by *Liza* spp. It was observed that there was no regularity in the landings of mullets.

About 2000 prawns of different species were observed along Karnataka coast for parasitic infestation. Prawns collected from Sastana had *spostome*



ciliates, cestodes in the gill chamber, nematodes near haepatopancreas and ectocommensal protozoans on the body and gill surfaces. Black gill was frequently observed in many prawns.

The clam *Katelysia opima* was stripped and viable gametes obtained. Fertilisation was 100 per cent with 95 per cent survival of fertilised eggs. The Trochophore larvae were fed with pure cultures of *Isochrysis* and *Tetraselmis* grown in the laboratory.

Mature adults of the oysters *Crassostrea madrasensis* were stripped and viable gametes fertilised under laboratory conditions. Use of Trimethoprim (2 mg/l) and Sulphamethozazole (10 mg/l) inhibited bacterial growth and resulted in high survival of larvae. The larvae were successfully reared up to settlement stage without circulation of water.

### 3.2 Aquaculture

Monoculture of giant freshwater prawn and polyculture of rohu, mrigal, silver carp, common carp and magur were carried out with artificial feeding, using different protein sources in the feed, to find out suitable cheaper sources of protein in place of fishmeal which generally forms the major protein source in formulated fish and prawn feeds. The feed containing a mixture of silkworm pupae and shrimp waste gave the best result in both the cases over an experimental period of 120 days.

This finding indicates that fishmeal in artificial diets can be replaced with a mixture of silkworm pupae and shrimp waste, without affecting the growth rate of the species cultured. The optimum dietary protein requirement of catla and rohu was studied by employing casein based feeds containing 20 per cent, 30 per cent, 40 per cent and 45 per cent protein. Feed containing 30 per cent protein gave the best result, indicating that the optimum dietary protein requirement of catla and rohu is around this level. Growth depression was noticed in those fish bred with the diet containing 45 per cent protein.

A short term experiment was conducted in glass aquarium tanks with continuous water recirculating system to study the growth promoting effect of the synthetic steroid, 17-methyltestosterone on the Indian major carp, *Labeo rohita*. As compared to the control diet, feed containing 5 ppm of 17-methyltestosterone promoted better food conversion ratio (FCR) and protein efficiency ratio (PER).

In a period of 120 days, the fingerlings of *Labeo fimbriatus* under different treatments viz., manuring with cowdung; manuring and supplementary feeding, with rice bran and groundnut oil cake in 1 : 1; and only supplementary

feeding had attained an average weight of 22.1 g, 20.44 g and 15.59 g respectively. The poor growth of the fishes fed on only artificial feed indicates that manuring the cisterns is also essential.

The pelleted feed G.N.C. (15 per cent), rice polish (15 per cent), fishmeal (30 per cent), ragi flour (3 per cent) and mineral premix (2 per cent) was given to the fishes at 5 per cent of their body weight daily. In 98 days the yearlings of *Labeo fimbriatus* had registered an average weight of 91.6 g and 114.5 g respectively. Results indicated that the feeding 5 per cent of the body weight seems to be sufficient for raising brood fish of *L. fimbriatus*.

A comparative study on the growth and survival of fry of *L. fimbriatus* under three different treatments were made for a period of 45 days in 20 m<sup>3</sup> cement cisterns. The fry were reared in cisterns manured with cowdung and single superphosphate only in one treatment. In other two treatments the fry were bred with macerated lucerne leaves and conventional feed of rice bran and oil cake separately. The net average increase in weight of fry in the order of treatments were 2.83 g, 4.4 g and 1.67 g with a survival of 90, 62 and 80 per cent respectively. Though the growth of the fry fed with macerated lucerne leaves was less as compared to conventional feed, better survival of fry was observed in this treatment. This indicates that fry of *fimbriatus* will thrive well on vegetable matter like macerated lucerne leaves.

Studies made on the growth of the fingerlings of *L. fimbriatus* under different stocking densities viz., 5000/ha, 7500/ha and 10000/ha had revealed that the growth of the *fimbriatus* did not affect adversely at different stocking densities. The average weight gained by the *L. fimbriatus* in the order of increasing stocking densities were 13.3 g, 11.58 g and 14.3 g respectively in a period of 115 days. Whereas the fingerlings of rohu had attained a net average weight of 73.0 g at the stocking density of 5000/ha.

Observations made on the growth of fishes in composite fish culture with five species combination fed with poultry droppings based feed, and subabul based feed; poultry droppings and subabul based feed, as against conventional feed indicated that poultry droppings and subabul based feed gave a better conversion and were proved to be economical feeds than the other feeds. The experiment lasted for 135 days.

While studying the fish and fisheries of Hemavathy river stretch near Mudigere, thirty different species of fishes were caught through the operation of different types of gears like hook and line, reel and rod, throw line, gill nets and local nets. Two fishes of Tor Kudhree weighing 5½ kg and 6½ kg were caught with the help of No. 7 hook and line. A detailed study on the operation of different types of gears in Hemavathy river was also made.

Studies made on the effect of cowdung and biogas slurry on chemical qualities of water revealed that the oxygen content was always higher in biogas slurry treatment than in cowdung treatment. Also nutrients like nitrate-nitrogen, nitrite-nitrogen, phosphate-phosphorus and dissolved organic matter were more in biogas slurry than treated ponds.

Studies conducted on the socio-economic status of the fishermen of Mugad village who depend on fishing and fish culture in Mugad tank near Dharwad showed that there is good scope to improve their economic conditions by adopting modern fishing and fish cultural practices.

Incidence of *Lernaea* infection on net host species of Mahaseer, Tur kudhree has been reported.

### 3.3 Fishery Oceanography

Observations on currents in the Arabian sea off Mangalore was carried out. Surface currents were directed generally towards South-West during April and May, while bottom currents were directed between North-West and South-East in April and towards South-West in May.

Inorganic nutrients during the process of mixing in the estuarine and coastal waters off Mangalore indicated seasonal variations of different forms of phosphorus and its adsorption and desorption. Variations in nitrate and nitrite-nitrogen, silicate-silicons were also observed.

### 3.4 Fishery Microbiology

*Vibrio parahaemolyticus* can sometimes be recovered from dry fishes obtained from fish markets. However, the levels are low and this organism does not survive the process of sundrying. Even when contaminated after drying, the survival is less than 2 hours.

Birds might have a role in the dissemination of *V. parahaemolyticus* in the environment as indicated by the occurrence of this organism in bird droppings.

*V. parahaemolyticus* can survive the process of cold smoking of fishes. In fact, studies conducted using sardines and mullets suggest that multiplication of *V. parahaemolyticus* might take place during the process of cold smoking (24 hr) and during storage of smoked fish at room temperature.

Chitin has been observed to influence the survival of *V. parahaemolyticus* at low temperature. As the temperature of incubation of *V. parahaemolyticus*

in buffer is lowered from 37°C through 10°C, multiplication of the strains is noted which was greater at lower temperature with 6 hr probably as a survival strategy of the organism.

Effect of plant protease inhibitors on fish spoilage bacteria reveals that protease inhibitors from Indian Red Weed seeds (*Adenanthera pavonia*) have a preservative effect on fishes as indicated by the biochemical and microbiological characters of fishes given a dip treatment in these inhibitors. The most important spoilage group, *Pseudomonas* appeared to be completely suppressed by the protease inhibitors. Further, the inhibitors selectively suppressed TMA and H<sub>2</sub>S producing bacteria which are most important in causing fish spoilage. These results suggest that protease inhibitors from plant sources could be used in fish preservation.

The presence of histamine in excess of 10–100 mg per cent in fishes bring about toxic symptoms in consumers. The level of histamine in market samples of sardines and mackerels were estimated and the results reveal that levels might sometimes exceed 10 mg per cent in mackerels. Histidine decarboxylating bacteria were found to be widely distributed in fish market environs and therefore might contaminate the fishes. Further, the results indicate that rapid urease test can be used to detect the presence of large number of proteus in fishes. By this test, proteus counts in excess of 10<sup>2</sup>/g could be detected in 10 hr.

### 3.5 Fish Processing Technology

Studies made on painless killing of frogs for processing frog legs indicated that frogs immersed in 1 per cent salt solution and subjected to 150 volts electricity has given quick result.

A curing time of 42 hr with fish to salt ratio of 3 : 1 was found to be optimum before the fishes are subjected to pressing.

It was found that when squids were iced immediately after catch, there was no discolouration even after 5 days of storage in ice.

Deep sea fishes *Priacanthus hamrur* and *Centrolopus niger* were grouped under semifatty fishes because of the presence of more than 5 per cent of fat in their meat. *Chlorophthalmus agassizi* was considered as lean fish. All of them were acceptable for human consumption.

It was found that canned products made from small sized tuna (less than 1 kg) and precooked at 100°C for 70–75 minutes in steam retained their quality

well up to one year after their production. Thus the canning method for small sized tuna could be standardised.

Effect of wood smoke on the preservation of oil sardine shows that it is possible to produce the smoked product with reduced level of 3, 4 Benzopyrene. It was found to contain about 2/mg of Benzopyrene/kg of smoked fish product. The product can also be stored at room refrigerated, cooler and cold storage temperatures for 6, 10, 15 and 28 weeks respectively in an acceptable condition.

### 3.6 Fishery Statistics

Statistical studies on the abundance and composition of trawl catch along Dakshina Kannada coast revealed that the major portion of the trawl catches were composed of fish followed by prawns, stomatopods, crabs and cephalopods in that order. Malpe observed marked increase in the total trawl catch when compared to Mangalore landing centre during 1983-84 fishing season.

Based on the secondary data of fish catch for Karnataka coast for the period 1956 to 1978, the following preliminary results were noted. The bulk of the landings of the Karnataka coast is made up by the Indian mackerel and the Indian oil sardine together accounting as much as 70 per cent of the total landings. The level of fluctuation in the annual landings is very high in all the fisheries. The coefficient of variation for clupeids is the minimum (61.63 per cent) and it is maximum for *Anchoviella* spp. (176.92 per cent).

### 3.7 Fishery Biochemistry

Among the fishes estimated for total lipids, neutral lipids, phospholipids, FFA, PV and fatty acid composition, highest total lipid was found in *T. dssumieri* and least in *T. thalassinus*. Natural lipid ranged from 58 per cent to 64 per cent while phospholipids ranged from 30.9 per cent to 38.1 per cent of total lipids.

On the analyses of mackerel (*Rastrelliger kanagurta*) for proteolytic bacteria, *Aeromonas* sp. and *Pseudomonas* sp. showed good proteolytic activity as evaluated by the size of the zone of hydrolysis around their colonies.

## 4. Home Science

Pilot study was conducted at Gurlakatti and Kankikoppa village. After modifying the questionnaires a cluster sample of nearby villages in Dharwad taluk were selected for the project work namely, Shivalli, Managundi, Kurubagatti and Shibargatti.

Based on the total number of households in the villages, 15 per cent of the households were selected as the target group and also 15 per cent from each group *i.e.*, the landless labourers, marginal farmers, small farmers, middle and large farmers were selected as the sample.

First phase of survey was conducted at all four villages during the period from February to April 1984 to collect information about general background of the family, the family composition, family resources and the housing condition. Number of households surveyed in each village are as follows : The total households of the selected villages were 1215, out of which 176 were selected and as a safety measure 220 households have been surveyed.

As a part of 3rd objective, a film show on health and sanitation, immunization, food adulteration, pest control and compost pit was organised at the earlier selected villages.

In the child development programme three villages *viz.*, Arshinagodi, Gangapur and Kurvinkop have been surveyed comprising the total sample of 1,500.

Anthropometric measurements of the children between 0-6 age group has been started. The anthropometric measurements (head circumference, chest circumference, arm circumference, arm length, leg length, height and weight) of 788 children from Guralkatti, Kanakikop, Jagapur, Reddaranagnoor and Kallapur have been taken.

The remaining 712 children of the three villages *viz.*, Arshinagodi, Gangapur and Kurvinkop have yet to be measured.

The anthropometric measurements of the tribal children (about 530) and also the slum children of Dharwad (about 325) have been taken twice, once in three months.

## 5. Basic Sciences

### 5.1 Chemistry

Studies on the hydrolysis of  $\alpha\beta$  — epoxysilanes was continued. It has been shown that large ring cyclic  $\alpha\beta$  — epoxysilanes behave like the acyclic ones.

Some understanding of the radical-induced oxygenation of 2,3-dichloro-norbornene, a model for cyclodiene insecticides, has been obtained.

Humification of paddy straw and soybean husk was studied. After incubation, the humic and fulvic acids were isolated, which were found to possess carbonyl and phenolic functions.

Soil samples from eucalyptus plantation have been collected and the phytotoxic substances are being isolated from them.

## 5.2 Statistics

In an uniform trial on redgram, variations in the experimental units are measured by coefficient of variation of various sizes and shapes of plots. The CV ranged from 25.4 per cent for the basic unit ( $1 \times 1$ ) to 15.20 per cent for plots of sizes of 25 such units ( $5 \times 5$ ) combination.

A new method on sampling of trees is established.

In a study of constraints limiting the adoption of package of practices in sunflower, in Bellary, Gulbarga, Bijapur, Mysore and Shimoga districts revealed the following findings :

- i) 20 per cent of the farmers applied N and P as per package of practices and obtained higher yields, while the rest, due to paucity of funds, applied lower doses.
- ii) Farmers have the knowledge of hand pollination but they could not adopt the same due to labour problems, paucity of funds etc.
- iii) The crop was harvested normally at physiological maturity level by a majority of farmers and realized higher yields.
- iv) A majority of farmers did not encounter any difficulty in marketing the produce.

## 5.3 Mathematics

A mathematical model for pulsatile flows in a rotating channel has been evolved.

## 5.4 Biochemistry

The purification and characterization of trypsin/amylase inhibitor from ragi has been reported earlier. The same inhibitor protein has both the trypsin and amylase inhibitory activities and represents an unusual class of protein-proteinase inhibitors. Therefore, it was of interest to study the mode of interaction of the inhibitor with the enzymes. The finger millet trypsin inhibitor

was titrated with  $\alpha$ -amylase in the presence and absence of saturating amounts of trypsin and with trypsin in the presence and absence of saturating amounts of  $\alpha$ -amylase. The competition experiments with trypsin and  $\alpha$ -amylase showed that trypsin does not interfere with  $\alpha$ -amylase inhibitory activity and  $\alpha$ -amylase does not interfere with trypsin inhibitory activity of the inhibitor. This suggests that two independent reactive sites on the inhibitor are responsible for the inhibition of trypsin and amylase.

The complex formed when the ragi trypsin inhibitor was mixed with trypsin was isolated by gel filtration chromatography. The isolated trypsin-inhibitor complex still possessed amylase-inhibitory activity which further substantiates the conclusion that the ragi trypsin inhibitor is a true 'double-headed inhibitor'.

Purothionins are high-sulphur, basic polypeptides present in wheat endosperm. They are very basic (20 per cent Arg + Cys) and contain large amounts of Cys (20 per cent) but no His, Met or Trp.

Purothionin-like proteins (purothionin analogues) were isolated from barley and rye. Until now we have had no information about isolation of purothionin analogues from *Setaria italica*. An attempt has been made to isolate a purothionin analogue from *Setaria italica*.

I, Se-709 variety of *Setaria italica* was selected and extracted with 0.05 M  $H_2SO_4$  after defatting with petroleum ether. This yielded three protein fractions, each of which contained fairly large amounts of basic amino acids but only traces of cystine. Polyacrylamide gel electrophoresis of these basic proteins at pH 4, showed no significant bands. They did not show any inhibitory activity with pepsin, trypsin, chymotrypsin, papain, bromelain and amylase.

Eventhough the *Setaria italica* protein fractions are very similar to purothionins in amino acid composition, it is probably not homologous in other properties.

On the whole, we are happy about the progress of Research. In the year to come, we hope that much more fund will be flowing-in through many more research projects and thus add to the improved quantum and quality of research. Thus we hope to serve the cause of the farming community still better.

K. KRISHNAMURTHY  
Director of Research



## **PART IV**

### **EXTENSION**

#### ***Extension Education Council***

Twenty fifth meeting of the Extension Education Council was held on 20th December 1983. The important suggestions/recommendations made by the Council are :

1. The Council agreed with the items suggested for inclusion in VII Five Year Plan proposals of the Directorate of Extension with certain modifications, considering new roles and responsibilities and obligations of the University to different State Development Departments and the needs of the farmers at large. The Council also gave consideration to the balanced development of extension work in other disciplines like Veterinary and Fisheries.
2. The Council while approving the technical programmes of different Extension Education Units under the Directorate suggested certain new programmes considering the feedback from the farmers and keeping in view the requirements of the different Development Departments.

#### ***Agricultural Information***

The University in collaboration with the State Department of Agriculture has brought out the following publications :

1. Package of Practices for High Yields 1983 (English)
2. Package of Practices for High Yields 1983 (Kannada)

The joint meeting of the package of practices for Horticultural crops to revise the recommendations for vegetables, plantation, flower and fruit crops was held from 4th to 6th August 1983 in collaboration with the State Department of Horticulture ; Indian Institute of Horticultural Research, Bangalore and Central Plantation Crops Research Institute, Kasargod.

Publications of fortnightly hints to farmers in both fields of Agriculture and Horticulture have been continued during the period. In collaboration with the State Department of Agriculture and Horticulture, 48 and 49 Press Releases

were issued, respectively. In addition, 49 sets of 'Question and Answers' in *Prajavani* and 50 in *Kannada Prabha* have been published.

Monthly tips to farmers were also issued through *Krishi Varthe*, *Vyavasaya Patrike* and *Belaku*.

The University has organised the following exhibitions :

1. Exhibition at GKVK Campus of the University on the occasion of Seminar-cum-Workshop on Dryland Development in Karnataka on 29th and 30th October 1983.
2. An exhibition on Biogas Technology at the Mysore Dasara Celebrations.
3. An exhibition on the occasion of Krishi Mela at GKVK Campus on 12th and 13th November 1983.
4. The University pavilion was arranged at Lalbagh at the time of Independence Day; Horticultural Show in coordination with the Horticultural Department.

#### **Farm Advisory Service**

Scientists of the University have attended to 3,153 queries and made 200 visits to the farmers fields to advice them on different problems relating to agriculture and allied fields; the details of which are as under :

Unit/Department	No. of replies given to queries of farmers	No. of farm visits
Extension Education Units and Consultancy Unit of the Directorate of Extension	818	63
Farmers Training Institute	136	34
Agricultural College, Hebbal	41	19
Agricultural College, Dharwad	241	5
Veterinary College, Hebbal	1,548	79
Research Stations	368	—
Total	3,153	200

#### **Correspondence Course on Paddy**

The third correspondence course on paddy has been organised during the year and 107 farmers participated in the programme.

**Field Days at Research Stations**

During the period under report 28 Research Stations conducted Field Days and Krishi Melas as detailed below :

Date of organising Field Day/ Krishi Mela	Agricultural Research Stations
14-9-83	Kandli
19-9-83	Arabhavi
19-9-83	Belavatagi
24/26-9-83	R.R.S., Dharwad
3-10-83	Hanumanamatti
3-10-83	Bailhongal
12-10-83	Brahmavar
12-10-83	Kankanadi
12-10-83	Ullal
13-10-83	R.R.S., Mudigere
28-10-83	Sirsi (Paddy)
12/13-11-83	GKVK Campus
19-11-83	Gangavathi
19/21-11-83	R.R.S., Mandya
5-12-83	Nagenahalli
15/16-12-83	Bijapur
16-12-83	Madikeri
22-12-83	Bagalkot
23-12-83	Gulbarga
26/27-12-83	Dharwad
28-12-83	Hagari
2-1-84	Ponnampet
6-1-84	Siruguppa
9-1-84	Annigere
11/12-1-84	R.R.S., Raichur
23-1-84	Bheemarayanagudi
23-1-84	Bidar
7-2-84	Madenur

**Farmers Training**

1. *Farmers Training Institute, Hebbal*: The Farmers Training Institute during the year conducted several institutional and peripatetic training programmes for farm men, farm women and convenors of charchamandals. The details are as under :

Type of Training Programme	No.	No. of persons trained
<i>a) Institutional training</i>		
i) For farm men	1	23
ii) For farm women	1	17
iii) Convenors of charchamandals :		
Farm men	2	79
Farm women	2	75
<i>b) Peripatetic training programme</i>		
i) Farm men	38	1,278
ii) Farm women	36	1,388
<i>c) WYTEP (DANIDA Project) training Programme</i>		
i) Farm youth	14	360
ii) Farm women	12	360

The Farmers Training Institute, Hebbal hosted the following other training programmes :

Eight programmes were organised (3 days duration) for the benefit of officials of various development departments of the State. In all, 209 officials were trained.

A training programme on Crop Production and Biogas Technology of 3 days duration was organised for the staff of MYRADA in which 30 persons have participated.

Eleven new charchamandals were organised in which 274 members were enrolled and 136 queries of charchamandals and individual farmers were answered.

Under the Lab-to-Land programme, the Institute staff continued to work with 50 farmers of M. Dasarahally village.

2. *Krishi Vignana Kendra, Hanumanamatti* : The Krishi Vignana Kendra, Hanumanamatti has organised 45 on the campus training programmes and 113 off the campus training programmes involving 3,394 persons. The details are as under :

Discipline	On-campus training programmes	No. of persons trained	Off-campus training programmes	No. of persons trained
Agril. Engineering	15	266	92	1,558
Soil and Water Management	1	18	6	149
Animal Science	12	257	3	123
Home Science	6	199	5	244
Extension, Sericulture and Others	11	368	7	212
Total	45	1,108	113	2,286

3. *Extension Education Units* : The Extension Education Units of the Directorate of Extension have organised 1650 group meetings, 436 training sessions and 105 field days/field visits involving 24,119 ; 8,185 and 8,289 farmers respectively. The details are given below :

Extension Education Unit	Group meetings		Training sessions		Field days	
	No.	Farmers involved	No.	Farmers involved	No.	Farmers involved
Bangalore	585	9,337	222	3,069	11	1,736
Dharwad	347	6,135	131	3,312	70	1,133
Raichur	259	3,186	35	728	9	4,340
Mudigere	99	—	22	—	4	—
Mandya	334	3,984	11	201	4	450
Mangalore	26	1,477	15	875	7	630
Total	1,650	24,119	436	8,185	105	8,289

4. *Training of extension functionaries* : The Staff Training Unit of the Directorate has organised the following training programmes for the benefit of extension workers of the State Department of Agriculture, Horticulture, Animal Husbandry, Fisheries, and at the request of Government of India organised certain special programmes also. The details are given below :

Name of the Department/Institution	No. of courses organised	No. of participants
1	2	3

1. *Department of Agriculture*

Soil Testing and Fertilizer recommendations  
for Southern and Northern regions

2 17

	1	2	3
2. <i>Department of Horticulture</i>			
Special course on Plantation Crops, Workshop on Subject Matter, Extension Education and Administration		4	56
3. <i>Department of Animal Husbandry and Veterinary Services</i>			
Diagnostic Techniques, Fodder Production		2	29
4. <i>Department of Fisheries</i>			
Induced Breeding of Carps and Nursery Management, Composite Fish Culture		3	43
5. <i>Ad-hoc Training Programme</i>			
Central Sector Training Programmes sponsored by Govt. of India (State level) on Wheat, Rice, Ragi, Jowar, Maize, <i>kharif</i> pulses, <i>rabi</i> pulses and Dryland Farming Technology		15	414
6. <i>Biogas Training Programme</i>			
Biogas plant Construction and Maintenance		24	480

The Unit with the help of other scientists of the University continued to organise the monthly training-cum-workshops for the benefit of the staff of the State Department of Agriculture under the T and V system in all the 19 districts of the State.

#### **Field Extension Work**

a) *Block Demonstrations*: Details of Block Demonstrations conducted by the Extension Education Units are given below :

Extension Education Unit	Season	Crops	No. of Block Demons. organised	No. of farmers			Area covered in in acres
				Small	Others	Total	
1	2	3	4	5	6	7	8
Bangalore	Kharif	Dryland					
		Ragi	1	33	27	63	150
		Redgram +					
		Groundnut	1	20	5	25	30
Raichur	Rabi	Safflower	1	5	—	5	8
Mudigere	Kharif	Paddy	1	3	5	8	25
		Coconut	1	40	—	40	20

1	2	3	4	5	6	7	8
Mandya	Kharif	Coconut	1	20	—	20	30
		Redgram	1	16	—	16	40
		Paddy	1	38	24	62	45
		Indaf-9	1	14	4	18	25
		Total	9	189	65	254	373

In all, 9 Block Demonstrations were conducted by the Extension Education Units on an area of 373 acres involving 254 farmers. The State Department of Agriculture, Horticulture, Nationalised Banks and Weedicide Organisations collaborated in organising Block Demonstrations.

b) *Trials conducted by the Extension Education Units* : The six Extension Education Units have organised 559 trials of which 310 were in *kharif*, 151 in *rabi* and 98 in summer. The details are as follows :

Extension Education Unit	No. of trials conducted							
	Kharif 1983-84		Rabi 1983-84		Summer 1983-84		Total	
	Number	Location	Number	Location	Number	Location	Number	Location
Bangalore	10	111	2	14	7	54	19	179
Dharwad	10	46	4	16	2	9	16	71
Raichur	6	17	5	15	—	—	11	32
Mandya	15	48	2	8	1	2	18	58
Mangalore	5	72	6	98	—	—	11	170
Mudigere	3	16	—	—	10	33	13	49
Total	49	310	19	151	20	98	88	559

Important trials conducted by the Extension Education Units were as follows :

#### Extension Education Unit, Bangalore

##### *Kharif 1983-84*

Mixing ragi with DAP

Comparison of KMP 41 with Sona

Comparison of H 911, HR 1523 with Indaf-8

Mixing cropping of ragi with lucerne

Comparison of Sel 5, 9 French beans with Contender

Comparison of onion Sel 11, 13, 14 and Bellary Red  
 Comparison of Sel 13 and 16 capsicum with C. Wonder  
 Effect of massorie phos vs superphosphate on ragi  
 Effect of massorie phos vs superphosphate on paddy  
 Effect of massorie phos vs superphosphate on groundnut

*Rabi 1983-84*

Comparison of sel 2, 5, 9 French bean with B. Stringless  
 Control of bacterial wilt of tomato by bleaching powder

*Summer 1983-84*

Comparison of KMP 41 vs Sona paddy  
 Comparison of 61-B cowpea with S-288

**Extension Education Unit, Dharwad**

*Kharif 1983-84*

Performance of Dh-8 vs recommend groundnut  
 Performance of IET 5656 and Gama 318 vs A-67 paddy  
 Performance of IET 5889 and IET 5882 vs A-200 or Intan paddy  
 Performance of BKN 6986-147-2 vs Intan paddy  
 Performance of DP 452 and DP 225 vs Laxmi or Jayadhar cotton  
 Performance of LH 299-1 vs Jayadhar cotton  
 Field trials of sel 22 vs Pusa Ruby tomato  
 Field trials of sel 11, 13 and 14 vs Bellary Red.  
 Performance of ICP 8863/BDN-1 vs local  
 Rhizobium treatment to redgram

*Rabi 1983-84*

Performance of KDW-39 vs recommended variety of wheat (irrigated)  
 Field trials of Sel-13 vs California Wonder capsicum  
 Field trials of Arka Manik vs Sugar Baby watermelon  
 Irrigation schedule to bengalgram.

*Summer 1983-84*

Performance of Dh-8 vs recommended variety of groundnut  
 Field trials of Sel-22 vs Pusa Ruby tomato

**Extension Education Unit, Raichur**

*Kharif 1983-84*

Use of synthetic pyrethroid insecticides alternate with conventional insecticide  
 for the control of cotton bollworms



- Use of planofix for better fruit set and control of flower drop in chilli
- Performance of KHT-6 vs Pusa Ruby tomato
- Application of higher dose of fertiliser for better yields in Pusa Kranti brinjal
- Weed control in onion by using basalin herbicide
- Inter cropping of niger in sunflower

*Rabi 1983-84*

- Intercropping of niger with sunflower
- Introduction of vegetable cowpea (S61-B) as new vegetable in the north eastern Karnataka
- Weed control in onion by basalin
- Spraying of  $\text{FeSO}_4$  in groundnut crop
- Reclamation of salt affected soils

**Extension Education Unit, Mandya**

*Kharif 1983-84*

- Trial on paddy varieties KMS 5914-4-6 vs Prakash
- Trial on paddy varieties KMP-39 vs IR-20
- Trial on paddy varieties KMP-41 vs Sona
- Trial on paddy varieties for late planting CH-6 vs local
- Trial on paddy varieties for saline soils
- Trial on ragi varieties HR 911 vs Indaf-5, Indaf-9 and Indaf-8
- Trial on sugarcane varieties KHS-3296 vs local practice
- Trial on ragi + soyabean mixed cropping
- Trial on soyabean + redgram mixed cropping
- Trial on mixed sowing of DAP with ragi seeds
- Comparison of Arka Nishanth radish with Japanese White
- Comparison of Sel-13 and 16 capsicum with California Wonder
- Comparison of Arka Kusumakar brinjal with Erengere
- Comparison of Sel-14 onion with Pusa Red
- High density planting of banana for increased production
- To study the relative efficacy of systemic and non-systemic fungicides in controlling the leaf spot and powdery mildew diseases of chrysanthemum
- To study the relative efficacy of systemic and non systemic fungicides in controlling the leaf spot and fruit rot diseases of capsicum

*Rabi 1983-84*

- Comparison of Sel-4 bottlegourd with Pusa Summer prolific long
- Trial on introduction of potato crop to Mandya District.

**Extension Education Unit, Mudigere***Kharif 1983-84*

Paddy varietal trials  
 Multilocation trial in cardamom  
 Propagation of cardamom by seedlings vs suckers

*Summer 1983-84*

Groundnut varietal trial  
 Application of zinc sulphate in paddy  
 Intercropping in sugarcane  
 Performance of pulses in rice fallows  
 Paddy varietal trial  
 Weedicidal trial in paddy  
 Multilocation trial in cardamom  
 Efficiency of rock phosphate vs super phosphate  
 Intercropping in coconut  
 Propagation of cardamom by seedlings vs suckers

**Extension Education Unit, Mangalore***Rabi 1983-84*

Use of half the recommended dose of Ekalux granules (6 kg/ac) for pest control in paddy  
 Use of Ekalux 25 EC at a lower dose (1.5 ml/l) to control paddy pests  
 Rock phosphate as a cheap source of phosphorous compared with super-phosphate on paddy  
 Rock phosphate as a cheap source of phosphorous compared with super-phosphate on groundnut  
 Cashew varietal performance trial

*Results of trials conducted by the Extension Education Units*

Name of the trial	No	Yield in kg/ac		% Increase
		Check	Treatment	
1	2	3	4	5

**Extension Education Unit, Bangalore***Rabi 1982-83*

Comparison of set 2, 5, 9 vs French beans with Burfee Stringless	5	4392	Set-2-3670 Set-9-5332	(-16) (+21)
Control of bacterial wilt of tomato by bleaching powder	9	4955	5328	7.5

1	2	3	4	5
<i>Summer 1982-83</i>				
Comparison of K.M. P. 41 & KM S.6 vs 5		Sona	KMP 41	+ 4
Sona paddy		2698	2806	
			KMS 6	-7.5
			2496	
Comparison of Indaf 5 & 9 with	10	Indaf	Indaf 9	11.2
HR 911		5 ragi	1644	
		1478	HR 911	14.2
			1698	
Comparison 2-5-9 beans vs	10	BS	S1-9	54.8
Burfee Stringless		2312	3580	
			S1-5	12.6
			2602	
			S1-2	2.2
			2354	
Comparison bottlegourd with P/S long	6	4574	4932	7.8
			P.S.	
Comparison of Sel. 11, 13 and 14 onion 12		B. Red		
with B. Red		6770		
Sel. 11			7546	11.5
Sel. 13			7214	6.6
Sel. 14			7553	11.6
Protection of tomato nursery from	7	6964	7345	5.5
leafcurl by nylon netting				
<i>Kharif 1983-84</i>				
Ragi-lucerne in Akkadi row	7	R-871	680	Ragi
		L	55	lucerne
Mussoriphos on paddy	10	2275	2312	1.7
Mussoriphos on ragi	12	762	716	1.8
Mussoriphos on groundnut	2	420	500	19.0
Mixing ragi with DAP	34	812	875	7.6
Comparison KMP 41 with Sona	13	2554	2694	5.4
Comparison of HR 911, HR 1523 vs	24	905	HR 911	7.9
Indaf 8			834	
Sel-5, 9 French beans with Contender	7	1998	HR 523-722	20.2
			Set 5- 2547	27.5

1	2	3	4	5
Comparison of onion set with Set 11, 13 & 14			Set-9-3038	52.1
Bellary Red		5315	Set-11-5816	9.4
	4		Set-13-5879	9.6
			Set-14-6501	22.3
Comparison of set 13, 16 vs	4	5355	Set-13-6636	23.9
California-Wonder			Set-16-6056	13.1

### Extension Education Unit, Dharwad

#### *Rabi 1982-83*

Performance of KDW-39 vs recommended wheat variety (irrigated)	5	965.6	1166.4	18.30
Performance of A-83 vs A-1 safflower (rainfed)	4	227.2	231.0	1.67
Scheduling of irrigation to bengalgram check rainfed vs trial-two irrigated	3	270.0	386.6	43.1
Performance of <i>rabi</i> jowar vs wheat after <i>kharif</i> groundnut	6	216.6	314.3	—

#### *Summer 1982-83*

Field trials of Sel-22 vs Pusa Rubi tomato	2	8210	9740	18.63
Field trials of Sel-16 vs California Wonder	1	5600	4000	—40.00
Field trials of Arka Manik vs Sugar Baby watermelon	2	9500	9950	4.73

#### *Kharif 1983-84*

Performance of Dh-8 vs recommended groundnut variety DH-3-30	5	520.20	643.40	19.50
Performance of BKN-6986-14-2 vs Intan paddy	3	2000	633	—215.00
Performance of IET-5656 and Gana 318 vs A-67 paddy	4	1800	—	—
IET-5656			1500	—26.00
Sona- 318			2000	10.00
Performance of IET-5882 and IET-5889 vs A-200 Intan paddy	3	1633		
IET-5882			2000	18.30
5889			1633	Nil

1	2	3	4	5
Field trials of Sel-22 vs Pusa Rubi tomato	6	3916.66	4466.66	14.04
Field trials of Sel-11, 13, 14 vs Bellary Red onion	4	4100.00		
Sel.11			3500.00	
Sel.13			3800.00	
Sel.14			4250.00	3.06
Performance of ICP 8863 vs local tur	2	51.35	81.00	36.60
Performance of BDN-1 vs local tur	1	60.00	110.00	45.45
Performance of ICP 8863 vs BDN-1 as check	1	70.00	80.00	12.50
<i>Rhizobium</i> treatment to redgram	1	104.00	120.00	13.33

### Extension Education Unit, Raichur

*Rabi 1982-83*

<i>Jowar varietal trial</i>				
(Grain Yield)	4	789.5		
SPH-218			937.5	18.0
SPH-212			794.0	0.6
5-4-1			871.5	10.4
<i>Fodder Yield</i>	4	1542.0		
SPH-218			1500.0	—
SPH-212			1356.0	—
5-4-1			1437.0	—
<i>Use of Pyrethroid based insecticides against cotton bollworms</i>	4	160.30		
Ripcord			1606.0	6.85
Voltas permethrin			1654.5	10.08
Voltas cypermethrin			1688.0	12.31
May and Baker permethrin			1646.0	9.51
May and Baker cypermethrin			1632.0	8.58
Decomethrin			1519.0	1.06
<i>Cotton varietal trial</i>	3	104.0	—	
DB-3-12		136.60	—	
CPD-8-1		86.60	—	
DP-225		121.33	—	
DP-452		137.33	—	
DP-187		124.00	—	
Comparison KHT-6 vs Pusa Rubi tomato	1	4286	4575	6.70
Control of weeds by spraying Basalin in onion	1	4200	4800	14.20

1	2	3	4	5
<b>Extension Education Unit, Mandya</b>				
<i>Rabi 1982-83</i>				
Comparison of Sel-9 beans vs Contender	4	3512.00	4535.00	34.2
Comparison of Pusa Red Sel-11	3	7901.00	9530.00	21.23
Sel-14 onion			10196.00	29.37
Comparison of Pusa Rubi tomato with Sel-4	2	5982.00	7368.00	35.6
Comparison of Japanese White with Arka Nishant radish	3	4912.00	6773.00	44.8
Comparison of Pusa summer prolific long vs S-4 bottlegroud	3	7926.60	9295.3	17.3
<i>Kharif 1983-84</i>				
Comparison of Japanese White vs Arka Nishant	4	1530.00	12660.00	81.00
Comparison of California Wonder S-13	2	4775.00	7890.00	74.70
S-16			6533.00	53.19
Comparison of Eranagere vs Arka Kusumakar	3	9936.00	13567.00	34.3
Comparison of Pusa Red vs S-14	3	7657.00	9621.00	25.78
Chemical control of leaf spot and powdery mildew disease of chrysanthemum				
No spray	1	7348.80		
vs i) Thiride			11314.40	45.00
ii) Topsin			12692.80	-
iii) Difference M-45			9928.00	-
Chemical control of leaf spot & fruit rot disease of capsicum				
No spray	1	4472.00		
vs Difference M-45			5840.00	
Bavistin-50			6619.20	50.00
Blitox-50			5803.20	
Topsin-50			6112.00	
Trial of paddy varieties on Prakash vs KMS-5914-4-6	3	2516.00	2755.00	9.5
Trial of paddy varieties on I.R. 20 vs KMP-39	2	2455.00	2653.00	8.1

1	2	3	4	5
Trial on paddy varieties Sona vs KMP-41	2	2623.00	2656.00	1.3
Trial on paddy varieties for saline soils				
Local	1	800.00		
vs I.R. 46			1300	62.5
I.R. 30864			1100	37.5
Trial on ragi varieties				
Indaf-5	4	898.00		20.9
Indaf-9		796.00		39.5
Indaf-8		1160.00		-19.6
vs H.R. 911			1077.00	
Trial on sugarcane varieties				
Local	3	48.5		
vs KHS-3296			50.2	16.18
Trial on ragi + soyabean mixed cropping Purna ragi only	5	632.22		
vs Purna ragi + Soyabean			439.2 174.5	-18.5

#### Extension Education Unit, Mudigere

*Kharif 1983-84*

Paddy varietal trial				
Intan vs	3	1740.00		
KMP-40			2280.00	30.00
KMF-39			1980.00	15.00
IET-1444				
Intan vs KMP-40		1740.00	2280.00	30.00
KMP-39			1920.00	14.00
IET-5882			2115.00	22.00
Intan vs		1700.00		
IR-46			2300.00	35.00
KMP-41			2000.00	17.00
IRT-1444			2160.00	27.00

(d) *Demonstrations conducted by the Extension Education Units :* The six Extension Education Units have organised 624 demonstrations during the year,

of which 321 were in *kharif*, 99 in *rabi* and 204 in summer. The details are as under :

Extension Education Unit	No. of demonstrations conducted							
	Kharif 1983-84		Rabi 1983-84		Summer 1983-84		Total	
	No.	Locations	No.	Locations	No.	Locations	No.	Locations
Bangalore	10	94	3	49	6	120	19	263
Dharwad	10	54	4	13	1	8	15	72
Raichur	6	17	4	6	-	-	10	23
Mandya	16	55	3	8	6	27	25	90
Mudigere	7	29	-	-	18	49	23	78
Mangalore	5	72	6	23	-	-	11	98
Total	54	321	20	99	31	204	103	624

Following are the titles of important demonstrations conducted by the various Units :

#### Extension Education Unit, Bangalore

##### *Kharif 1983-84*

Fish culture	Fodder
Piggery	Redgram/blackgram/cowpea
Sericulture	Greengram mixture
Dairy	Dryland agriculture
Groundnut and redgram mixture	Relay crop of tomato and redgram

##### *Rabi 1983-84*

Fish culture	Bee keeping
Vegetables	

##### *Summer 1983-84*

Fish culture	Poultry
Piggery	Sheep
Sericulture	Dairy

#### Extension Education Unit, Dharwad

##### *Kharif 1983-84*

- Performance of SB-905 vs SB-1079 jowar
- Recommended dose of fertiliser to Morden sunflower
- Performance of DB-3-12 vs Jayadhar cotton
- Recommended dose of fertilizer to hybrid cotton (Jayalaxmi)



Package of practices — set treatment, spacing and fertilizer application in potato vs farmers method.  
 Improved cultivation practices — fertilizer management in chillies vs local method.  
 Bollworm control in hybrid cotton  
 Plant protection in potato crop  
 Chemical control of chilli Murda complex  
 Termite control in groundnut

*Rabi 1983-84*

Performance of Keerthi vs HD-2189 wheat (irrigated)  
 Entire safflower vs wheat + safflower  
 Improved cultivation practices in garlic — spacings fertilizer management  
 Irrigation schedule to wheat

*Summer 1983-84*

Gypsum application to groundnut vs no gypsum application

**Extension Education Unit, Raichur**

*Kharif 1983-84*

Control of tur pod borer by monocrotophos  
 Control of cotton bollworms by synthetic pyrethroid insecticides  
 Composite fish culture in farmers pond

*Rabi 1983-84*

Control of insect pests in cabbage  
 Control of cotton pests in rainfed  
 Control of safflower aphids by insecticides  
 Popularising cultivation of Keerthi wheat under irrigation

**Extension Education Unit, Mandya**

*Kharif 1983-84*

Demonstration on use of urea granules in paddy  
 Demonstration on use of weedicide in paddy  
 Demonstration on use of zinc sulphate in paddy  
 Demonstration on use of Azolla in paddy  
 Demonstration on use of weedicide on sugarcane  
 Demonstration on cultivation of redgram Hyd. 3C intercrop in jowar  
 Demonstration on cultivation of Hyd. 3C redgram  
 Demonstration on cultivation of South African maize

Demonstration on cultivation of cowpea  
 Demonstration on mixed cropping of groundnut + redgram  
 Demonstration on cultivation of hybrid jowar  
 Demonstration on cultivation of ratoon jowar  
 Demonstration on cultivation of sugarcane  
 Demonstration on management of ratoon crop of sugarcane  
 Demonstration on cultivation of chrysanthemum  
 Demonstration on cultivation of coconut gardens

*Rabi 1983-84*

Demonstration on cultivation of cabbage  
 Demonstration on cultivation of potato  
 Demonstration on chemical control of leaf blight disease of potato

*Summer 1983-84*

Demonstration on use of Azolla in paddy  
 Demonstration on use of mussooriephos in sugarcane  
 Demonstration on cultivation of groundnut  
 Demonstration on cultivation of cowpea  
 Demonstration on cultivation of ragi  
 Demonstration on use of weedicide in paddy

**Extension Education Unit, Mudigere**

*Kharif 1983-84*

Improved practices in cultivation of ragi (Dry)  
 Line planting and fertilizer application in paddy  
 Improved practices in cultivation of tobacco  
 Cultivation of pepper Paniur hybrid  
 Eradication of Katte disease in cardamom  
 Composite fish culture  
 Mushroom cultivation

**Extension Education Unit, Mangalore**

*Kharif 1983-84*

Application of furadon to paddy nurseries for better pest control  
 Application of Ekalux granules to the main field for the control of pests  
 Supervised control of paddy pests and diseases  
 Method demonstrations to control paddy earhead bug  
 Use of recommended dose of fertilizers and pesticides for better yields  
 (lab-to-land) in paddy.

*Rabi 1983-84*

Supervised control of paddy pests and diseases  
 Application of rock phosphate to groundnut  
 Application of rock phosphate to paddy  
 Application of rock phosphate to coconut  
 Cashew tea mosquito control  
 Paddy demonstrations on the use of recommended dose of fertilizers and pesticides for better yield (lab-to-land)

e) *Results of important demonstrations conducted by the Extension Education Units:* Following are the results of some important demonstrations conducted in the Extension Education Units.

Title of the demonstration	No. of locations	Av. yield in kg/acre		% increase over check
		Check	Demonstration	
1	2	3	4	5

**Extension Education Unit, Hebbal***Summer 1982-83*

Fish culture	11	—	—	—
Piggery	2	—	200/animal	—
Sericulture	4	16650 leaves	19280	17
Poultry broilers	6	—	1.4	—
Sheep	56	—	23/animal	—
Dairy	11	—	8 lit/animal/day	—

*Kharif 1983-84*

Fish culture	20	—	—	—
Piggery	2	—	200/animal	—
Sheep	26	—	23/animal	—
Dairy	5	—	8 lit/animal/day	—
Sericulture (equipments)	6	—	—	—
Groundnut + redgram mixture				
G.nut vs G.nut + redgram	22	400.00	300.00	—
Fodder	13	—	150.00	—
Redgram +			46080	
Blackgram +	36	500	500	—
Greengram	—	—	178	—
Cowpea	—	—	—	—

1	2	3	4	5
Dryland agriculture				
levelling and bunding	60	—	—	—
Relay cropping of redgram and tomato, tomato vs tomato + redgram	3	3000	3000 160	—
<i>Others</i>				
Fish culture	25	—	—	—
Vegetables	22	—	—	—
Bee keeping	2	—	2 kg/box	—

### Extension Education Unit, Dharwad

#### *Rabi 1982-83*

Performance of KDW-16 vs HD-2189 wheat irrigated. Checked-H.D. 2189 D/N KDW-16	6	115.8	123.3	8.6
Performance of KDW-137 vs Bijaga Yellow wheat rainfed Check — Bijaga Yellow D/N — KCW-137	2	130	139.00	6.9
Economics of entire safflower vs wheat + safflower	1	60.00 wheat 160 + Saff 440		— —
Improved cultivation practices vs local method in garlic	2	1100.00	1150.00	4.50
Package of Practices vs farmers method (check) in cabbage cultivation	1	3680.00	5040	36.95

#### *Summer 1982-83*

Gypsum application to groundnut irrigated vs without gypsum	8	878.5	947.5	7.8
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#### *Kharif 1983-84*

Performance of SB 905 vs SB 1097 jowar	2	1300	1550	16.1
Response of Morden sunflower-2 recommended dose of fertilizer	6	190.8	231.6	17.6

	1	2	3	4	5
Package of practices/seed treatment, spacing and fertilizer application vs farmers method in potato		4	2975	3700	24.3
Improved cultivation practices, fertilizer management vs local method in chilli		6	441.66	511.44	16.1
Bollworm control in hybrid cotton. Check farmers method (PP) vs PP as per package of practices		5	1200	1181	-0.75

**Extension Education Unit, Mandya**

*Rabi 1982-83*

Demonstration on cultivation of watermelon	5	12840.00	13562.00	5.5
Demonstration on cultivation of potato	2	7954.00	8450.00	6.2

*Summer 1982-83*

Demonstration on use of Azolla in paddy	1	2380.00	2495.00	5.1
Demonstration on use of mussooriephos in sugarcane	2	49.00	48.50	1.5
Demonstration on cultivation of G.nut (use of gypsum and correct seed rate)	2	68.000	810.00	19.1
Demonstration on cultivation of cowpea (line sowing and DAP application)	2	195.00	390.00	99.1
Cultivation of ragi (proper spacing and fertilizer use)	2	1180.00	1556.00	31.8
Use of weedicide in paddy	2	2325.00	2525.00	8.6

*Kharif 1983-84*

Cultivation of chrysanthemum flower crop	2	7400.00	8500.00	14.83
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**Extension Education Unit, Raichur**

*Rabi 1982-83*

Control of aphids on safflower by dusting with endosulfan (check without dust)	2	955.17	1268.00	29.55
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1	2	3	4	5
Control of insects in dryland cotton				
by endosulfan dusting	2	—	130.00	62.50
Pest control in cabbage vegetable	2	2400.00	7600.00	315.00
Control of tur pod borer by				
endosulfan spraying	3	387.33	415.00	—
Popularising cultivation of safflower				
as entire crop	6	—	360.80	—
Popularising cultivation of				
H.D-2189 wheat irrigated <i>i.e.</i>				
UP-301 check HD-2189 D/N	4	925.00	1106.00	11.8
Popularising cultivation of DCH-32				
cotton in UKP area	3	—	817.00	—

*Kharif 1983-84*

Use of planofix for better fruit				
set and control of flower drop				
in chilli	2	i) 504.8	667.8	10.2
		ii) 4019.0	4557.5	13.39
Performance of KHT-6				
tomato vs Pusa Rubi	1	7500	—	loss
KHT-6	—	—	400.00	—
Fertilizer trial in brinjal	i) 2	3000	4600	25.8
	ii) —	5010	5894	—
Weed control in onion by using				
basolin herbicide	1	4410	5100	14.6
Intercropping of niger in safflower				
safflower + niger	1	4000	4120	1.0
Control of tur pod borer by				
monocrotophos	2	600	800	33.3

**Extension Education Unit, Mudigere***Summer 1982-83*

Fertilizer application to paddy	1	1225.00	1705	42.8
Eradication of Katte disease in				
cardamom	1	—	—	—
Composite fish culture 0.5 kg/sq m	1	—	—	—
High density planting in cardamom	1	—	—	—

*Kharif 1983-84*

Improved practices in ragi	2	800	1200	50
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1	2	3	4	5
Line planting and fertilizer application in paddy	3	1700	2450	50
Tobacco cultivation	1	534	818	53
Cultivation of pepper Paniyur hybrid	1	—	—	—
Eradication of Katte disease in cardamom	1	—	—	—
Composite fish culture 0.5 kg/sq m	1	—	—	—

**Extension Education Unit, Mangalore**

*Summer 1982-83*

Paddy varietal demonstration high yielding varieties vs local Udupi	3	833.33	1700	111.2
Groundnut demonstration	5	571	708	23.08

*Rabi 1982-83*

Application of rock phosphate to paddy	9	1323.3	1552.2	14.4
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*Kharif 1983-84*

Pest control recommended method vs local method in paddy Udupi	4	1350	1300	14.12
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f) *Whole Farm Demonstrations* : During the year under report, 67 Whole Farm Demonstrations have been organised by the Extension Education Units. The details are given below :

Extension Education Unit	No. of Whole Farm Demonstrations			
	Completed 3 years	Completed 2 years	Completed one year	Total
Bangalore	—	—	26	26
Dharwad	—	15	10	25
Mudigere	—	—	9	9
Mandya	2	3	2	7
	2	18	47	67

g) *Working with Youth Clubs* : The different Extension Education Units of the Directorate continued their work with 57 Youth Clubs and have organised 168 demonstrations, 87 lectures, 70 training sessions and 6 film shows.

Extension Education Unit	No. of Youth Clubs	Demonstration	Lectures	Training sessions	Film shows
Bangalore	12	88	65	48	1
Raichur	9	20	12	6	3
Dharwad	29	32	1	13	—
Mudigere	2	2	1	—	2
Mandya	5	26	8	3	—
Total	57	168	87	70	6

h) *Working with High Schools*: The Extension Education Units worked with 39 High Schools to provide lessons on agriculture and to develop a positive orientation towards agriculture. The units have provided 1459 lesson plans to the schools. The staff of the units made visits to the schools. The details of the activities are provided below :

Extension Education Unit	No. of schools	No. of visits made	No. of lesson plans provided
Bangalore	4	58	38
Dharwad	20	30	1344
Raichur	7	29	30
Mudigere	2	16	16
Mangalore	2	2	2
Mandya	4	29	29
Total	39	164	1459

#### **National Demonstrations**

During the period under report two National Demonstration Units continued to be in operation in the districts of Bellary and Bijapur. The Unit at Ullal in Dakshina Kannada District was shifted to Agricultural Research Station, Hiriya in Chitradurga district with effect from 18-5-1983.

A total of 68 demonstrations and 48 field days were organised on demonstration plots involving 1,057 farmers. The details are as under :



National Demonstration District	No. of specialists working	No. of demonstrations conducted				Field days	
		One crop	Two crop	Entire farming system	Total	No.	Farmers participated
1	2	3	4	5	6	7	8
Hiriyur (Chitradurga)	2	14	—	4	18	32	490
Bijapur (Bijapur)	3	15	5	2	22	8	129
Siruguppa (Bellary)	2	10	18	—	28	8	438
Total	7	39	23	6	68	48	1,057

Some of the important results of the National Demonstrations conducted are as follows :

- 1) Under the area of National Demonstration Unit, Bijapur in two demonstrations on crop - 5 Hybrid jowar (*kharif*) an yield of 2,399 kg and 2,500 kg/ac has been obtained under irrigation.
- 2) In one of the demonstrations on hybrid maize conducted in Siruguppa, a farmer could obtain an yield of 4,500 kg/ha.

#### **Pilot Bakery Project**

The Pilot Bakery Project during the year has organised one 20-week duration training programme, nine 5-day cake making courses for ladies and popular 3-day short courses. The details of the training programmes and the number of participants are given below :

Type of course	No. of batches	No. of participants
1. Long term training programme (20 weeweeks course)	1	20
2. Short term training programme (1 week course for ladies)	1	15
3. 5-day cake making course for ladies	9	250
4. 3-day short courses for ladies at Bangalore	40	1,738
5. 3-day short courses for ladies at Dharwad	18	282
6. <i>Ad-hoc training programmes</i>		
a) 4-week special course to the participants sponsored by the Society of Indian Bakery, SRC	1	15
b) 4-week Special course	2	12
c) Programmes for the benefit of voluntary organizations	5	14

The Bakery Institute at Hebbal also trained four foreign students in 3-day short courses sponsored through S.I.E.T., Hyderabad.

#### **Extension Work Carried out by College Departments**

The scientists of the College Departments assisted in extension work by participating in radio talks, associating in conducting training programmes, developing literature etc. Details furnished by some College Departments are as follows :

College Departments	Trails/Demonstrations	Extn. literature	Radio talks	Training programmes
<b>Agricultural College, Hebbal</b>				
Agricultural Economics	—	—	—	7
Agricultural Microbiology	1	2	—	2
Horticulture	39	4	2	14
Soil Science	50	—	3	8
Seed Technology	—	4	2	1
Farm Forestry	—	—	—	2
<b>Agricultural College, Dharwad</b>				
Seed Technology	—	—	1	5
Agricultural Botany	24	3	2	10
Crop Physiology	—	2	1	4
<b>Veterinary College, Hebbal</b>				
Veterinary Pathology	—	—	3	3
Veterinary Anatomy	—	—	1	—
Veterinary Parasitology	—	—	—	1
Animal Nutrition	—	1	—	3
Poultry Science	—	4	16	10
Vety. Gynaecology & Obstetrics	—	3	—	6

#### **Village Adoption Programme**

Under the 20 point programme of the Prime Minister of India the University has implemented the village adoption programme with regard to promotion of technology in agriculture and allied fields. The details are given below :

Extension Education Units/ Research Stations	No. of villages adopted	Farmers worked in			
		Dryland agriculture	Pulse production	Oilseed production	Others
1	2	3	4	5	6

#### **I. Extension Education Units**

Bangalore	13	25	118	279	232
Mandya	6	181	91	4	7
Raichur	8	36	26	30	210

	1	2	3	4	5	6
Dharwad		5	76	90	98	89
Mangalore		5	—	—	25	483
Mudigere		7	312	175	89	532
<i>II. Agricultural Research Stations</i>		14	217	95	61	601
Total		58	847	595	586	2,154

### **Lab to Land Programme**

The second phase of the Lab to Land programme started from 1st June 1982 was continued during the year 1983-84. Under this programme, a total of 2,758 families of small farmers/landless labourers were enrolled out of the allotted number of 3,000 farm families to the University. The details of the farm families allotted and adopted by 30 centres of the University under lab to land programme in different categories under the II Phase is given below :

Name of the Unit	Total No. of families enrolled	Rainfed	Irrigated	Landless Agril. labourers
1	2	3	4	5
1. Director of Instruction (Agri), Hebbal, Bangalore	50	23	—	27
2. Extension Leader, EEU, Bangalore	700	377	127	196
3. Chief Instructor, Farmers Training Institute, Hebbal	50	17	33	—
4. AICRP on Millets, GKVK	49	17	8	24
5. Sunflower Scheme, GKVK	50	—	16	34
6. Chief Scientist, Dry Farming, GKVK	50	50	—	—
7. AICRP on Pulses, GKVK	50	—	32	18
8. Home Science Department, Hebbal	50	31	—	19
9. Director of Instruction (PGS), Dharwad	49	18	—	31
10. Extension Leader, EEU, Dharwad	330	199	74	57
11. Sorghum Breeder, Dharwad	41	—	—	41
12. AICRP on Buffaloes, Dharwad	50	—	50	—
13. AICRP on Cotton, ARS, Dharwad	50	30	—	20

	1	2	3	4	5
14. Water Management Scheme, Dharwad		50	3	14	33
15. Director of Instruction (Home Science), Dharwad		50	9	—	41
16. Chief Training Organiser, KVK, Hanumanamatti		100	66	17	17
17. Extension Leader, EEU, Mandya		300	96	153	51
18. Chief Scientific Officer, RRS, Mandya		50	—	47	3
19. AICRP on Rice, RRS, Mandya		50	—	46	4
20. Extension Leader, EEU, Raichur		76	20	53	3
21. Chief Scientific Officer, RRS, Raichur		50	30	5	15
22. National Demonstration Unit, ARS, Siruguppa		50	—	20	30
23. National Demonstration Unit, Bijapur		32	26	6	—
24. N.A.R.P., Bijapur		44	31	—	13
25. Chief Scientific Officer, RRS, Mudigere		49	49	—	—
26. Extension Leader, EEU, Mangalore		138	123	—	15
27. National Demonstration Unit, Ullal		50	50	—	—
28. AICRP on Pulses, Gulbarga		50	20	—	30
29. AICRP on Tobacco, Shimoga		50	7	4	39

***Extension Programme to Promote Bhagyalakshmi Biogas Plant in Karnataka***

The Directorate of Extension is closely involved in the biogas programme under 20-point programme of Government of India.

The different items of work under this programme include :

a) *Construction of biogas plants under the technical supervision of the Directorate of Extension :* During this year, different field units of the Directorate of Extension have provided technical assistance to farmers in constructing

91 Bhagyalakshmi biogas plants. The Unitwise details of the plants constructed are given below :

Name of the Unit	No. of plants constructed by farmers with the technical assistance of staff of the Directorate of Extension
1. Extension Education Unit, Hebbal	59
2. Extension Education Unit, Dharwad	7
3. Extension Education Unit, Mandya	5
4. Extension Education Unit, Mudigere	6
5. Krishi Vigyan Kendra, Hanumanamatti	14
Total	91

b) *Special training programmes on operation and maintenance of biogas plants* : In April and May 1983, all the Gobar Gas Supervisors working in all the taluks of the State were given training in biogas maintenance and supervision.

From July 1983 to December 1983, 16 training courses have been organised for Agricultural Assistants of the State Department of Agriculture in biogas plant construction and maintenance in Bangalore, Hanumanamatti, Mandya and Kothnur (Gulbarga Dist.) in which 258 extension workers have been trained.

c) *Training of masons* : During the period, 3 mason trainings were conducted by the University in Dharwad, Bangalore and Shimoga districts in which 40 masons were trained in Bhagyalakshmi biogas plant construction.

d) *Rectification of problem biogas plants* : As desired by the State Government, the University Directorate of Extension nominated 20 biogas experts and assigned them to different districts of the State to help farmers in rectifying non-functioning biogas plants. Till end of March 1984, the rectification work was taken up with 144 biogas plants and they were got rectified.

K. A. JALIHAL  
Director of Extension

## **PART V**

### **COMMUNICATION CENTRE**

During the year under report, new committees for 'Mysore Journal of Agricultural Sciences', 'Current Research' and 'UAS Diary' were formulated, and each one of the committees met separately and took several decisions with regard to hastening the process of printing and other aspects related to their periodicals.

The Communication Council met once and provided direction to the Communication Centre about its operation and regularisation of the temporary employees in the Press.

Dr. K. M. Jayaramaiah, Professor of Agricultural Extension (Development Education) took over the charge of Editor, Communication Centre from Prof. Jade Srinivasamurthy on 14th December 1984. Sri K. R. Ganapathy, reported for duty as Associate Editor on 3rd June 1983. Fortunately, 25 out of 27 temporary employees of the Press were given permanent appointments during the year.

The following staff members were designated as Editor(s) to the periodicals published by the Communication Centre

- 1) Dr. K. M. Jayaramaiah      — Mysore Journal of Agril. Sciences
- 2) Prof. V. C. Hittalamani    — Krishi Vignana
- 3) Mr. K. R. Ganapathy        — Current Research and UAS Diary

The periodicals and publications brought out by the Communication Centre during the year are detailed below :

#### **Periodicals**

1. *Mysore Journal of Agricultural Sciences* : Three quarterly issues of this Journal Vol. XV, No. 3 and 4 (1981) and Vol. XVI, No. 1 (1982) were printed and published. These issues covered 52 research articles, 31 thesis abstracts and two Book Reviews. The subscribers of this journal include many professionals from India and abroad. This journal is being covered in many International and National abstracting agencies.

2. *Current Research* : Five combined issues (two months each) – 1 & 2 to 9 & 10 of Vol. XI for the year 1982 were published. Nine feature articles, 31 research news articles and 26 short research reports were included in these issues. This journal gives a good account of the on-going research programmes and trends in the field of Agriculture and allied subjects.

3. *Krishi Vignana* : One issue of the *Krishi Vignana* Vol. VIII – No. 3 (1982), a quarterly was released for the benefit of farming community. It is very much in demand by the farmers of the State.

4. *U.A.S. Diary* : Nine issues of the Vol. XVIII and 2 issues of the Vol. XIX covering the months of January 1983 to November 1983, were released for the benefit of the teachers as well as the administrative functionaries of the UAS. This diary serves as an important reference material to the UAS Staff as it covers important circulars, Board decisions, appointments and activities of the University.

#### **Annual Report**

An Annual Report which provides an insight into the projections and achievements of the different departments of the University, encompassing the major functions of Teaching, Research, Extension and Administration, for the year 1982-83 was printed. This report contained 259 pages of Crown Quarto.

#### **U.A.S. Budget**

The draft copy of the UAS Budget 1984-85 and Revised Budget 1983-84 was printed. This document comprised of 416 pages.

#### **Series Publications**

##### **(i) Technical Series :**

- i) Studies on the Integrated Control of Coconut Blackheaded Caterpillar : No. 43 ; PP : 34
- ii) Biology of Predatory Mite Typhlodromips Tetranychivorus Gupta: No. 44 ; PP : 50

##### **(ii) Miscellaneous Series :**

- i) Institution Building and Institution Management : No. 32 : PP : 75

#### **Books Published under Government of India Text Book Project**

(Department of Kannada Studies)

### ಭಾಷಾಂತರ ಗ್ರಂಥಗಳು

- 1) ಬ್ಯಾಕ್ಟೀರಿಯಾ ವರ್ಗೀಕರಣ ಮತ್ತು ವಿವರಣೆ (ಸೂಕ್ಷ್ಮಜೀವಿ ಜಗತ್ತು - ಭಾಗ-5)
- 2) ಆಧುನಿಕ ಆಹಾರ ಸೂಕ್ಷ್ಮಜೀವಿ ವಿಜ್ಞಾನ
- 3) 29 ನೇಯ ದಿನ
- 4) ಕೃಷಿ ಆರ್ಥಿಕ ವಿಶ್ಲೇಷಣೆ ಪ್ರವೇಶಿಕೆ
- 5) ಮಣ್ಣಿನ ಭೌತಿಕ ಗುಣಧರ್ಮಗಳು
- 6) ಕೃಷಿ ಯಂತ್ರಗಳು ಹಾಗೂ ಉಪಕರಣಗಳು

### ಮೂಲ ಗ್ರಂಥಗಳು

- 1) ಹಣ್ಣಿನ ಬೆಳೆಗಳ ಕೀಟ ನಿಯಂತ್ರಣ
- 2) ತ್ರಿಕೋನ ಮಿತಿ
- 3) ಭತ್ತದ ಬೆಳೆ ಕೀಟ ನಿಯಂತ್ರಣ
- 4) ಸುಗಂಧ ದ್ರವ್ಯ ಸಸ್ಯಗಳು
- 5) ಬಿದಿರು ಮತ್ತು ಬೆತ್ತ
- 6) ಜೀವ ಶಾಸ್ತ್ರ ಪಾರಿಭಾಷಿಕ ಶಬ್ದಕೋಶ

In addition, a Wall Calendar of UAS in Kannada for the year 1984 was printed and released. The Convocation Address of the Chief Guest, Welcomes Address of the Vice-Chancellor and Ceremonial Sheets for the XVIII Convocation (1984) were printed at UAS Press alone.

### U.A.S. Printing Press

The important works executed in the press during the year under report include: two quarterly issues of 'Mysore Journal of Agricultural Sciences', one issue of 'Krishi Vijnana', five combined issues of 'Current Research', eleven issues of UAS Diary; an Annual Report, and other publications like UAS Budget, two Kannada books (Poustika Ahara and Hannina Be'e Keeta Niyanthrana) and three UAS Series Publications. Further, the total number of Job works completed during the year were 195, the labour charges of which amounts to Rs. 75,560-10. The various components of the job works included: composing of 2,392 pages of demy octavo size, 13.47 lakhs impressions printed in different sizes, and the books bound in different styles 37,942 with wrappers, 1275 with half Calico and marble and 275 with full Calico. The job works comprised of the works of all supporting departments and the students.

During the year the types were given for recasting; the accessories required for all the printing machines were provided and the Nee'akanteswara Printing Machine was put into operation. The pinning machine was repaired and other machines which were not in use since long were put into use in the binding section.

### BAT's Preferred

During the year 172 BAT's valued at Rs. 1,58,341.25 were preferred, out of which 99 BAT's of the value of Rs. 68,853.45 were adjusted. In addition, 11



BAT's claimed during 1982-83 were adjusted during 1983-84 and thus contributing to an additional amount of Rs. 21,035.50.

**Photographic Unit**

With a limited staff this unit continued to assist the teachers and P.G. students with respect to developing photographs, slides, charts etc. A National Video Camera with National Video Cassette Recorder (Portable) and other accessories was purchased, out of ICAR Grants.

The Progress achieved under this Unit is as follows:

1) Photographs taken	:	1114
2) Films Developed	:	58
3) Slides prepared : Coloured	:	210
B & W	:	438
4) Enlargements (assorted)	:	1493
5) Specimen Photographs	:	83
6) Photo Micrographs	:	43
7) Clinical Photographs	:	21
8) Recopied Photographs	:	688
9) Charts	:	13
10) Maps	:	3
11) Labels and Name Boards	:	120

36 University programmes/functions were covered and 600 photos were taken for processing.

A Video film of 2 hours duration was taken covering the 18th Convocation, held during March 1984.

### **Additional Staff**

Three part time Assistant Editors and two Proof Readers (on temporary basis) were appointed to assist the publication work.

### Exhibition

Some of the Charts and Photographs were replaced in the Exhibition and it was kept open for the benefit of the visiting teams of students, farmers and the extension professionals.

The Editor and Associate Editor continued to be involved in teaching and guiding the P. G. students.

K. M. JAYARAMAIAH

*Editor*

*Communication Centre*

## **PART VI**

### **CAMPUS DEVELOPMENT**

#### ***GKYK Campus***

The construction of Sericulture building costing Rs. 13.5 lakhs with the World Bank assistance has been completed. Construction of Undergraduate Hostel at a cost of Rs. 33.00 lakhs was taken up for execution and about 60 per cent of progress has been achieved so far. The University also took up the construction of the College of Agriculture building costing Rs. 98.00 lakhs to enable the shifting of the present Agricultural College from Hebbal Campus to GKVK in view of the decision of the University to convert Hebbal Campus into an Animal Science Campus. The construction of a Seed Processing Complex with subsidiary buildings like Cold Storage, Storage Building and other Administrative and residential units at a cost of Rs. 25 lakhs were initiated with the World Bank assistance and the same are under good progress. In order to augment the irrigational facilities at the Campus, 8 bore wells were drilled during the year and arrangements are being made to commission them with the suitable pumpsets and pipeline. Arrangements are also being made to get protected water supply from the BWS&SB for which the raising mains have been completed at a cost of Rs. 4.20 lakhs.

#### ***Hebbal Campus***

The construction of I floor to the Veterinary Hospital at a cost of Rs. 7.5 lakhs has been completed and the same has been handed over to the Departments for use. The University took up the construction of a Nourara Bhavana out of the donations made by the Employees Association and the same is under good progress. A Raitha Bhavana duly financed by M/s Mangalore Chemicals and Fertilisers, was taken up to provide facilities for the visiting farmers and other seminars and the same has been completed. Here too, arrangements have been made to provide protected water supply to domestic consumption by constructing an underground storage tank and raising mains. Efforts are also being made to drill bore wells to improve the irrigational facilities at this Campus.

#### ***Dharwad Campus***

The construction of a P.G. Hostel costing Rs. 12.00 lakhs has been completed and has been put to use. An Undergraduate Hostel costing Rs. 12.00 lakhs has been taken up and the work is under progress. The construction

of a Glass House for P.G. students, Sericulture building, Animal Science Laboratory building and a first floor to the Ladies Hostel were also initiated and are in final stages of completion. Construction of some residential quarters were taken up with the assistance of ICAR and are expected to be completed during the current financial year.

#### ***Mangalore Campus***

The construction of Masonry Ponds for Fish culture, taken up under ICAR assistance have been completed. A P.G. Hostel costing Rs. 2.5 lakhs is also taken up for execution.

The University also initiated the construction of Laboratory building, Trainees Hostels, Staff quarters and other subsidiary building works under NARP at Mudigere, Shimoga, Bijapur, Bidar and Brahmavar near Udupi in Dakshina Kannada District. at a total cost of Rs. 100 lakhs.

Similarly construction of a Seed Processing Unit with Godown and Office buildings with the residential quarters under the National Seed Project at a cost of Rs. 65 lakhs have been taken up at Kathalagere and Hassan.

The construction of Diagnostic Laboratories under the UAS-KDDC Animal Health Coverage Scheme have been taken up at a cost of Rs. 30.00 lakhs at Bangalore, Mysore, Hassan and Tumkur are nearing completion.

It has been possible for the University to improve the irrigational facilities at several of its research stations and campuses during the year by providing lift irrigation and drilling bore wells at a total cost of Rs. 8.00 lakhs.

With regard to acquisition of lands, efforts are made to acquire private lands at Gulbarga, Bidar, Bijapur, Brahmavar, Dharwad and other Research Stations of the University through the Revenue Authorities, in addition to transfer of the Government lands at Gulbarga to the University.

The Estate Officer expresses his sincere thanks to all his colleagues and staff members of the Estate Branch for their cooperation extended to him during the year under report.

B. VENKATA SWAMY  
*Estate Officer*

## **PART VII**

### **RESOURCES AND FINANCIAL ESTIMATES**

The Non-lapsable lump sum Block Grant payable to the University under Section 35 of the Act has been increased from Rs. 480 lakhs to Rs. 520 lakhs during the year 1983-84 as against the request of the University for sanctioning Rs. 587.10 lakhs to cover items like increasing Dearness Allowance and other Allowances to the employees, Pension contribution, Revision of Pay scales of Teachers borne on UGC scales, increase in the maintenance of buildings from  $1\frac{1}{2}$  per cent to  $3\frac{1}{2}$  per cent, extra cost due to revision of pay scales of service personnel, etc. The request of the University was examined in detail by the State Government and the Govt. kindly agreed to release a sum of Rs. 520 lakhs for the year 1983-84 and Rs. 540 lakhs for the year 1984-85. The University was requested to exercise economy measures in filling up of vacant posts and other items like office contingencies, maintenance of vehicles and other recurring charges of the University. However, the State Government released a sum of Rs. 480 lakhs only during 1983-84 as against Rs. 520 lakhs provided for in the Budget Estimates of State Government, with an assurance that the balance of Rs. 40 lakhs would be released in addition to Rs. 540 lakhs provided for in the Budget Estimates of State Government for the year 1984-85. The matter is being pursued with the State Government.

Due to reduction in the anticipated Block Grants from the State Government, the University had to exercise certain cuts in the allocations made in the budget for recurring and non-recurring items required by the teaching, research and extension departments to balance the budget for the year 1983-84. This may affect the programmes taken up by the University under teaching, research and extension. The State Government will have to be approached again to enhance the grants for maintenance expenditure, so that, the activities could be continued as already planned.

#### **Development Grants**

A sum of Rs. 150 lakhs was released to the University during the year 1983-84. Out of Rs. 150 lakhs, the amount earmarked for research is Rs. 30 lakhs and this amount will be the share of the State Government for ICAR Coordinated Research Projects which have been sanctioned on 75:25 per cent basis. The remaining amount of Rs. 120 lakhs was used, mainly for the following items :

- a) Increasing the irrigation facilities at Research Stations ;
- b) Construction of Laboratories, Rat proof godowns, Office-cum-laboratory buildings, etc. at Research Stations ;
- c) Livestock buildings at Hebbal and KVK, Hanumanamatti ;
- d) Hostel facilities at Hebbal and Dharwad ;
- e) Construction of staff quarters was initiated at Honnaville, Madenur and Chintamani ;
- f) Extending the existing dispensary at Dharwad Campus ;
- g) Formation of Tennis Court at GKVK ;
- h) Construction of first floor to the School Building at Hebbal ;
- i) Construction of Dairy Technology Building at Hebbal ;
- j) Asphaltting of road leading to Guest House at Dharwad and providing water bound maccadum Road and Block tapping the approach road at GKVK ;
- k) Creation of new positions for strengthening the teaching, research, extension activities and general administration ;
- l) Providing equipment for teaching, research and extension units ;
- m) Establishment of new extension units started during VI Plan viz., Farmers' Training Institute, Hebbal; Extension Education Units at Mudigere and Mangalore and Bakery Unit at Dharwad ;
- n) Establishment of new research stations started during the VI Plan viz., Agricultural Research Station, Navile; ARS, Kandli, Hassan ;
- o) Development of Inland Fisheries at research stations ;
- p) Providing basic cultivation cost, station, maintenance and utilities and payment of charges for acquisition of lands for the research station started under National Agricultural Research Project at Bijapur, Mudigere, Bidar, Brahnavar, Nagamangala, Navile (Shimoga) and strengthening the Directorate of Research; and
- q) For the staff employed at GKVK, Kathalagere, Kandli (Hassan), Siruguppa, Mandya and Dharwad for breeder seed production and foundation seed production under N.S.P. II.

#### **ew ICAR Projects**

The following new ICAR Coordinated Research Projects have been actioned by the ICAR during the year 1983-84.

1. AICRP on oil seed - strengthening of major centres inter-alia at Bangalore
2. Rapid Improvement of Agricultural Technology and Socio-economic Upliftment of Scheduled Castes and other backward communities at GKVK.
3. Improvement of rice varieties for adverse soil conditions, Hebbal

4. Epidemiology and control of Chilli Mosaic Disease in Karnataka
5. AICRP on Oilseeds Germplasm Management Unit for Sunflower under Project Coordinator, GKVK
6. All India Multilocational Research in Acarology
7. Study on Breeding and Culture TOR SPP available in Karnataka.

The number of All India Coordinated Research Projects assigned to this University during the year 1983-84 is 103 involving a sum of Rs. 227.44 lakhs as against the number of 106 schemes that were in operation during 1982-83 involving a sum of Rs.166.99 lakhs. Twenty five per cent of the expenditure in respect of Schemes is met out of the grants received from the State Government and the balance from the ICAR.

The allocation of funds for the year 1983-84 over the previous years allocation of 1982-1983 is detailed below :

Particulars	Accounts for 1982-83	Budget for 1983-84 (Revised)
(Rupees in lakhs)		
(A) <i>Non-Plan</i>		
Direction	199.91	215.97
Teaching	246.64	268.74
Research	192.62	207.94
Extension	28.55	36.87
Sub-total (A)	667.72	729.52
(B) Schemes sponsored by other agencies	80.15	64.71
Total (A) & (B)	747.87	794.23
(C) <i>Plan</i>		
<i>Five year plan schemes of the University</i>		
a) Development Expenditure	134.72	253.40
b) ICAR/IBRD/NARP Project	43.83	112.81
c) University Seed Production Programme	1.34	5.24
d) ICAR Coordinated Research Projects	166.99	227.44
e) Govt. of India Schemes	15.05	12.33
f) State Plan Schemes (Adhoc Schemes)	8.47	23.23
g) Second National Seed Project	14.59	77.13
Total	384.99	711.58
Grand Total (A) + (B) + (C)	1132.86	1505.81
Anticipated Savings	—	(—) 27.30
Net	1132.86	1478.51

The statement showing the summary of Budget Estimates of Receipts and Expenditure for 1983-84 and 1984-85 is as follows :

(The abstracts of Receipts and Expenditure is given in Appendix-III & IV)

	Original Estimates for 1983-84	Revised Estimates for 1983-84	Budget Estimates for 1984-85
1	2	3	4
(Rupees in lakhs)			
<i>Receipts</i>			
1. Grants from State Government	675.71	692.45	758.32
2. ICAR, Govt. of India and other Agencies	404.56	413.32	397.27
3. Income from Fees	7.17	6.67	6.75
4. Income from University Property, Farms, Rent & other Misc. Receipts	142.27	152.69	157.63
5. Other Misc. Income	20.05	20.64	20.62
Total Receipts	1249.76	1285.77	1340.59
<i>Expenditure</i>			
1. University Administration	259.51	215.97	218.59
2. Resident Teaching	292.96	268.74	313.63
3. Research	206.49	207.94	220.60
4. Extension	38.22	36.87	44.80
Total Expenditure	797.18	729.52	797.62
Schemes Sponsored by other Agencies	40.83	64.71	64.39
Total	838.01	794.23	862.01
<i>Five Year Plan Schemes</i>			
6. a) Development Schemes Financed by ICAR and State Government	246.59	253.40	232.82
b) NARP Project Financed by World Bank through ICAR and State Government	95.75	112.81	70.95
c) University Seed Production Programme	4.50	5.24	5.84
d) ICAR Coordinated Research Projects	201.54	227.44	227.81
e) Government of India Schemes	11.16	12.33	12.68

1	2	3	4
f) State Plan Schemes (Ad-hoc Schemes)	22.46	23.23	18.32
g) Second National Seed Project	82.06	77.13	64.58
Total Plan Schemes	664.06	711.58	633.00
Total	1502.07	1505.81	1495.01
Anticipated Savings	(—)55.10	(—)27.30	(—)33.80
Net Total	1446.97	1478.51	1461.21

Assistance received from the State Government, ICAR, KDDC and other Agencies towards Development Schemes during the year 1983-84 is furnished below :

	(Rupees in lakhs)
1. State Government (Development Grant)	150.00
2. State Govt. Ad-hoc Schemes	16.29
3. Government of India	13.99
4. ICAR Coordinated Research Projects	53.63
5. ICAR Centrally Sponsored Schemes	96.21
6. NARP Project	67.84
7. Second National Seed Project	10.15
<i>Grants from Other Sources</i>	
8. PL-580	5.48
9. Department of Atomic Energy	1.51
10. K.D.D.C.	30.00
11. University Grants Commission	0.32
12. Karnataka State Council for Science & Technology	0.35
13. UNICEF	0.60
14. Mangalore Chemicals and Fertilizers	0.50
15. Centre for Rural Development Studies	0.05
16. M/s Hindusthan Lever Foundation	0.85

The University gratefully acknowledges the assistance received from these Agencies.

H. M. NAGABHUSHANA  
Comptroller



## APPENDICES

## APPENDIX I

### LIST OF PERSONS APPOINTED DURING 1983-84

<i>Sl. No.</i>	<i>Name</i>	<i>Designation and subject</i>	<i>with effect from</i>
1	2	3	4
<b>Teaching</b>			
PROFESSORS			
1.	M. Udayakumar	Crop Physiology	1-7-83
2.	M. C. Devaiah	Sericulture	9-8-83
3.	N. S. P. Rebello	Agril. Marketing & Cooperation	19-10-83
4.	P. G. Chengappa	-do-	19-10-83
5.	S. C. Hiremath	-do-	24-10-83
ASSOCIATE PROFESSORS			
1.	M. Mohan Joseph	Fishery Biology	20-6-83
2.	Grace Varghese	Clothing and Textiles	6-8-83
3.	N. Karamathulla	Agricultural Economics	11-10-83
4.	K. N. Ranganatha Sastry	-do-	12-10-83
5.	G. K. Hiremath	-do-	12-10-83
6.	G. Nanjunde Gowda	Finance	12-10-83
7.	M. G. Chandrakanth	Agricultural Economics	2-12-83
8.	H. S. Vijayakumar	Finance	9-1-84
9.	R. Govindan	Sericulture	12-1-84
10.	Hemalatha M. Patil	Agricultural Marketing	9-2-84
11.	L. K. Wader	Cooperation	13-2-84
12.	K. R. Rama Rao	Food and Nutrition	18-2-84
13.	M. D. Harapanahalli	Animal Genetics and Breeding	9-3-84
14.	K. S. Panchabhavi	Sericulture	31-3-84
ASSISTANT PROFESSORS			
1.	B. K. Ramachandrappa	Crop Production	5-5-83
2.	S. G. Patil	Chemistry and Soils	23-6-83
3.	A. M. Veerabhadraiah	-do-	23-6-83
4.	K. M. Krishnappa	Agronomy	23-6-83
5.	G. N. Gajanana	Chemistry and Soils	27-6-83
6.	B. M. Ramachandra Reddy	Accountancy	23-7-83
7.	Indrani Karunasagar	Fishery Microbiology	16-6-83
8.	H. S. Pradeep	Fishery Biology	16-6-83
9.	C. V. Mohan	Fish Pathology	17-6-83
10.	K. Saroja	Child Development	18-6-83

1	2	3	4
11.	N. Vasuki	Chemistry and Soils	24-6-83
12.	S. K. Patil	-do-	30-6-83
13.	N. Jayabalan	Fishery Biology	6-7-83
14.	N. N. Karnool	Accountancy	27-7-83
15.	R. S. Kulkarni	Agricultural Botany	1-8-83
16.	K. Sudhir	Chemistry and Soils	2-8-83
17.	S. K. Nadaf	Agricultural Botany	11-8-83
18.	Noorusubah Begum	English	3-10-83
19.	D. M. Venkata Reddy	Seed Technology	7-11-83
20.	T. R. Keshava Reddy	Agril. Economics	9-11-83
21.	L. B. Kunnal	Agril. Economics	19-11-83
22.	T. K. Narayana Swamy	Sericulture	24-11-83
23.	Lalitha Achuth	Agril. Economics	26-11-83
24.	N. Nagaraj	-do-	26-11-83
25.	M. K. Shiva Prakash	Agril. Microbiology	3-2-84
26.	V. P. Kalappa	Seed Technology	4-2-84
27.	B. V. Chinnappa Reddy	Agril. Economics	16-2-84
28.	S. Govinda Gowda	Sociology	23-2-84
29.	Mysore Arun Kumar	Biochemistry	23-2-84
30.	M. Bharathi	Sociology	16-3-84
31.	Mohammed Iqbal Shariff	-do-	19-3-84
32.	T. S. Nalini	Vety. Pathology	20-3-84
33.	P. W. Basarkar	Biochemistry	23-3-84

## INSTRUCTORS

1.	B. V. Chinnappa Reddy	Agril. Faculty	9-4-83
2.	C. A. Srinivasa Murthy	-do-	9-5-83
3.	R. H. Patil	-do-	28-5-83
4.	Amritham Sebastian	Physical Education	18-8-83
5.	Pramila Motebennur	-do-	22-8-83
6.	S. M. Shivaprakash	Fisheries	23-8-83
7.	Rajani R. Kuikarni	Basic Sciences	10-11-83
8.	K. N. Krishnamurthy	-do-	28-11-83
9.	K. Chandrashekar	-do-	3-12-83
10.	Krishnappa	-do-	7-12-83
11.	A. A. Tomy	-do-	1-2-84
12.	Beena Rai	-do-	6-2-84
13.	M. S. Jayaram	-do-	1-3-84
14.	H. H. Oliveppa	-do-	7-3-84
15.	B. S. Rajagopal	-do-	9-3-84
16.	S. K. Shashikumar	Vety. Science	5-3-84
17.	Dinakar S. Desai	-do-	6-3-84
18.	K. Venkata Reddy	-do-	7-3-84
19.	K. V. Maruthy	-do-	29-3-84

## Research

## PROFESSORS

1.	B. R. Hegde	Chief Scientist	27-6-83
2.	T. Satyanarayana	-do-	29-6-83
3.	K. G. Shambulingappa	Sr. Scientist (Oilseeds)	30-6-83

1	2	3	4
4.	B. S. Naidu	Prof. of Plant Breeding	8-7-83
5.	M. M. Khan	Scientist - S. 3 (Hort.)	28-7-83
6.	C. Nanja Reddy	Research Officer (Economics)	20-10-83
7.	A. Bomme Gowda	Sr. Seed Research Officer	5-1-84
8.	K. Baiakrishna Rao	Chief Scientific Officer posted as R.A.D.	6-1-84
9.	N. S. Parameswar	Prof. of Plant Breeding	6-1-84
10.	R. Siddaramappa	Chief Scientist	25-1-84
11.	M. A. Singlachar	Chief Scientist posted as R.A.D.	7-2-84
12.	T. Swamy Rao	Sr. Scientist (Pulses)	13-3-84

## ASSOCIATE PROFESSORS

1.	Riaz Ahmed Shariff	Plant Scientist (Ragi)	21-6-83
2.	B. Narayana Bhat	Plant Scientist (Sorghum)	22-6-83
3.	T. S. Gowramma	Sr. Scientist (Home Science)	23-6-83
4.	M. Gopalakrishna Rao	Plant Scientist (Paddy)	30-6-83
5.	B. Y. Kullaiswamy	Plant Scientist	2-7-83
6.	C. D. Singh	Assoc. Prof. (Physiology) NARP	14-7-83
7.	S. N. Talwar	Cotton Breeder	15-7-83
8.	H. M. Chandrappa	Assoc. Professor, NARP	15-7-83
9.	K. M. Channakrishnaiah	Geneticist, Sunflower Scheme	16-7-83
10.	A. Manjunath	Assoc. Prof. (Pl. Breeding), NARP	18-7-83
11.	Y. S. Veeraraje Urs	Assoc. Prof. (Physiology), NARP	21-7-83
12.	A. Ramamurthy	Maize Breeder	19-8-83
13.	B. Vidyachandra	Rice Breeder	19-8-83
14.	D. Rajagopal	Assoc. Prof. Entomology (PL. 480)	22-9-83
15.	Gubbaiah	Entomologist (Rice)	23-9-83
16.	K. A. Kulkarni	Entomologist (PL. 480)	7-10-83
17.	M. S. Joshi	Sorghum Breeder	10-10-83
18.	D. S. Lokamanya	Assoc. Prof. Agril. Economics, NARP	14-10-83
19.	H. K. Sangappa	Assoc. Prof. Entomology (Pulse Scheme)	21-10-83
20.	K. Virupakshappa	Geneticist, Germplasm Unit, Sunflower	7-11-83
21.	D. N. Nagaraj	Sr. Technical Assistant	14-12-83
22.	B. K. Nageshchandra	Assoc. Prof. Entomology, Termite Scheme	4-1-84
23.	N. K. Krishnaprasad	Assoc. Prof. Entomology, NARP	13-2-84
24.	B. L. Visweswara Gowda	-do-	15-2-84
25.	R. R. Hanchinal	Plant Scientist (Cotton)	15-3-84
26.	Police Patil	Breeder	19-3-84

## ASSISTANT PROFESSORS

1.	A. P. Viswanath	Asst. Agronomist (HPHT Scheme)	9-4-83
2.	T. V. Ramachandra Prasad	Jr. Agronomist (AICRP on Weed Control)	15-4-83
3.	Y. B. Palled	Jr. Scientist (Agronomy)	18-4-83
4.	C. S. Hunshal	Asst. Agronomist (AICRP on Sorghum)	18-4-83

1	2	3	4
5.	K. Kenchaiah	Asst. Professor Agronomy-(NARP)	24-4-83
6.	S. I. Halikatti	Jr. Agronomist (AICORP-Safflower)	30-4-83
7.	B. T. Pujari	Jr. Agronomist (ECF Scheme)	5-5-83
8.	Somasekhar L. Madiwalar	Asst. Agronomist (AICCIPI)	6-5-83
9.	H. V. Nanjappa	Jr. Agronomist (AICARP)	6-5-83
10.	M. B. Guled	Asst. Prof. of Crop Production	6-5-83
11.	H. Mariraju	Farm Superintendent (NARP)	1-6-83
12.	B. N. Patil	Scientist (Agronomy)	1-6-83
13.	T. Seshadri	Farm Manager (Agronomy) NARP	2-6-83
14.	B. C. Shankaralingappa	Asst. Professor (Agronomy) NARP	3-6-83
15.	A. G. Bandi	Asst. Prof. of Crop Production	9-6-83
16.	K. E. Thimmappa	Jr. Agronomist (ECF Scheme)	15-6-83
17.	H. Susheela	Jr. Scientist (Proj on Home & Farm Management)	21-6-83
18.	A. N. S. Gowda	Jr. Plant Physiologist (AICRP on Pulses)	24-6-83
19.	G. K. Mukunda	Technical Assistant, NARP	29-6-83
20.	B. Raju	Technical Assistant, NARP	30-6-83
21.	S. Srinivas	Asst. Prof. of Chemistry & Soils (NARP)	30-6-83
22.	Shāranappa	Farm Superintendent	4-7-83
23.	B. S. Janagoudar	Jr. Scientist (Pl. Physiology)	4-7-83
24.	H. Shivanna	Asst. Sorghum Breeder	11-7-83
25.	B. G. Suryanarayana Reddy	Jr. Breeder, Sesamum Scheme	13-7-83
26.	M. N. Gennur	Jr. Geneticist, AICRP on Wheat	15-7-83
27.	S. J. Mokashi	Jr. Breeder (Sugarcane)	16-7-83
28.	G. Nijaguna	Jr. Breeder, AICRP	18-7-83
29.	B. R. Gurumurthy	Jr. Pl. Physiologist	18-7-83
30.	P. Kusumakumari	Asst. Cytogeneticist	20-7-83
31.	A. Rama Murthy	Asst. Pl. Scientist	20-7-83
32.	B. S. Nandihalli	Technical Asst., NARP	22-7-83
33.	S. T. Kajjidone	Asst. Prof. of Pl. Breeding, NARP	4-8-83
34.	Basava Raj M. Khadi	Asst. Cotton Breeder	5-8-83
35.	M. Rudraradhya	Asst. Prof. of Plant Breeding, NARP	6-8-83
36.	K. Chalapathi	Asst. Prof. of Agrostology, NARP	8-8-83
37.	D. M. Upadhyaya	Jr. Breeder	8-8-83
38.	M. E. Shashidhar	Asst. Prof. of Pl. Breeding, NARP	8-8-83
39.	S. J. Patil	Asst. Prof. of Crop Physiology, NARP	17-8-83
40.	R. Umashankar	Jr. Pl. Physiologist	18-8-83
41.	R. Rajashekar Gowda	Asst. Prof. of Sericulture (World Bank Project)	29-8-83
42.	R. Devendra	Jr. Pl. Physiologist	5-9-83
43.	M. Jayaramaiah	Asst. Prof. of Pl. Breeding, NARP	5-9-83
44.	K. P. Chinnaswamy	Asst. Prof. of Sericulture (World Bank Project)	23-9-83
45.	A. R. V. Kumar	Asst. Prof. of Entomology, NARP	26-9-83
46.	L. Krishna Naik	Asst. Entomologist	26-9-83
47.	M. S. Ganesh Babu	Jr. Agronomist	27-9-83
48.	Neelu Nangia	Asst. Prof. of Sericulture (World Bank Project)	28-9-83

1	2	3	4
49.	H. L. Nadaf	Jr. Breeder	30-9-83
50.	K. S. Prakash	Jr. Breeder	1-10-83
51.	M. R. Gururaja Rao	Jr. Pl. Breeder	7-10-83
52.	A. K. Chakravarthy	Jr. Entomologist	24-10-83
53.	V. T. Sannaveerappanavar	Jr. Entomologist	24-10-83
54.	Badrinath	Asst. Prof. of Chem., NARP	16-11-83
55.	B. B. Chinnappa Goudar	Jr. Physiologist	17-11-83
56.	T. N. Venkata Reddy	Asst. Seed Research Officer, NSP-II	23-11-83
57.	N. S. Bhatt	Asst. Entomologist	30-11-83
58.	B. Siddappa	Asst. Seed Production Specialist	12-12-83
59.	D. S. Ravikumar	—do—	15-12-83
60.	P. N. Nagarajeswamy	—do—	22-12-83
61.	M. Shekar Gowda	—do—	9-1-84
62.	G. V. Jagadish	Asst. Seed Research Officer, NSP-II	4-2-84
63.	R. Chandru	Oil Chemist	6-2-84
64.	R. Muniraju	Jr. Scientist	6-2-84
65.	G. V. Basavaraju	Asst. Seed Production Specialist	9-2-84
66.	Veena V. Savalagi	Jr. Microbiologist	20-2-84
67.	S. V. Hosamani	Dairy Husbandry Officer	20-2-84
68.	K. Nagabhushanam	Asst. Prof. of Entomology, NARP	23-2-84
69.	M. V. Sholapurkar	Jr. Statistician	1-3-84
70.	M. S. Surendra	Statistician	1-3-84
71.	Sara A. Nidgundi	Asst. Animal Scientist	15-3-84
72.	N. G. Kumar	Asst. Prof. (Termites Scheme)	21-3-84
73.	N. C. Sharatchandra	Jr. Entomologist	22-3-84
74.	M. Ramaiah	Asst. Seed Production Specialist	30-3-84

## RESEARCH ASSISTANTS

1.	C. Anjinappa	Research Assistant	5-4-83
2.	M. N. Gennur	—do—	6-4-83
3.	H. Chandrappa (Yalanada)	—do—	15-4-83
4.	M. S. Nagaraju	—do—	19-4-83
5.	Dileep Ishwarappa Jirali	—do—	20-4-83
6.	R. Lakshmana	—do—	23-4-83
7.	Shailaja Hittalmani	—do—	20-5-83
8.	Y. S. Govinda Rao	—do—	23-5-83
9.	B. R. Rangaswamy	—do—	23-5-83
10.	T. H. Gowda	—do—	23-5-83
11.	G. R. Manure	—do—	9-6-83
12.	M. K. Nagamani	—do—	7-7-83
13.	S. N. Megeri	—do—	15-7-83
14.	Y. Vishwanatha Shetty	—do—	27-7-83
15.	G. Govindaraj	—do—	13-8-83
16.	K. G. Ananda Naik	—do—	27-8-83
17.	M. L. Annapurna	—do—	21-9-83
18.	S. Meena Kumari	—do—	22-9-83
19.	H. B. Shivaleela	—do—	1-10-83
20.	Geetha. G. Shirnalli	—do—	4-10-83
21.	Meena Joshi	—do—	1-10-83
22.	Susheela. G. Hippargi	—do—	31-10-83
23.	V. Manjunath	—do—	30-11-83

1	2	3	4
24.	Yamunappa. H. Ryagi	Research Assistant	23-1-84
25.	B. L. Chidananda	—do—	15-3-84
26.	G. Nalini	—do—	19-3-84

### Extension

#### ASSOCIATE PROFESSORS

1.	H. Krishna Murthy	Extension Leader	1-8-83
2.	B. S. Siddaramaiah	—do—	24-10-83

#### ASSISTANT PROFESSORS

1.	S. S. Naglikar	Asst. Soil and Water Management Specialist	30-6-83
2.	S. N. Upperi	—do—	27-6-83
3.	K. Pandurangaiah	—do—	18-8-83
4.	L. V. Hirevenkanagoudar	Extension Consultant	7-10-83
5.	T. V. Rajanna.	Radio Contact Officer	8-10-83
6.	V. A. Mokashi	Information Specialist	24-10-83
7.	N. Krishna Murthy	Ag. Extension	2-11-83
8.	V. V. Desai	Asst. Farm Management Specialist	9-11-83
9.	K. G. Narasimhaiah	Agril. Extension	10-11-83
10.	Honnaiah	Asst. Farm Management Specialist	21-11-83
11.	G. N. Nagaraj	—do—	2-12-83
12.	D. G. Hemagiriappa	Training Asst.	3-12-83
13.	B. K. Narayanaswamy	Technical Asst.	3-1-84

### Service Personnel

1.	M. R. Prabhakar,	Deputy Comptroller
2.	K. N. Govinda Swamy	—do—
3.	B. N. Mahadevappa,	—do—
4.	S. Srinivasa Murthy	—do—
5.	M. Krishna Murthy	—do—
6.	K. T. Somasekhar,	Deputy Librarian
7.	S. M. Kumar	—do—
8.	D. Venkatesh	—do—
9.	G. S. Jayakumar	Executive Engineer (Planning), GKVK
10.	D. Ramegowda	Executive Engineer, NARP, GKVK
11.	M. Rajasekharaiah	Asst. Exec. Engineer (Auto), Agril. College, Dharwad
12.	T. Aswathappa,	Asst. Executive Engineer (Auto), GKVK
13.	K. N. Jayarama Reddy,	Superintendent (General)
14.	Mirza Waliulla Baig	—do—
15.	S. Ramachandra Rao	—do—
16.	Z. Thara Nalini	Stenographer
17.	B. R. Chandrasekhara	—do—
18.	Maggie Rosaline	—do—
19.	Thammanna Gowda	—do—

1	2	3	4
20.	Pavate Satakka	Stenographer	
21.	S. A. Jagdale	-do-	
22.	Shivananda	-do-	
23.	Raghavendra	-do-	
24.	K. R. Dinamani	-do-	
25.	S. V. Dambal	-do-	
26.	R. H. Chandugol	Assistant	
27.	V. B. Madig	-do-	
28.	K. F. Chalawadi	-do-	
29.	D. T. Lamani	-do-	
30.	M. Rathinam	-do-	
31.	N. R. Hari	-do-	
32.	V. Krishnamurthy	-do-	
33.	M. V. Padmanabhaswamy	-do-	
34.	R. Shivaprasad	-do-	
35.	B. M. Venkataraya	-do-	
36.	R. N. Nagaraja	-do-	
37.	D. Narayana	-do-	
38.	B. Mari	-do-	
39.	H. M. Mudappa	-do-	
40.	V. Aswathanarayana	-do-	
41.	S. Jagadeesh	-do-	
42.	P. T. Laxman	Processing Assistant	
43.	K. S. Sridharamurthy	-do-	
44.	S. C. Maradagi	-do-	
45.	K. V. Sathyanarayanaraju	-do-	
46.	Mohammed Reyaz	Junior Engineer	
47.	M. Ramachandrachar	Dairy Plant Assistant	
48.	Narayan S. Malavade	Draughtsman	
49.	D. Chandrappa	Care-taker	
50.	H. Yesu Poojari	Aquarium Assistant	
51.	Nandakishore	Pharmacist	
52.	P. P. Hosakatti	Stockman	
53.	Fakirappa Bheemappa Morab	Stockman	
54.	Allisa	Field Assistant	
55.	N. Channappa	-do-	
56.	H. S. Ramachandra	-do-	
57.	Thirumalappa	-do-	
58.	Neelava Garag	Guest House Cleaner	
59.	T. B. Nagaraja	Typist	
60.	Ravigangadhar Rasalkar	-do-	
61.	B. V. Muralidhara Rao	-do-	
62.	N. K. Nagaraju	-do-	
63.	H. B. Rangaswamaiah	-do-	
64.	Vazir Khan	-do-	
65.	Anantha Hanumantharao Kulkarni	-do-	
66.	G. A. Subramanyam	-do-	
67.	B. S. Komala	-do-	
68.	C. Shashikala	-do-	
69.	B. Chandraprabha	-do-	
70.	Sharfunnisa	-do-	
71.	N. Nagamani	-do-	



1	2	3	4
72.	H. Shakuntala	Typist	
73.	C. M. Rozy	-do-	
74.	Naseema Khatoon	-do-	
75.	N. Padma Bai	-do-	
76.	B. R. Annapoorna	-do-	
77.	Zabair Khan	-do-	
78.	G. E. Honnappa	-do-	
79.	Valeppa	-do-	
80.	Thibbegowda	-do-	
81.	Mahadevappa Bheemappa Manigeri	Messenger	
82.	C. D. Mahabaleswara	Tracer	
83.	Puttaswamachari	-do-	
84.	V. M. Munirathnamma	-do-	
85.	R. Vasantharaju	Ele. Wireman	
86.	Narasinga Rao R. Vagole	Cook-cum-Caretaker	
87.	G. Narayanaswamy	-do-	
88.	Shakshavali	Messenger	
89.	Venkataramaiah	Tractor Driver	
90.	H. Devendrappa	-do-	
91.	A. Subramanyam	-do-	
92.	Sadashiv Gurupeddappa Galgali	-do-	
93.	B. A. Somanna	Driver (L. V.)	
94.	V. F. Kambavimath	-do-	
95.	B. Basappa	-do-	
96.	A. V. Rajanna	-do-	
97.	B. S. Srinivasa	-do-	
98.	K. K. Gopalakrishna	-do-	
99.	A. B. Nanjundaiah	-do-	
100.	P. D. Anthony	-do-	
101.	H. T. Venkatesh	-do-	
102.	A. Subramanyam	-do-	
103.	Narasimha Rao	-do-	
104.	M. S. Banjigar	-do-	
105.	N. Ramakrishna	Jr. Compositor	
106.	B. S. Sampath	-do-	
107.	Lakshmana	-do-	
108.	Chaluvaraju	-do-	
109.	P. K. Chandrasekhara Raju	-do-	
110.	V. Somashekar	-do-	
111.	C. S. Gopalakrishna	-do-	
112.	K. S. Nagaraja Rao	-do-	
113.	B. Venkatesh	-do-	
114.	V. Rangaraju	-do-	
115.	Gopalakrishna Sastry	-do-	
116.	Venkatachalaiah	-do-	
117.	S. Hanumantharaya	-do-	
118.	T. Narayanappa	-do-	
119.	V. S. Srinivasa Murthy	-do-	
120.	R. Krishna Murthy	Asst./Machine Minder	
121.	Bhadraiah	-do-	
122.	A. Prasannakumar	-do-	
123.	Mahaboob Ali Nadaf	-do-	

1	2	3	4
124.	L. Shamanna	Assistant Binder	
125.	Krishnappa	-do-	
126.	Gururaja	-do-	
127.	B. T. Nataraja	-do-	
128.	H. V. Venkatesha Reddy	-do-	
129.	V. S. Virakthmatt	Press Helper	
130.	K. Byanna	-do-	
131.	G. Venkataraju	-do-	
132.	A. Krishna Murthy	-do-	
133.	Erappa	Sports Helper	
134.	Narayanaswamy	-do-	
135.	H. Gangadharappa	Helper	
136.	Nagaraja	-do-	
137.	Shalamkhan	-do-	
138.	Shivappa Channappa Alnavar	Sports Helper	
139.	Narayanaswamy	-do-	
140.	Subbaraya	-do-	
141.	Venkatarama	-do-	
142.	Umesha Yellappa Shirahalli	-do-	
143.	K. Nagesh	-do-	
144.	H. G. Muniyappa	Poultry Attender	
145.	V. Narayanappa	-do-	
146.	K. S. Murthy	-do-	
147.	H. Govindaiah	-do-	
148.	Srinivasa	-do-	
149.	Nagaraja	-do-	
150.	J. Nagarajaiah	-do-	
151.	T. Giriya	-do-	
152.	Nanjundaiah	-do-	
153.	K. Shivanna	-do-	
154.	K. Muniraju	-do-	
155.	Maddurappa	-do-	
156.	Channappa	-do-	
157.	K. Vasu	-do-	
158.	S. N. Ramakrishna	-do-	
159.	Kemparudraiah	-do-	
160.	K. Venkataramaiah	Bus Helper	
161.	A. T. Krishna	-do-	
162.	G. Muninanjappa	-do-	
163.	B. Balakrishna	Bosun	
164.	Laxman Puthran	-do-	
165.	K. V. Ramachandra	Seamerman	

## APPENDIX II

### LIST OF PUBLICATIONS BY THE STAFF OF THE UNIVERSITY

<i>Name of Author (s)</i>	<i>Title of the paper with the details of publication</i>
<b>Agricultural Botany</b>	
Giriraj, K and Goud, J. V. (1983)	"Association of yield components and development traits in grain sorghum ( <i>Sorghum bicolor</i> )." <i>Ind. J. Agril. Sci.</i> , <b>53</b> : 5-8.
Patil, S. S. and Goud, J. V. (1983)	"Correlated response of polygenic characters in <i>Sorghum bicolor</i> in M <sub>3</sub> , M <sub>4</sub> generations." <i>Proc. 70th Indian Science Congress</i> , Tirupathi, Jan. 3-8.
Ramachandram, M. and Goud, J. V. (1983)	"Quantitative inheritance of spine index and its components in safflower." <i>Indian J. Agri. Sci.</i> , <b>53</b> : 311-313.
Halalli, M. S., Gowda, B. T. S., Kuikarni, K. A. and Goud, J. V. (1983)	"Evaluation of progenies in advanced generations for resistance to shootfly ( <i>Antherigona soccata</i> Rondani) in sorghum. <i>Ind. J. Genet.</i> , <b>43</b> : 292-294.
Kullaiswamy, B. Y. and Goud, J. V. (1983)	"Inheritance and linkage relationships of three qualitative characters in sorghum." <i>Curr. Sci.</i> , <b>52</b> : 132-135.
Kullaiswamy, B. Y. and Goud, J. V. (1983)	"Genetic association between 2 panicle characters in sorghum." <i>Curr. Sci.</i> , <b>52</b> : 93-94.
Halalli, M. S., Gowda, B. T. S., Kuikarni, K. A. and Goud, J. V. (1983)	"Inheritance of resistance to shootfly ( <i>Atherigona soccata</i> Rond) in sorghum." <i>SABRAO</i> , <b>14</b> : 165-170.
Hanchinal, R. R. and Goud, J. V. (1983)	"Development of monosomic lines in durum wheat." <i>Wheat information Service</i> , <b>56</b> : 3-6.
Giriraj, K. and Goud, J. V. (1983)	"Heterosis for vegetative characters in grain sorghum ( <i>Sorghum bicolor</i> )." <i>Ind. J. Heredity</i> , 9-13.
Kullaiswamy, B. Y. and Goud, J. V. (1983)	"New genes for awning in sorghum ( <i>Sorghum bicolor</i> )." <i>Madras Agril. J.</i> , <b>70</b> : 355-359.
Kullaiswamy, B. Y. and Goud, J. V. (1983)	"Inheritance and linkage relationship of three peduncle characters in sorghum." <i>Ind. J. Genet.</i> <b>43</b> : 306-310.
Kajjidoni, S. T., Hiremath, K. G., Kadapa, S. N. and Goud, J. V. (1983)	"Nature of gene action for ten quantitative characters in diploid cotton ( <i>G. herbaceum</i> and <i>G. arboreum</i> )." <i>Mysore. J. agril Sci.</i>
Goud, J. V. and Kullaiswamy, B. Y. (1983)	"Present status of linkage groups in sorghum." <i>XV International Congress of Genetics</i> , New Delhi, Dec., 1983.

<i>Name of Author (s)</i>	<i>Title of the paper with the details of publication</i>
Goud, J. V., Anahosur, K. H. and Kulkarni, K. A. (1983)	"Breeding for multiple resistance in sorghum." <i>National Seminar on Breeding Crop Plants for Resistance to Pests and Diseases</i> . TNAU, Coimbatore, 1983.
Ramachandram, M. and Goud, J. V. (1983)	"Components of oil content in safflower ( <i>Carthamus tinctorius</i> )." <i>Mysore J. agric. Sci.</i> , <b>16</b> .
Kullaiswamy, B. Y. and Goud, J. V. (1983)	"Some additional loci to the second linkage group in sorghum." <i>Madras Agril. J.</i>
Kanaka, S. A. and Goud, J. V. (1983)	"Inheritance of quantitative characters of sorghum." <i>Mysore J. agric. Sci.</i> , <b>16</b> : 19-24.
Ramachandram, M. and Goud, J. V. (1983)	"Genetics of some economic characters in safflower ( <i>Carthamus tinctorius</i> )." <i>Mysore J. agric. Sci.</i> , <b>16</b> .
Udayakumar Holla, Kadapa, S. N. and Goud, J. V. (1984)	"Heterosis in <i>Gossypium herbaceum</i> × <i>G. arboreum</i> ." <i>Ind. J. Agril. Sci.</i> <b>54</b> : 16-24.
Kajjidoni, S. T., Hiremath, K. G., Kadapa, S. N. and Goud, J. V. (1984)	"Heterosis and combining ability in <i>Gossypium herbaceum</i> × <i>G. arboreum</i> ." <i>Ind. J. Agril. Sci.</i> , <b>54</b> : 9-16.
Goud, J. V. and Kullaiswamy, B. Y. (1984)	"Pleiotropic and differential action of genes in rice ( <i>Oryza sativa</i> )." <i>Ind. J. Genet.</i> <b>44</b> .
Goud, J. V., Thimmappaiah and Kullaiswamy, B. Y. (1984)	"Linkage studies in rice ( <i>Oryza sativa</i> )." <i>Ind. J. Genet.</i>
Hadagal, B. N., Manjunath, A. and Goud, J. V. (1984)	"Inheritance of anthocyanin pigmentation in a few parts of rice ( <i>Oryza sativa</i> )." <i>Ind. J. Genet.</i> <b>44</b> .
Hugar, C. B., Parameshwarappa, R. and Goud, J. V. (1984)	"Genetic evaluation of new male sterile lines in sorghum ( <i>Sorghum bicolor</i> )." <i>Mysore J. agric. Sci.</i> , <b>17</b>
Goud, J. V. (1984)	"Cytogenetics of ragi—a review." <i>National Seminar on Finger Millet (Elusine coracana)</i> UAS Hebbal, 1983.
Bandepgoudar, M. R. and Goud, J. V. (1984)	"Inheritance studies in sorghum." <i>Ind. J. Genet.</i>
Bhat, M. G., Gowda, B. T. S., Anahosur, K. H. and Goud, J. V. (1984)	"Inheritance of resistance to downy mildew in sorghum." <i>Ind. J. Genet.</i>
Viswanath, K. P. and Mahadevappa, M. (1982)	"Scope of hybrid rice breeding research in Karnataka." <i>Curr. Res.</i> <b>11</b> : 100-104.
Mahadevappa, M., Narayanaswamy, M. S. and Channaiah, C. (1982)	"Wild paddy—pernicious weed." <i>Indian Farming</i> <b>27</b> : 34-35.
Mahadevappa, M. (1982)	"Highlights of rice breeding research in UAS during 1981-82." <i>Curr. Res.</i> , <b>11</b> : 45

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Bisaliah, S. and Karamathullah, N. (1983)	"Market parameters and agricultural technology evaluation frame". <i>Proc. of the NARP Workshop on Agricultural Economics</i> , UAS October 20-21, 1983.
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Karamathullah, N. and Bisaliah, S. (1983)	"Dynamics of soybean innovation in India Spatial and temporal analysis." <i>14th Annual Workshop of AICRP on Soyabean</i> held on 27-29th April 1983 at Almova, U.P.
Mallikarjunaiah, K. G. (1983)	"Impact of regulation on the marketing of agricultural produce" <i>National Workshop on Regulation and Management of Agril. Product Markets</i> , organised by the Directorate of Marketing and Inspection, G.O.I., held at Jaipur on February 2-5.
Nagaraja, G. N. and Venkataram, J. V. (1983)	"An optimum cropping pattern and its impact on net farm returns in Doddaballapur taluk, Bangalore District, Karnataka—an Linear Programming model." <i>Agril. Banker</i> , 6 : 52
Nanja Reddy, C. N. (1983)	"Whole farm approach and economic concept in operation." <i>Proc. of the NARP workshop on Agricultural Economics</i> , UAS, October 20-21
Shivkaran Singh and Ramanna, R. (1982)	"Potentiality of employment on small and large farms—A study of Farms in Eastern Region of Hyderabad District, A.P." <i>Agril. Situation in India</i> , Dec. 1982.
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Ramanna, R. (1983)	"Role of agricultural economist in the NARP research." <i>Proc. of the NARP workshop on Agricultural Economics</i> , October 20-21.

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Deshmukh. R. C. and Ramaiah, R. (1983)	"Comparative study of sprinkler and check basin method of irrigation, sorghum as test crop." <i>Marathwada Agril. J.</i>
Guruswamy, T. (1983)	"A new implement for ridging, furrowing (bedding) cum seeding." <i>Agril. Engg. Today</i> , 7 : 51-52.
Guruswamy, T. (1983)	"Evaluation and land levelling implement under dryland conditions - A case study." <i>Indian J. Soil Conservation</i> , 11.
Guruswamy, T. (1983)	"Evaluation of sweep and blade hoe." <i>XX Annual Convention of ISAE</i> , G.B. Pant University of Agri. and Techn., Pantnagar, March 5-7.
Guruswamy, T. (1983)	"Boomiyanu Matta Maduva Krishi Upakaranagalu Mattu Ayugala Mahatva." <i>Seminar on Irrigation Day</i> , CADA, UKP, Krishnapur.
Maurya, N. L., Davadattam, D. S. K. and Naravani, N. B. (1983)	"Efficient use of irrigation water through land levelling." <i>International Workshop on Contingency Irrigation Planning for Command Area during Deficit Rainfall Years</i> , APAU, Rajendranagar, Hyderabad, August 2-5.
Maurya, N. L. and Guruswamy, T. (1983)	"Draftability of cross-bred and local bullocks - A case study." <i>XX Annual Convention of ISAE</i> G.B. Pant University of Agril. and Techn., Pantnagar, March 5-7.
Srinivasmurthy, B. K. (1983)	"Selection of I.P. Sets" (Kannada), <i>Karnataka Vyavasaya Patrike</i> , 10 : 9.

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Abraham, E. S., Koraddi, V. R., Rao, G.G. and Basavanna, P. (1983)	"Effect of sowing dates and fertilizer treatments on the fibre properties of two cotton genotypes grown under rainfed conditions". <i>Seminar on the Influence of Agronomic Treatments on Quality and Economic Characters of Cotton Fibre</i> , held at CTRL, Bombay, Nov. 1983.
Agasimani, C. A., Palled, Y. B., Sajjan, S. N., Katti, H. S. and Naik, H. D. (1983)	"Effect of seed quality, seed treatment and soil treatment on pod yield of groundnut". <i>Curr. Res.</i> 12 : 24-25.

<i>Name of Author (s)</i>	<i>Title of the paper with the details of publication</i>
Agasimani, C. A., Palled, Y. B., Sajjan, S. N., Katti, H. S. and Naik, H. D. (1983)	"Effect of seed quality, seed treatment and soil treatment on pod yield of groundnut". <i>Curr. Res.</i> <b>12</b> : 24.
Bhat, S. M., Sheelavantar, M. N., Prabhakar, A. S. and Patil, V. S. (1983)	"Evaluation of sorghum hybrids and varieties for drought tolerance". <i>Curr. Res.</i> <b>12</b> .
Gumaste, S., Jayanna, M. and Palled, Y. B. (1983)	"Effect of method of establishment of subabul ( <i>Leucaena leucocephala</i> (Lam.) de Wit.) on the mortality percentage and initial vigour of seedlings". <i>National Convention on Subabul</i> held at Bangalore.
Gumaste, S. K., Jayanna, M. and Palled, Y. B. (1983)	"Influence of method of establishment on the mortality and initial vigour of leucaena seedlings". <i>National Convention on Subabul</i> held at Institute of Agril. Technologists, Bangalore, on May. 25-26.
Havanagi, G. V. and Hegde B. R. (1983)	"Response of pearl millet and finger millet crops to fertiliser management under rainfed conditions". <i>Fert. news.</i> <b>28</b> : 62-68.
Hosamani, S. A. (1983)	"Effect of sowing dates on the growth and yield and performance of selected sorghum genotypes in rabi season". <i>XIII All India Annual Sorghum Workshop</i> held at Hissar from April 18th to 21st.
Hosamani, S. A. (1983)	"Effect of sowing dates on the growth and yield performance of selected soy bean genotypes in rabi season". <i>XIII All India Annual Soybean Workshop</i> held at Mysore, Nov. 18-21.
Kachapur, M. D., Nadagouda, V. B. and Biradar, B. M. (1979)	"Performance of niger ( <i>Guizotia abyssinica</i> Cass) cultivars in summer under drier region of Karnataka". <i>Indian Oilseed J.</i> , <b>9</b> : 22-23.
Kachapur, M. D. and Radder, G. D. (1981)	"Quality studies in niger genotypes in relation to spacing and fertility levels". <i>Indian Oilseed J.</i> <b>11</b> : 1-2.
Kachapur, M. D. and Nagod Malasiddappa (1984)	"Water management in groundnut". <i>Seminar on Oilseeds organised by the IFFCO at Manvi.</i>
Koraddi, V. R. and Nadagoudar, B. S. (1983)	"Causes for low yields of Varalaxmi hybrid cotton". <i>ISARD Seminar on Cotton</i> held at Arekurahatti.
Krishnamurthy, K. T. V., Ramachandra Prasad, K., Kenchaiah, N., Narasimha, N., Dwarkanath and Khan, T. A. (1983)	"Integrated weed control transplanted paddy". <i>Proc. 9th Asian-Pacific Weed Sci. Soc. Conf.</i> , Philippines.
Muniyappa, T. V., Ramachandra Prasad, T. V. and Krishnamurthy, K. (1983)	"Biology and chemical control of <i>Oxalis latifolia</i> Linn". <i>Indian J. Weed Sci.</i> <b>15</b> .

<i>Name of Author (s)</i>	<i>Title of the paper with the details of publication</i>
Nadagoudar, B. S., Joshi, V. R., Chandrashekar, C. M. and Shiva-yogisewar, B. (1983)	"Good cotton seed to achieve desired plant population and yield". <i>Seminar on Cotton Productivity Challenges in 80's</i> Karnataka Chamber of Commerce, Hubli.
Padaganur, G. M., Koraddi, V. R. and Srinivasachar, M. (1982)	"A note on the incidence of cotton stenosis in two varieties sown on different dates". <i>J. Ind. Soc. for Cotton Improvement</i> , <b>12</b> : 75.
Palled, Y. B., Jayanna, M. and Gumaste, S. K. (1983)	"A review on moisture toxicity of <i>Leucaena leucocephala</i> ". <i>National Convention on Subabul</i> , held at Institute of Agricultural Technologists, Bangalore on May 25-26.
Palled, Y. B., Hosamani, M. M. and Patil, M. P. (1983)	"Harvesting of organic nitrogen from intercropped leucaena". <i>Leucaena Research Reports</i> , <b>4</b> : 33.
Subba Rao, N. S., Tilak, K. V. B. R., Sing, C. S. and Linge Gowda, B. K. (1983)	"Field response of finger millet ( <i>Eleusine coracana</i> ) to inoculation with <i>Azospirillum brasilense</i> ". <i>Curr. Sci.</i> <b>52</b> : 439.
Thimmegowda, S. (1983)	"Nitrogen nutrition to greengram ( <i>Phaseolus aureus</i> L.)". <i>Acta Agronomica</i> , <b>32</b> : 139-141.
Thimmegowda, S. (1983)	"Prospects and production technology for wheat on light soils of Karnataka". <i>Proc. National Seminar on Productivity in Wheat and Wheat Products</i> held in Vigyan Bhavan, New Delhi, April. 29-30, pp. 21-24.
Agasimani, C. A. and Hosmani, M. M. (1983)	"Shenga labhadhayaka bele". <i>Krishipete</i> , <b>9</b> : 17-21.
Agasimani, C. A. and Hosmani, M. M. (1983)	"Yellu Utpadane hecchisiri". <i>Krishiloka</i> , <b>16</b> : 4.
Agasimani, C. A. and Hosmani, M. M. (1983)	"Labhadayaka yenne kalina bele - Suryakanti". <i>Krishipete</i> <b>10</b> : 21-22.
Agasimani, C. A. and Habib, A. F. (1983)	"Shenga belege sunnada (calcium) avasyakate hagu adannu puraisuva vidhana". <i>Krishipete</i> <b>10</b> : 11-13.
Agasimani, C. A. (1983)	"Karnatakadalli shenga eluvari hecchisuva vidhanagalu". Khushki besaya abhivruddi hagu belegala vichara Sankirana. Holalu 6th Nov. 1983. Karnataka Sarakara, Krishi Elakhe, Bellari Jille : 27-28.
Agasimani C. A. (1983)	"Besigeyalli naeravari shenga eluvari hecchisalu anusarisabekada kramagalu". <i>Krishi Sampada</i> <b>5</b> : 8-10.
Agasimani, C. A. (1984)	"Besigeyalli shenga besaya". <i>Samyukta Karnataka Kannada daily</i> -Hubli, <b>51</b> : 4



<i>Name of Author (s)</i>	<i>Title of the paper with the details of publication</i>
Agasimani, C. A. and Habib, A. F. (1984)	"Shenga belege avashyavada posbaka sunna (calcium) hagu adannu puraisuva vidhana". <i>Krishi Sampada</i> , <b>5</b> : 1-3.
Agasimani, C. A. (1983)	"Male ashraydalli shenga hagu yellu beleyuvadu labhadayaka". Vana besayada pathagalu-Varta Vibhaga, Akashavani, <i>Krishi Vishwa Vidyalaya</i> , Dharwad.
Gadagi, D. D. and Palled, Y. B. (1983)	"Belekalu belegala pramukhayate mattu utpada-kate". <i>Krishipete</i> , <b>9</b> : 17-18.
Gumaste, S. K. and Palled, Y. B. (1983)	"Bhusarkhasanegu subabul". <i>Krishiloka</i> , <b>16</b> : 6.
Hosamani, S. A. (1983)	"Main principles of dry farming". (Kannada). <i>Krishivarte</i> . Indian Institute of Socio Economic Studies, Bangalore. Special Issue, Nov-Dec. 1983.
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Kachapur, M. D. and Nagod Malasiddappa (1983)	"Mungarumale Thadawadaga anusarisabhdada Krishi tanthrikathegalu". <i>Negila Yogi</i> , 6-7.
Kachapur, M. D. and Nagod Malasiddappa (1983)	"Badabhoomige Warawada gurellu (niger)". <i>Seminar</i> held at Holala on Nov. 6.
Kachapur, M. D. and Nagod Malasiddappa (1983)	"Soulu Jameenige waggad oudala". <i>Seminar</i> held at Holalu on Nov. 6.
Nadagoudar, B. S. and Patil, B. N. (1983)	"New varieties of cotton". <i>Krishi Varthe</i> , <b>8</b> : 10-12.
Nadagoudar, B. S. (1983)	"Sugarcane cultivation". <i>13th Annual day of Krishi Ranga</i> . AIR, Dharwad, pp. 3-6.
Palled, Y. B. and Agasimani, C. A. (1983)	"Subabuldinda hasirele gobbara". <i>Krishi Sampada</i> , <b>3</b> .
Palled, Y. B. and Gadagi, D. D. (1983)	"Subabul Koilu". <i>Krishiloka</i> , <b>17</b> : 21-22.
Palled, Y. B. and Gadagi, D. D. (1983)	"Subabul danakarugalie poustika ahar". <i>Krishiloka</i> , <b>16</b> : 7.

### Chemistry and Soils

Shirwal, A. S. (1983)	"Koobabul as a geen manuring multipurpose crop". <i>Bhoovikas</i> <b>12</b> : 31-33.
Shirwal, A. S. (1983)	"Educational opportunities in agricultural services in India". <i>Kissan World</i> .

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| Chetti, M. B., Panchal, Y. C. and Janardhan, K. V. (1984)                         | "Effect of varying levels of salinity on growth, yield and yield components of cotton genotypes". <i>National Seminar in Plant Physiology</i> , Hissar February 10-12, p. 49.                                   |
| Venkatasubbaiah, K., Chimmad, V.P. and Janardhan, K. V. (1984)                    | "Osmo-conditioning as a means of seed invogouration in greengram". <i>Ibid.</i> , p. 35.  |
| Hiremath, S. M. and Parvatikar, S. R. (1984)                                      | "Growth and yield analysis in sorghum—Relationship between yield, TDM, vein frequency and stomata". <i>Ibid</i> p. 74.  |
| Patil, S. J., Panchal, Y. C. and Janardhan, K. V. (1984)                          | "Effect of short term moisture stress on free proline and relative water content in different plant parts of maize genotypes". <i>Ibid</i> , p. 23.   |
| Janardhan, K. V., Patil, B. N. and Raikar, D. S. (1984)                           | "Relative tolerance of safflower ( <i>Carthamus tinctorius</i> L.) varieties to saline water irrigation". <i>Ibid</i> , p. 30.  |
| Janardhan, K. V., Patil, B. C., Joshi, Y. R. and Nadgoudar, B. S. (1984)          | "Accumulation and distribution mineral nutrients in developing cotton bolls as influenced by fertilizer ratios". <i>Ibid</i> , p. 125.  |
| Janagoudar, B. S., Venkatsubbaiah, K., Janardhan, K. V. and Panchal, Y. C. (1983) | "Effect of short term stress on free proline accumulation relative water content and potassium content in different plant parts of three cotton genotypes" <i>Indian J. Plant Physiol.</i> , <b>24</b> : 82-87. |

### Farm Forestry

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| Bhaskar, V. (1983)                               | "Effect of forest soils on seed germination of <i>Sesbania grandiflora</i> and <i>Beaena leucocephala</i> ." <i>Myforest</i> <b>19</b> : 72-75.                                   |
| Bhaskar, V. and Swamy Rao, N. (1983)             | "Pre and post harvest vegetation changes in eucalyptus hybrid plantation in Bettahalli (GKVK)" <i>Myforest.</i> , <b>19</b> : 133-136.  |
| Bhaskar, V. and Dasappa (1984)                   | "Ground flora in eucalyptus plantation of different ages". <i>KFRI Abstr. No. 11</i> , p. 42.   |
| Swamy Rao, N., Dasappa and Singh, C. D. (1984)   | "Preliminary studies on chemical weed control in eucalyptus (hybrid) nursery". <i>Proc. of the National Seminar on Eucalyptus</i> , Kerala Forest Research Institute, Peechi. 44. |
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“ಕನ್ನಡ ವಿಶ್ವಕೋಶ”

#### University of Mysore

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**APPENDIX**

Accounts for	
RECEIPTS	
Head of Account	Accounts for 1983-84
1	2
(Rupees in lakhs)	
<b>A. General Funds :</b>	
I. (a) STATUTORY GRANTS FROM THE STATE GOVT. UNDER SECTION 35 OF THE ACT :	
i) Block Grants	480.00
ii) Development Grants	150.00
iii) Adhoc Schemes	16.29
Total (a)	646.29
(b) Grants from ICAR and Govt. of India :	
i) I.C.A.R.	227.84
ii) Government of India	13.99
Total (b)	241.83
Total I	888.12
II. GRANTS FROM OTHER SOURCES UNDER SECTION 30(iii) OF THE ACT :	
1. P.L.-480 - U.S.A.	5.48
2. Dept. of Atomic Energy	1.51
3. University Grants Commission	0.32
4. K.D.D.C.	30.00
5. M/s Mangalore Chemicals & Fertilisers	0.50
6. United Nation Children Funds	0.60
7. Centre for Rural Development Studies	0.05
8. Ford Foundation, Newyork	(-)0.02
9. M/s Hindustan Lever Research Foundation	0.85
10. K.S.C. for Science & Technology	0.35
Total II	39.64



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1983-84

EXPENDITURE	
Head of Account	Accounts for 1983-84
1	2
(Rupees in lakhs)	
<b>A. General Funds</b>	
<b>I. GENERAL</b>	
1. University General Administration	94.02
2. University General Expenses	52.32
3. University Library	15.07
4. University Museum	0.13
5. University Press and Publication	5.30
6. University Workshop, Hebbal campus	2.24
7. University Workshop, Dharwad	0.09
8. University Examination	0.98
9. University Works Expenditure	25.43
10. University Central Stores	3.46
11. Maintenance of University Dispensary at Hebbal	2.25
Total I	201.29
<b>II. RESIDENT TEACHING</b>	
1. Agricultural College, Hebbal	60.14
2. College of Agriculture, Dharwad	53.22
3. Veterinary College, Hebbal	61.77
4. College of Basic Sciences and Humanities	29.87
5. College of Fisheries, Mangalore	33.36
6. Agril. Engg. Institute, Raichur	14.78
7. College of Rural Home Science, Dharwad	5.69
Total II	258.83

**APPENDIX**

RECEIPTS	
Head of Account	Accounts for 1983-84
1	2
III. INCOME FROM FEES ETC.	7.77
IV. INCOME FROM UNIVERSITY PROPERTY	142.28
V. OTHER MISCELLANEOUS INCOME	22.19
Total 'A' General Funds	1,100.00
<b>B. Foundation Fund</b>	—
<b>C. Debt. and Suspense Accounts</b>	.
1. Advances	4.01
2. Loans	27.10
3. Deposits	38.16
4. Suspense	(-)0.24
5. Revolving Fund Account	0.87
6. Second National Seed Project	20.63
Total C	90.53
TOTAL RECEIPTS A + B + C	1,190.53
Add : Opening Balance	57.22
Grand Total	1,247.75

**III Contd.**

EXPENDITURE	
Head of Account	Accounts for 1983-84
1	2
<b>III. RESEARCH</b>	
1. Direction	4.50
2. Regional Research Stations	105.63
3. Agricultural Research Stations	80.66
Total III	190.79
<b>IV. (a) EXTENSION</b>	31.25
Total I to IV	682.16
<b>V. SCHEMES SPONSORED BY OTHER AGENCIES</b>	64.56
Total I to V	746.72
<b>VI. FIVE YEAR PLAN SCHEMES OF THE UNIVERSITY</b>	543.96
Total 'A' General Funds	1,290.68
<b>B. Foundation Fund</b>	—
<b>C. Debt. &amp; Suspense Accounts</b>	
1. Advances	2.86
2. Loans	46.30
3. Deposits	(-)23.72
4. Suspense	—
5. Revolving Fund Account	0.72
6. Purchase of Steel, Cement and other Building Materials etc.	(-)10.40
Total C	76.5
TOTAL EXPENDITURE A + B + C	1,306.44
Add: CLOSING BALANCE	(-)58.69
Grand Total	1,247.75

**APPENDIX****(b) Budget Estimates****Abstract Estimates of**

RECEIPTS	
Head of Account	Amount
(Rupees in lakhs)	
<b>A. General Funds</b>	
I. (a) STATUTORY GRANTS FROM THE STATE GOVERNMENT UNDER SECTION 35(2) OF THE ACT	
– Block Grant – Development Grant and Grants for Adhoc Schemes	758.32
(b) Grants from I.C.A.R. and Govt. of India	340.97
Total I	1,099.29
II. GRANTS FROM OTHER SOURCES	
a) PL-480	3.51
b) Wheat Associates, USA	—
c) Dept. of Atomic Energy	1.57
d) World Bank Aided Projects (Sericulture)	37.74
e) Karnataka Dairy Development Corporation	12.01
f) Mangalore Chemicals & Fertilizers	0.82
g) University Nations Children Fund	0.40
h) University Grants Commission	0.25
Total II	56.30

**IV****for 1984-85****Receipts and Expenditure**

EXPENDITURE	
Head of Account	Amount
	(Rupees in lakhs)

**A. General Funds**

I. UNIVERSITY GENERAL ADMINISTRATION	110.73
1. University Administration	52.59
2. University General Expenses	14.70
3. University Library	0.13
4. University Museum	5.03
5. University Press & Publications	3.17
6. University Workshop	1.30
7. University Examinations	25.92
8. University Work Expenditure	2.33
9. University Central Stores	2.69
10. Maintenance of Uni. Dispensary at Hebbal Campus	
Total I	218.59

II. RESIDENT TEACHING	77.31
1. Agricultural College, Hebbal	64.02
2. Agricultural College, Dharwad	67.67
3. Veterinary College, Hebbal	25.87
4. College of Basic Sciences & Humanities, GKVK	9.48
5. College of Basic Sciences & Humanities, Dharwad	42.74
6. College of Fisheries Sciences, Mangalore	18.58
7. Agril. Engineering Institute, Raichur	7.96
8. College of Rural Home Science, Dharwad	

Total II 313.63

APPENDIX

RECEIPTS	
Head of Account	Amount
(Rupees in lakhs)	
III. INCOME FROM FEES ETC.	6.75
IV. INCOME FROM UNIVERSITY PROPERTY	157.63
V. OTHER MISCELLANEOUS INCOME	20.62
Total III, IV & V	185.00
Total A	1,340.59
B. Foundation Fund	1.00
C. Debt and Suspense Account	139.32
Total Receipts A + B + C	1,480.91
Add : Opening Balance	—
Grand Total	1,480.91

**IV Contd.**

EXPENDITURE	
Head of Account	Amount
	(Rupees in lakhs)
III. RESEARCH	220.60
IV. EXTENSION	44.80
Total I to IV	797.62
V. SCHEMES SPONSORED BY OTHER AGENCIES	64.38
VI. FIVE YEAR PLAN SCHEMES OF THE UNIVERSITY	633.01
Anticipated savings under LTC, Vacant posts and other items	(-)33.80
Total A	1,461.21
<b>B. Foundation Fund</b>	1.00
<b>C. Debt and Suspense Accounts</b>	
a. Advances	2.50
b. Loans	32.14
c. Deposits	26.26
d. Revolving Fund Account	1.30
e. Purchase of Steel, Cement & other Building materials	6.50
Total C	68.70
Total Expenditure A + B + C	1,530.91
Add : Closing Balance	(-)50.00
Grand Total	1,480.91

## APPENDIX V

*(Excerpts from the Addresses on the occasion of the XVIII Convocation of the UAS, on March 9, 1984)*

### **Welcome Address by Dr. N. G. Perur, Vice-Chancellor, UAS**

.... We are singularly fortunate that our respected Chancellor and His Excellency the Governor of Karnataka, has been able to find time to preside over the Convocation this evening, in spite of his very busy numerous engagements. His sustained interest in the well-being of this University has always been a source of inspiration and motivation for better performance. I extend a very cordial welcome to him.

We feel greatly honoured by the presence of the Honourable Minister for Agriculture and the Pro-Chancellor of this University. In spite of the State Legislature being in Session, he has been able to find time to participate in this Convocation. I extend a very warm welcome to the Honourable Minister for Agriculture and Pro-Chancellor.

Our today's Chief Guest Mr. B. Sivaraman the Chairman of the Central Silk Board and Member, Commission on Centre-State Relations, is an able and experienced Administrator. As an ICS Officer, he held several important positions at the Centre and brought about far-reaching changes in agriculture policy of the country which resulted in the Green Revolution. He was Vice-Chairman of the National Commission on Agriculture and also a Member, Planning Commission. Presently, Mr. Sivaraman is the Chairman, Central Silk Board, Bangalore and Member, Commission on Centre-State Relations. We are extremely happy that Mr. Sivaraman has accepted our invitation to be the Chief Guest of the Eighteenth Convocation of this University and to address the Graduating Students. I extend a very warm welcome to Mr. Sivaraman.

.... The University has five teaching campuses—G.K.V.K., Hebbal, Dharwad, Mangalore and Raichur. Eight degree programmes and a diploma course in Agricultural Engineering are offered by the University at present. Master's degree programme is offered in 36 and Ph.D. in 19 disciplines. The University with its motto of service to agriculture and rural community has taken significant steps to diversify both undergraduate and postgraduate degree programmes. The undergraduate degree programmes in newer areas such as Agricultural Marketing and Cooperation, Dairy Science and Sericulture have



been recently started by the University. A separate section of students who have opted for Kannada medium has also been newly opened this year. In all the undergraduate degree programmes offered by the University, a great emphasis is laid on the practical content of the courses. The students are allotted plots of one-tenth of hectare for individual cultivation. Courses like Village Stay Practicals, Placement Service, Internship etc., are provided to develop competence and skills to understand and resolve field problems. Like in the previous years this year also our graduates have secured maximum number of PG Fellowships.

Under the UNDP Centre for Advanced Studies in Tropical Horticulture started in 1979 with close collaboration of Indian Institute of Horticultural Research, so far 11 foreign consultants from U.S.A., Australia and Italy visited the centre and assisted in strengthening postgraduate teaching and research in Horticulture. Two staff members of the University visited U.S.A., Australia and Netherlands on study tour. Again, six more staff members have been recently selected under Fellowship Training Programme in foreign countries.

The Veterinary College of the University started in 1958 celebrated its Silver Jubilee during 1983. This College during the last 25 years has blossomed into one of the finest Veterinary Colleges in the country. The University has added in recent years a Dairy Farm of 150 crossbred milking cows, a poultry unit of 2000 layers, a piggery unit, a sheep unit, an experimental Animal House to improve facilities for teaching and research. The College has so far produced 1300 B.V.Sc. graduates and 300 postgraduates.

... With the basic philosophy of integration of teaching, research and extension in addition to full-time research workers, there is active involvement of teachers and of about 900 postgraduate students in the total output of research work of the University.

During 1983, several improved crop varieties were released. A *herbaceum* type of cotton variety KDCd-1 was released to replace Jayadhar, Suyodhar and Western-1. This variety is early by about 15 days, resistant to fusarium wilt, has higher ginning outturn and gives about 30 per cent higher lint than the present ruling varieties. A new *kharif* hybrid sorghum DSH-1 has been released for cultivation in transition tract. This hybrid takes about 115 to 120 days to maturity, gives higher grain as well as fodder yield. A new variety of sesamum KDSe-1 having higher percentage of oil and moderately resistant to powdery mildew and bacterial leaf blight disease has been released. Cotton variety DS-56 and cowpea variety KHCw-3 have been prereleased for testing and multiplication. In case of bunch groundnut, Dh-8 has been found promising for irrigated conditions in summer. *Rabi* sorghum hybrid SPH-218 has given good performance at Bijapur under dryland conditions. In case of ragi,

HE-8-2-1-3 has been found promising. In Shimoga area, new strain of *barbadosense* cotton BCS 9-70 has recorded higher yield as compared to Suvin. In case of sugarcane, CO 7219 has given about 10 to 15 per cent higher yield than CO 740.

In sunflower, genotypes with lower threshold water potential for stomatal closure were found to be more productive under rainfed conditions. The role of calcium in maintaining the membrane integrity under moisture stress conditions was established. Calcium enriched tissues maintained higher leaf water content when subjected to moisture stress. In bunch type groundnut, genotypes with high rate of flowering during the first three weeks of flowering were found to be more productive. Some of the organic solutes which accumulate under moisture stress conditions like proline were found to prevent membrane damage.

Urea super granules applied at 10 to 15 cm depth has given higher yield of paddy compared to application of prilled urea. Use of azo-spirillum has increased the grain yield of ragi. Sowing of redgram in May in paired rows with a spacing of 3 m between two pairs and sowing of ragi in between pairs in July has given promising results. Multi-furrow opener and crust-breaker fabricated at the University are found to be useful in dryland farming. Mixed cropping of bengalgram and safflower in 3 : 1 row proportions has given higher monetary returns than sole cropping.

In case of cashew, two high yielding selections-8/46 Taliparamba-Kerala and 3/67 Guntur-Andhra have been identified. Studies on rejuvenation of old cashew trees by top working taken up for the first time has given very encouraging results. Adventitious shoot cuttings in sandalwood, rooted better than normal shoot cuttings.

The paddy variety IET-7575 has been found to be resistant to brown planthopper damage. Companion cropping of sorghum and garlic was found to have allelopethic effect against aphids. Wheat or paddy bran added with monocrotophos and jaggery when broadcasted in the field controlled armyworms of sorghum. Dipping roots of paddy seedlings in 0.02 per cent chloropyrrophos for 12 hours was found effective in controlling most of the paddy pests in the early stages.

Survey on crop production and cocoon losses conducted in 16 districts of the State indicated that about 75 per cent of the sericulturists grew improved variety of Mulberry M-5 as irrigated crop and 77 per cent of them reared silkworms in their dwelling houses. By and large Mys × NB4D2 silkworm race was raised. Purification of cytoplasmic polyhedrosis virus and the isolation of uscardine causing fungus has been done.

A multiple source of resistance to the major diseases of sorghum has been identified in IS-3443. Wheat variety DWR-39 has been identified as resistant to the most virulent races of stem rust. Ramularia leaf spot is becoming a limiting factor in safflower cultivation under irrigated conditions. The disease can be controlled by spraying carbendazim. Effective control methods have been developed for control of banana decline due to nematodes by pairing and pralinage of banana suckers with nematicides electron microscopy and chemotherapeutic studies have revealed that the cause of pigeonpea phyllody to be mycoplasma like organism. Studies on stem rot of coconut revealed that a fungus is associated.

An antibiotic resistant *Rhizobium* strain formed 90 per cent of nodules in redgram as against 32 per cent formed by normal rhizobia. The improved inoculation technique gave increase in yield of redgram over the control under field conditions. Mimosine was found to play a role in specificity of *Rhizobium* in subabul nodulation and nitrogen fixation. Dual inoculation of VA mycorrhiza and *Rhizobium* was found to, significantly enhance biomass production in subabul in low fertile soils.

A peddle-cum-power winnower has been developed and released for the use of farmers. This machine is quick and efficient in winnowing of threshed crops. The output of this machine varies from 10 to 35 q/hr depending upon the crop and the power unit.

.... Studies indicated that Regional Rural Banks provided better services than the Primary Agricultural Credit Cooperative Societies. The yield gap analysis in two major rainfed crops-ragi and groundnut, indicated potentialities for increasing the yields by 2 to 3.5 q of ragi and 1 to 2 q of groundnut per ha in various size groups of farmers. A cross section time series study using factor analysis, cluster analysis, index of economic power of agricultural sector, Oshima's index etc., revealed that during the 24 year period after State reorganisation 'irrigated' and 'dryland' farming were the two underlying dimensions on which the other key variables influencing agricultural performance depended. Development of irrigation potential considerably reduced inter-regional disparities besides providing for institutional and other infrastructural facilities for agricultural growth.

Survey was conducted on 200 families indicated that soya tofu products blended with 40 per cent cow's milk had highest acceptability followed by flavoured and blended milk beverages and fried foods. In another study tempeh prepared with a blend of sunflower seeds and groundnut seeds had higher acceptability than tempeh with soybean alone in Indian spicy curry. A study on motor development of infants from birth to three months indicated that motor development of male infants was faster than female infants. Motor development

increased with increased body weight. First borns were ahead in their motor development compared to that of later borns.

As a result of breeding work carried out at Dharwad over a period of about 30 years, a new breed of sheep named as 'UAS Sheep' was released this year. This breed has 25 per cent Bannur, 25 per cent South Down and 50 per cent Deccany blood. The growth rate is faster than the original Indian parent breeds and the wool is soft and more crimped. The meat is more soft and tender. A study on body weights and reproductive traits of 10 genetic groups revealed the usefulness of Nellore half-bred rams for improvement of Nellore breed of sheep.

Lactation studies resulted in development of equations for predicting 300 days yields from the part yields in Surthi of cattle in 159 villages of eight districts in KDDC area has revealed 29 per cent infection. The epidemiology of these diseases has also been studied to evolve effective package of practices. The leaves of eucalyptus trees have molluscicidal property and the results from these experiments suggest the possibility of biological control of snails which act as intermediate hosts for large number of fluke infections of cattle and sheep.

A specialised strain-cross Cornish line has been developed and is being evaluated for its suitability as a male parent line. This line has the added advantage of producing multi-coloured progenies resembling desi-plumage pattern. Similarly, a strain cross White Plymouth Rock female line has been evolved to produce broiler chicken on cross-breeding with the above Cornish lines. In order to reduce the cost of feed, inclusion of subabul leaf meal in poultry diets has a favourable effect on both egg production and growth rate. Two new species of poultry viz., Japanese Quail and Turkey have been introduced in the University farm. These Quails could be economically raised on deep litter system. A new drug Coxiban has been tried against poultry coccidia and found to be highly effective, in not only the prevention of the disease but also useful in weight gain in broilers. A ribosomal vaccine using *Leptospira pomona* serovar ribosome has been standardized. The studies in hamsters have been indicated that this vaccine is superior to formol heat inactivated vaccines. Egg drop syndrome is highly economical disease syndrome of poultry caused by an Adenovirus. A survey conducted in this regard has shown that the infection is widely prevalent. So far, three isolates recovered from different outbreaks have been characterized.

For the first time in Karnataka, fringed carp *Labeo fimbriatus* was induced to breed at Fisheries Research Station, Hesarghatta. The growth of silver carp fingerlings was better in cisterns fertilized with ammonium sulphate. Fingerlings of *Puntis pulchellus* fed with the leaves of lucerne had grown better than those fed with *Hydrilla*. Possibilities of replacing fish meal with cheaper

protein sources like silkworm pupae and shrimp waste in the formulation of fish feeds have been worked out. Technique of suppressing sex in common carp and tilapia hatchlings by administration of synthetic androgen has been developed. Skinless and boneless fillets of mrigal was successfully canned in different filling media. A continuous smoke generator and smoke chamber have been fabricated. Two new methods of painless killing of frogs used in processing frozen froglegs have been evolved.

Farmers Training Institute, Hebbal organised 28 institutional courses in which 586 farmers and 266 farm women were trained; 89 one-day training courses were organised in villages involving 2653 farmers and 761 farm women and 3 special courses on biogas technology were also organised benefitting 64 farm women. Krishi Vigyan Kendra, Hanumanamatti, organised 44 institutional training programmes and 67 off-campus training programmes involving 1832 farmers and farm women. During the period, 6 regional training programmes were organised in collaboration with the Government of India in which 155 extension workers from different States were trained. Two training programmes were organised for Animal Husbandry and Veterinary Department in which 17 workers were trained. For Agricultural Department 7 training programmes were organised in which 142 extension workers participated. Three training programmes were organised for Fisheries Department wherein 32 extension officers were involved. Five training programmes have been organised for the benefit of staff members of the Department of Horticulture wherein 62 participants participated. The monthly trainings in T & V programme were conducted every month in all the 19 districts of the State by the University training teams constituted for different districts. The second correspondence course on paddy cultivation was completed in March 1983, in which 141 farmers had enrolled. The third correspondence course now been started in August 1983 in which 101 farmers have been enrolled. The six Extension Education Units of the University organised 23 trials in 106 locations and 14 demonstrations in 85 locations during summer 1983. In *kharif* 1983, the Units have planned and implemented 77 trials in 683 locations and 64 demonstrations in 1633 farmers' fields. During the *rabi* season, the Units have laid out 82 trials in 152 locations and 91 demonstrations in 121 farmers' fields. The Units are working with 66 farmers in the whole farm demonstration scheme. Under 20 Point programme, the extension work is being conducted in 63 villages adopted by University Extension Units and Research Stations. The six Extension Education Units and three National Demonstration Units have encouraged 230 farmers to complete the construction of Bhagyalakshmi biogas plants, while another 177 farmers are being assisted to complete construction of these biogas plants. During the period, 3 mason trainings were conducted by the University in Dharwad, Bangalore and Shimoga districts in which 40 masons were trained in Bhagyalakshmi biogas plant construction. From July 1983, 24 training courses have

been organised for Agricultural Assistants of the State Department of Agriculture in biogas plant construction and maintenance in Bangalore, Hanumanamatti, Mandya and Kothnur (Gulbarga district) in which 480 extension workers have been trained. Bakery Training Unit of Hebbal completed two 20 weeks long duration courses during this period. 73 Short courses in bakery were organised by Hebbal and Dharwad Training Units in which 2,706 housewives were trained. The University through its 30 centres located in different regions is continuing the work with 3,000 families of small farmers under the II Phase of the lab-to-land programme sponsored by ICAR. The University has selected 63 villages for intensive implementation of the programme for increased agricultural productivity and agricultural items of 20-point programme.

The Communication Centre of the University has brought out several issues of the Mysore Journal of Agricultural Sciences, the 'Current Research', the 'Krishi Vignana' and the 'UAS Diary'. In addition, two technical bulletins entitled 'Institution Building and Institution Management' were published. Video set has been purchased with the financial assistance of the ICAR. The Department of Kannada has taken up publication of 15 books. The total Kannada books published so far comes to 139.

The Inter-Campus Youth Festival was conducted at Raichur in August 1983. The UAS Sports Council has recommended for awarding of UAS Sports Gold Medal to Mr. K. M. Renukaprasad, a fourth year Horticultural student for his outstanding performance in Kho-Kho. In the State Level Kannada Essay Writing Competition conducted by Director of Health and Family Welfare for all the six Universities, all the three cash prizes were bagged by the students of this University; Mr. M. C. Nandeesh and Mr. Azad Ismail Saheb of Fisheries College, Mangalore got the 1st and 2nd prize and Mr. Pulikeshi Karamaddi of Dharwad Campus got the 3rd prize. The University Employment Information and Guidance Bureau registered 263 graduates seeking employment assistance. A Cafeteria at the Cellar of Naik Bhavan was started in October, 1983 to relieve the rush at GKVK Garden Cafeteria. A stationery stall for the benefit of the students was started at GKVK Hostel.

#### **Address by Chief Guest--Shri B. Sivaraman**

.... The National Commission on Agriculture has no doubt done monumental work even though I say it, having been involved too much in its labours. People say so. Yet we were only too well aware when we signed the Report in January, 1976 that the science of agricultural research was galloping in a responsive environment and seeking new and important vistas of growth. Here and there we tried to give an indication of what we thought were priority sectors

for the future. Our main emphasis was on agriculture *per se* even though we did do a massive survey of the potential in forestry, fisheries, horticulture, animal husbandry and land use. We did suggest the possibility of mixed farming taking root as the mainstay of a vast peasant farming of small holdings. You all know that in the eight years since the signing of the Report, the science of forestry, fisheries, horticulture, animal husbandry and land use has gone far beyond what we judged as possible. As an example, the science of rainfed agriculture started with the Coordinated Research in Dry Farming at Hyderabad and systematised so wonderfully by ICRISAT, has, as explained by Dr. Swindale last year at your Convocation, given good farmers a yield of Rs. 4,000 per hectare as against the average of Rs. 700 per hectare in traditional agriculture. Concurrent extension by the technologists of ICRISAT helped by your University and Tamil Nadu Agricultural University has translated the technology usefully on to farmers' fields. Your Dharwad Campus has the opportunity of updating the technology by location specific adjustments in the Vertisoles of Northern Karnataka. Yet, as Dr. Swindale has pointed out, the translation of the science to the farmers on a large scale, is lagging far behind.

... With all modern technology, considering the pace of extension possible, in a vast country like ours with millions of small peasant holdings, a suggested growth rate over a long period of 4 per cent in comprehensive agriculture, as recommended by the National Commission, is certainly the outer limit of possible achievement. All of us agree that for a balanced and rapid growth of the economy, industrial growth of about 10 per cent per year and a similar growth in the tertiary sector along with, of course, Social Justice, is essential for lifting the country and its millions from the morass of poverty. World experience shows that industrial growth follows in the wake of surplus agriculture but not necessarily so. There has to be an industrial base already and a surplus from agriculture for investment. We have no doubt achieved a savings rate of 23 per cent of the national product. We have an industrial base. Yet, we know that our industrial growth is tardy. There appears to be another constraint we do not appear to notice but is obvious.

... Theoretically as the National Commission has pointed out in the logic of the Small Farmers and Agricultural Labour Scheme, if this scheme based on mixed farming and comprehensive agriculture is pursued sincerely by the nation, a vast number of the present subsistence holdings will become surplus producers and agricultural labour with fair wages will also be consumers opting for industrial goods. In addition, the National Commission has suggested the strategy of encouraging and modernising the village and cottage industries to draw off artisans with marginal holdings and artisans who are agricultural labour also away from subsistence farming to a way of life based on industry and thereby easing pressure on the agricultural sector. The National Committee on the

Development of Backward Areas has further pursued this theme and pointed out the serious lack of action and suggested the way to success. We do not appear to have appreciated the logic of growth and seem to place too much reliance on slogan mongering as an end in itself. Only an agricultural surplus arising out of a vast and energetic small peasantry who are surplus producers and consumers of industrial goods supported by a vast artisans class who are prosperous producers with modern technology and hence buyers of industrial goods, can start the industrial revolution in this country and lead to the take off of the economy. The role of Agricultural Universities in dealing with the problems of the agricultural sector is vast.

The 4 per cent growth rate in comprehensive agriculture postulated by the National Commission on Agriculture has to be reached. In addition a large part of the subsistence farmers and the poor labour has to be enabled to become consumers of industrial goods through a surplus in earning. Irrigation, fertiliser application and pest control to support the varietal revolution is the strategy so far followed and closely supported by the Universities. Yet we appear to be reaching a plateau of growth far below our requirements. Let us analyse the problem a little more. The National Commission has pointed out that this country has enough water resources which in the present regional distribution of waters can be made to irrigate ultimately a little more than 50 per cent of the the gross area under cultivation. Assuming this millenium, which like the horizon is ever distant, the areas dependent on rainfall only for agriculture can with a little calculation be shown to be more than half the net area under cultivation. If Karnataka has to keep its place in the national growth, and it has to, it has certain handicaps ; but, at the same time, it has certain advantages. The percentage of rainfed net cultivated area in Karnataka after exploiting the possible water sources for irrigation may be more than the national average. This initial handicap in natural resources can be made up only a a vigorous and innovative dry farming technology. The present back-up of the labour of ICRISAT in this field has to be replaced by a wide applied and adaptive technology in the varied forms of Vertisoles and Alvisoles in Karnataka under varying levels of and spread of rainfall in the State.

The Agricultural Universities of this country have a much wider franchise and a much wider responsibility than the scientific and technological institutions in the country. These Universities have to promote as a package education, research and research extension as a coordinated programme, each supporting the other. They are not merely cram shops to turn our graduates to add to the quasi-educated unemployed in the country. Whilst it has a role to educate its Alumni in practical agriculture so that they can go out into the world with confidence in the application of their science and technology, it has



a greater role of bringing the millions of uneducated farmers within the technological revolution by example and precept. Unfortunately, unless a miracle has happened in the last two or three years, the three parts— education, research and research extension— are working in water tight compartments with no rapport amongst each other or with the clientele. Your University had a better start in ensuring in the early years a transfer between the field organisation and the research and education organisation. This was the advice of the National Commission rarely followed. There is need to follow closely the advice of the Commission in their special report on Research, Extension and Training, issued in early 1972.

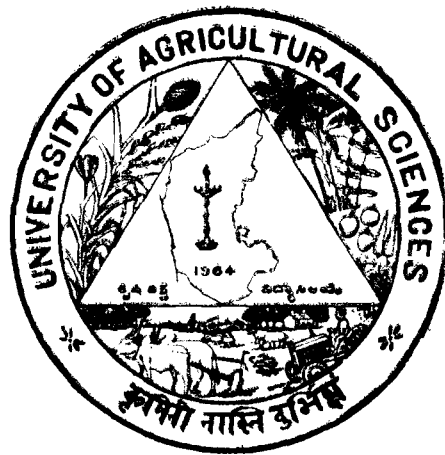
Research extension is a tool not only for carrying the fruits of research to the responsive farmers, but also to educate the researchers in the field, of problems which affect the translation of the research to the field with sufficient efficacy and acceptance. Two schemes are basic for the lab-to-land and land-to-lab process. The national demonstrations on farmer's field by the research workers and the 'operation research' programme in a large area covering a village or more need your particular attention. I am afraid both these key projects are languishing for lack of appreciation by the University and a lack of understanding on the part of the faculty that it is a joint effort at their level and not scheme to be left to contract personnel without any base in the research system in the University. You have had the benefit of collaborating with ICRISAT. Can you see the excellent coordination of the project with the top level and the involvement of all the disciplines in the operation research by the researchers of ICRISAT on farmers areas? Can you see the meticulousness with which their workers apply their knowledge and experience on the farmers, fields and get response? If you have, what prevents you of the faculty to translate the knowledge with you on a vast scale in research extension? Something appears to be lacking. You would not be discharging your franchise if you do not fill up the gaps quickly. Operational research applies to the whole field of comprehensive agriculture comprising animal husbandry, forestry, fisheries, horticulture and land use. We have yet to see operational research programmes in many of these sectors, Why? Dry farming is essentially a varying system of mixed farming getting the most out of the land through exploitation of any of the sectors of comprehensive agriculture relevant to the area. Area approach is necessary involving several disciplines in the University. Unless you can understand the basics of operational research and the need for cooperation and coordination amongst the disciplines and an actual field impact through the research workers themselves, the dry farming revolution needed in Karnataka will be a long way off.

There are two other important aspects of agriculture which I thought I should mention at this august assembly. The vast irrigation projects in Karnataka are expected to help the Vertisoles of North Karnataka. We are not getting

the returns from the vast investments in the projects like Ghataprabha, Malaprabha, and now Upper Krishna. Two dangers exist-water-logging and the cracking of the canal system in many parts of the researches during summer. The first problem is due to lack of the dry farming technology for moisture control on the land and over-irrigation of soils which need controlled and small irrigation as supplements to the rainfall. It also occurs because of the breakages of the canals, flooding areas vastly in excess of water requirements, and possible water control. The University in its agriculture engineering discipline can deal with land use and the land shaping. They, with the help of the irrigation engineers, can similarly tackle the problem of stabilising the canal system so that it does not crack in summer. The problem needs urgent handling.

The other problem is that of microbiology. Fertilizer application is necessary for agricultural growth. At the same time, the National Commission on Agriculture has pointed out that more than half the nitrogen fixed on the fields of India and absorbed by the crops is a gift of nature. This process of nitrogen fixing in nature and made available to the plant growth needs probe by many disciplines in the University. Particularly, the development of symbiotic nitrogen fixing bacteria of quality and phospho and azoto bacteria and now the new and vastly interesting field of quasi-symbiotic bacteria which seem to fix nitrogen in cereals need your attention. I am quite sure, quite an amount of probing is being done in our Agricultural Universities in this respect. Yet, I notice a lack of coordination and a thrust to get results within a time frame. In the interest of the dry farmers of Karnataka it is important that this sector of increasing nitrogen fixing in nature to be examined by you as a priority subject.

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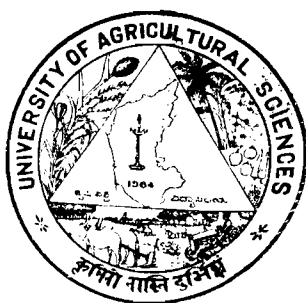
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# **ANNUAL REPORT**

**1984 - 85**

**THE UNIVERSITY OF AGRICULTURAL SCIENCES**  
HEBBAL, BANGALORE-560 024

**TWENTYFIRST ANNUAL REPORT**  
**OR THE PERIOD FROM 1st APRIL 1984 TO 31st MARCH 1985**



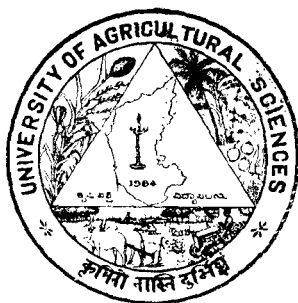
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**TWENTYFIRST ANNUAL REPORT**  
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## FOREWORD

This report, pertaining to the year 1984-85, highlights the achievements of the University in the areas of teaching, research, extension education and development. Dr. N. G. Perur, as Vice-Chancellor, provided leadership during that phase of development of the University.

The Board of Regents took many valuable decisions during this year, which have a bearing on the all round development of the University. Some such important decisions were :

- Sanction of Maintenance Allowance of Rs. 300 per month per student during village stay practicals, for final year Agriculture students, including Diploma students in Agricultural Engineering.
- To subsidise the food charges in respect of Scheduled Caste and Scheduled Tribe students staying in the University Hostels.
- To establish two more divisions – Division of Agricultural Economics and Rural Sociology ; and a Division of Agricultural Extension Education.
- To purchase computer from USA at a cost of about Rs. 18.5 lakhs.

During the year under report, 1064 students were admitted, and a total of 501 undergraduate and 273 postgraduate students were awarded their respective degrees. Forty five candidates were also awarded Gold Medals and prizes during the Annual Convocation. A number of National Seminars/ Symposia/Workshops and Guest lectures were organised by various departments of the University as a step towards improving the academic standards of the staff and the students. As a part of the expansion programme, the Agricultural College at Raichur and Veterinary College at Bidar were started and 30 students were admitted at each college. During the year 4,085 publications were added to the Library.

Students Counselling has been an important activity in helping the students to help themselves, in which 300 teachers served as counsellors. State level essay writing and Inter-collegiate debating competitions were organised, in which UAS students bagged a good number of prizes. Our teams performed creditably in the South Zone as well as in the All-India Inter-University Tournaments. The University Employment Information and Guidance Bureau was established to help those who seek employment in



(iv)

various fields. Earn While You Learn scheme was continued for the benefit of the undergraduate students.

The research work was carried out through 39 All-India Coordinated Research Projects, 30 ICAR Ad-hoc Research Projects and 41 Research Projects funded by other institutions. Twelve crop varieties and one pomegranate variety were released during this period. During the period under report, a new Research Station was started near Tiptur, where about 1547 acres of Amrutmahal Kaval land was made available to the University by the Department of Animal Husbandry.

The University organised 393 training sessions involving 6626 farmers, through its Extension Education Units. In addition 7463 farmers were trained through Farmers' Training Centre and KVK respectively. A total of 2887 families have been helped under the Lab-to-land programme. The University covered 47 villages under Village Adoption Programme and organised 121 Whole Farm Demonstrations as well as 69 National Demonstrations. Thirty four training programmes were organised for the benefit of extension workers of the Development Departments in addition to organising Training-cum-Workshops for the staff of Department of Agriculture, under the T and V System.

The University continued to publish Mysore Journal of Agricultural Sciences, Current Research and Krishi Vignana. One Technical Series, One Miscellaneous Series and eight Kannada text books were also published.

Sustained progress was made in the construction of buildings for the College of Agriculture at GKVK, UG Hostels, Laboratories and Staff Quarters at various campuses of the University. Hon'ble Sri Ashok Nath Banerji, Chancellor of the University of Agricultural Sciences, inaugurated a new Auditorium at Dharwad campus.

The non-lapsable lump sum Block Grants payable by the Government during the year was Rs. 540 lakhs. A sum of Rs. 239 lakhs was released as Development Grants by the State Government.

We hope that the State Government, ICAR and other agencies will enhance their support for the all round progress of the University

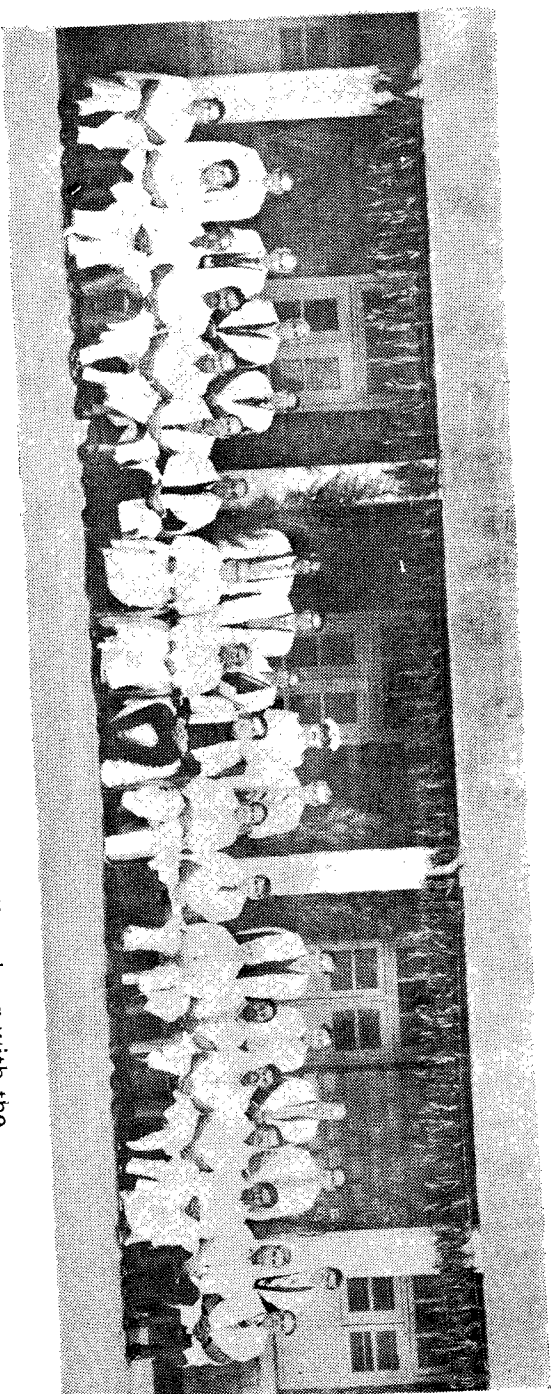
S. V. PATIL  
*Vice-Chancellor*

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## NINETEENTH CONVOCAATION



The Chancellor, Chief Guest and Vice-Chancellor along with the  
members of Board of Regents and Academic Council



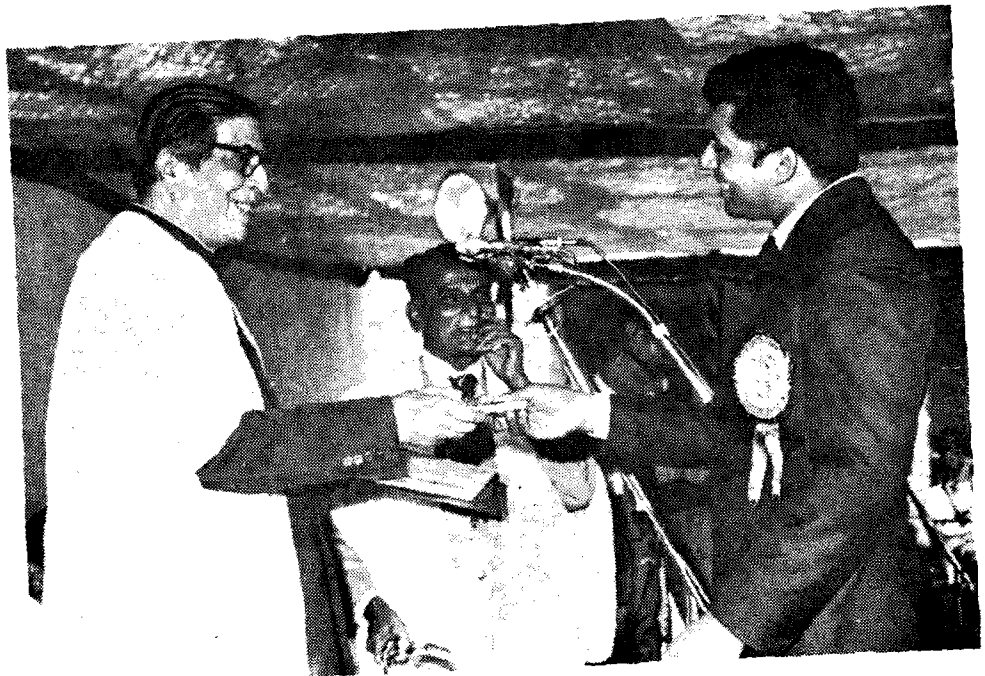
Sri C. Subramaniam, Chief Guest, delivering the Convocation Address



A view of graduates at the Convocation



The Chancellor administering the oath to the graduating students



The Chancellor, Sri Ashoknath Banerji, distributing the certificates



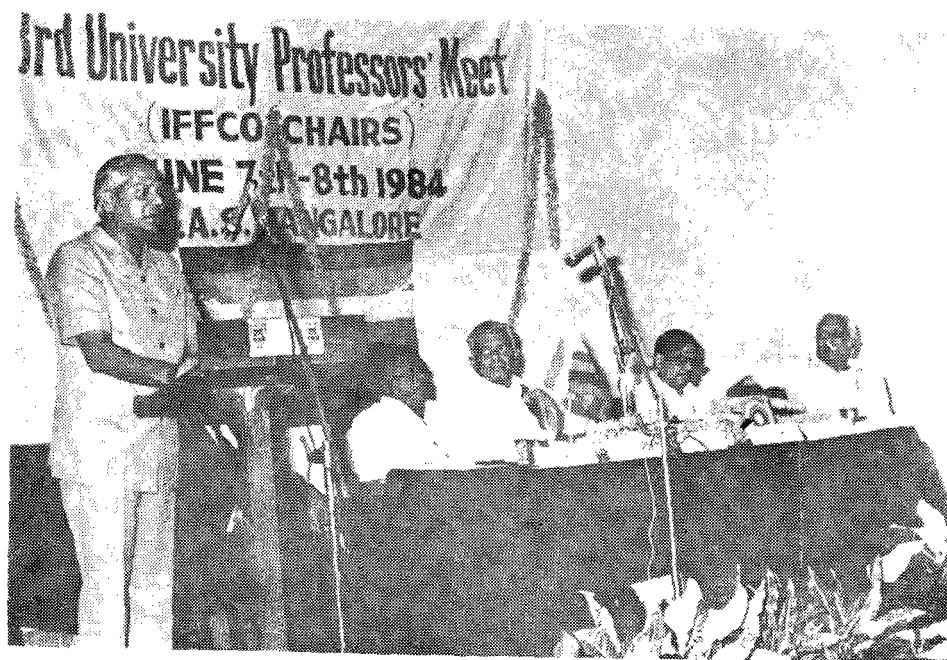
Dr. M. S. Randhawa, Deputy Director General, ICAR inaugurating the Workshop



Sri B. L. Gowda, Hon'ble Minister for Agriculture, laying the foundation stone for Rajagopal Bhavan

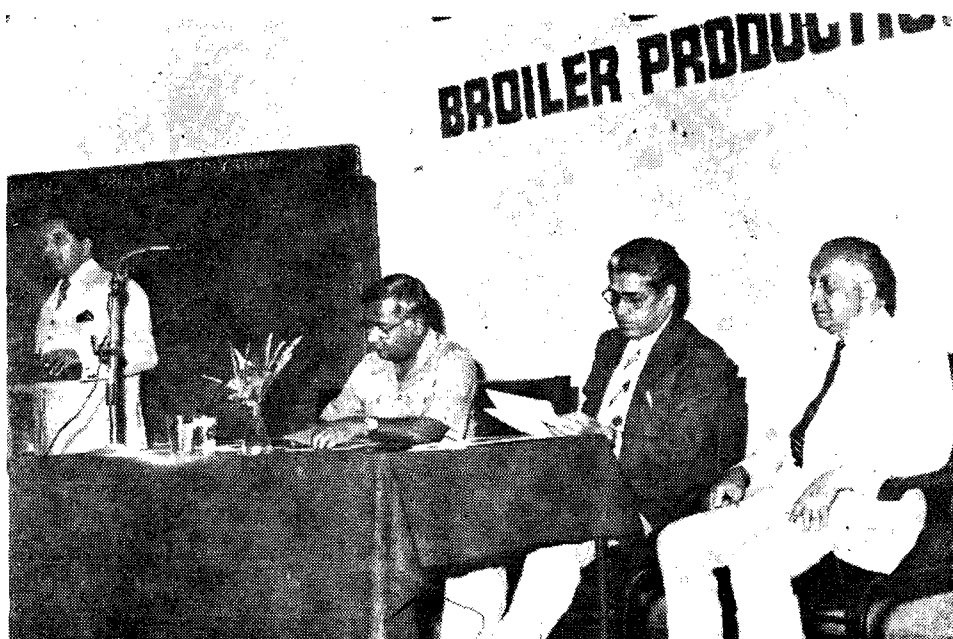


Sri Abdul Nazir Sab, Hon'ble Minister for Rural Development and Panchayat Raj, inaugurating the training programme

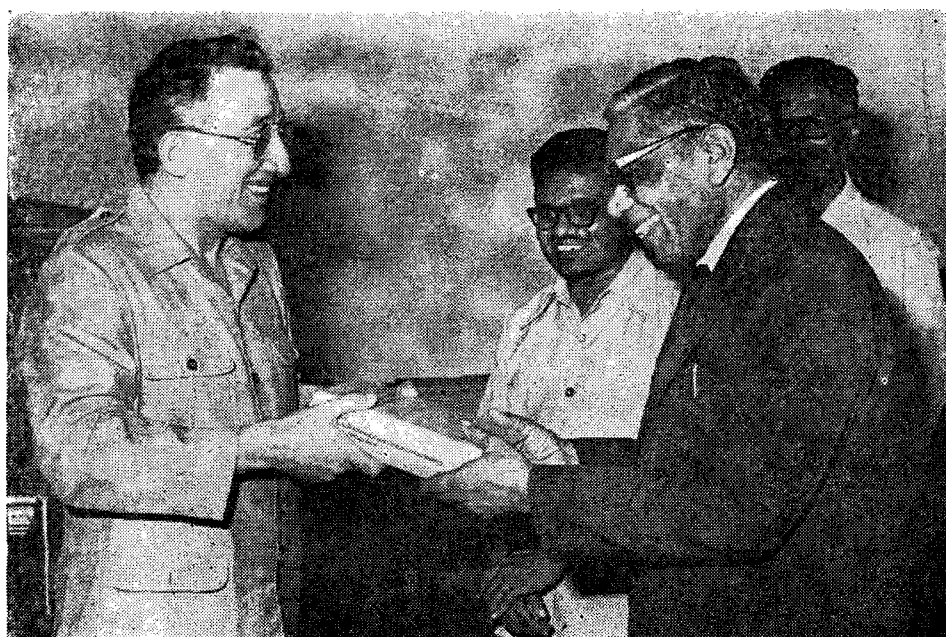


The Hon'ble Ministers for Agriculture and Cooperation at the IFFCO Professors Meet





The Director of Animal Husbandry and the Director of Research  
at the Inaugural Session of the Seminar on Broiler Production



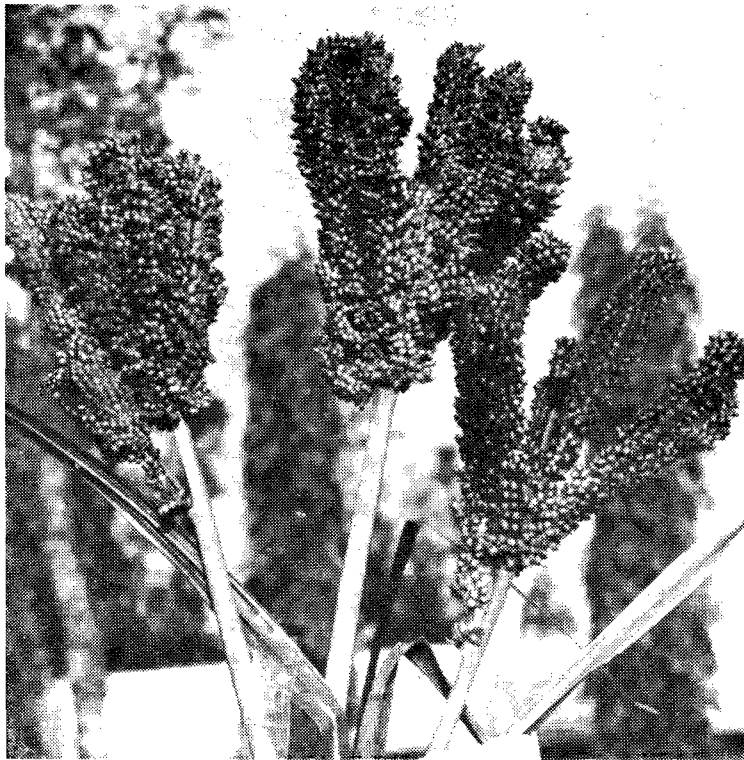
Presenting of books to the UAS Library by Consulate General of  
Federal Republic of Germany, Madras



John C. Gordon, Dean of Yale University Planting a Sampling  
at Hebbal Campus



KMP-39 (Karuna) Paddy



Indaf-9 Ragi



UAS Students holding the trophy with joy

## **PART I**

### **UNIVERSITY ADMINISTRATION**

#### **A. General**

##### **(i) BOARD OF REGENTS**

###### ***Chairman***

Dr. N. G. Perur, Vice-Chancellor

###### ***Members***

1. Secretary to Government, Finance Department
2. Secretary to Government, Agriculture and Horticulture Department
3. Secretary to Government, Education Department
4. Director of Agriculture in Karnataka
5. Director of Animal Husbandry and Veterinary Services in Karnataka
6. Director of Horticulture in Karnataka
7. Director of Fisheries in Karnataka
8. Mr. H. Viswanath
9. Mr. R. V. Halapanavar
10. Dr. K. C. Naik
11. Mr. R. K. Solapurkar
12. Mr. Mune Gowda
13. Mr. D. G. Basavana Gowda (upto 2-1-85)
14. Mr. Lakshminarasimhaiah (upto 2-1-85)
15. Smt. K. S. Nagarathnamma (upto 2-1-85)
16. Mr. B. V. Karigowda
17. Mr. T. V. Parthasarathy
18. Mr. H. B. Chaluvaiah
19. Mr. Inayathulla Rehaman Siddique
20. Mr. Ningappa Siddappa Khed

## (ii) OFFICERS OF THE UNIVERSITY

**Chancellor**

Mr. A. N. Banerji, His Excellency the Governor of Karnataka

**Pro-Chancellor**

Mr. B. L. Gowda, Hon'ble Minister for Agriculture, Government of Karnataka (upto 6-1-85)

Mr. M. P. Prakash, Hon'ble Minister of State for Agriculture, Government of Karnataka (from 15-3-85)

**Vice-Chancellor**

Dr. N. G. Perur

**Dean**

Dr. R. Narayana, I/c (upto 3-9-84)

Dr. K. A. Jalihal, I/c (from 18-10-84)

**Other Officers**

Director of Instruction (PGS), Dharwad	.... Dr. R. B. Patil
Director of Instruction (Agri), Hebbal	.... Dr. K. S. Krishna Sastry (upto 23-4-84) .... Dr. R. Ramanna, I/c (from 23-4-84)
Director of Instruction (Agri), Dharwad	.... Dr. R. K. Hegde, I/c
Director of Instruction (Vety), Hebbal	.... Mr. K. Trivikrama Rao (upto 31-3-84) .... Dr. A. V. Rai, I/c (from 1-9-84)
Director of Instruction (Fisheries), Mangalore	.... Mr. H. P. C. Shetty
Director of Instruction (BSH)	.... Dr. R. Narayana (upto 3-9-84) .... Dr. Sundararaj, I/c (from 4-9-84)
Director of Instruction (H.Sc.), Dharwad	.... Dr. (Mrs) Leela Phadnis
Director of Extension	.... Dr. K. A. Jalihal
Director of Research	.... Dr. K. Krishnamurthy
Registrar	.... Mr. R. Krishnappa
Estate Officer	... Mr. B. Venkataswamy

Librarian	.... Dr. R. Narayana, I/c (upto 3-9-84) .... Mr. D. Venkatesh, I/c (from 4-9-84)
Director of Student Welfare	.... Mr. K. Subbaiah (upto 31-1-85) .... Dr. P. G. Chengappa, I/c (from 1-2-85)
Comptroller	.... Mr. H. M. Nagabhushana
Administrative Officer	.... B. M. Venkatachala Raju, I/c

### (iii) HEADS OF DEPARTMENTS

#### **Basic Sciences and Humanities**

1. Biochemistry	.... Dr. T. K. Virupaksha Professor (GKVK)
2. Statistics	.... Dr. N. Sundararaj Professor (GKVK)
3. Economics	.... Dr. S. Bisaliah Professor (GKVK)

#### **Agriculture**

1. Agricultural Botany	.... Dr. J. V. Goud Professor (Dharwad)
2. Agricultural Chemistry and Soils	.... Dr. P. B. Deshpande Professor (Hebbal)
3. Agricultural Economics	.... Dr. R. Ramanna Professor (GKVK)
4. Agricultural Engineering	.... Dr. N. L. Maurya Principal (Raichur)
5. Agricultural Entomology	.... Dr. T. S. Thontadarya Professor (Hebbal)
6. Agricultural Extension	.... Dr. M. K. Sethu Rao Professor (Dharwad)
7. Agricultural Microbiology	.... Dr. T. K. Ramachandra Reddy Professor (Dharwad)
8. Agronomy	.... Dr. G. V. Havanagi Professor (Hebbal)
9. Crop Physiology	.... Dr. Y. C. Panchal Professor (Dharwad)

- |   |  |
|---|--|
| 10. Horticulture                              | .... Dr. U. V. Sulladmath<br>Professor (GKVK)  |
| 11. Plant Pathology                           | .... Dr. R. K. Hegde<br>Professor (Dharwad)    |
| 12. Seed Technology                           | .... Dr. G. N. Kulkarni<br>Professor (Dharwad) |
| 13. Agricultural Marketing<br>and Cooperation | .... Dr. P. G. Chengappa<br>Professor (Hebbal) |

#### **Veterinary**

- |                                 |   |
|---------------------------------|---|
| 1. Animal Genetics and Breeding | ... Dr. A. V. Rai<br>Professor (Hebbal)                                 |
| 2. Gynaecology and Obstetrics   | ... Dr. R. V. Patil<br>Professor (Hebbal)                               |
| 3. Poultry Science              | ... Dr. B. S. Ramappa<br>Professor and Geneticist<br>(Poultry), Hebbal  |
| 4. Surgery                      | .... Dr. P. H. Thippaiah Reddy<br>Professor (Hebbal)<br>(upto 31-10-84) |
| 5. Veterinary Anatomy           | .... Dr. Abdus Salam<br>Professor (Hebbal)                              |
| 6. Veterinary Pharmacology      | ... Dr. Honne Gowda<br>Professor (Hebbal)                               |
| 7. Veterinary Physiology        | ... Dr. K. Thimmaiah<br>Professor (Hebbal)                              |
| 8. Animal Nutrition             | ... Dr. T. K. Das<br>Professor (Hebbal)                                 |
| 9. Veterinary Parasitology      | ... Dr. S. Abdul Rahman<br>Professor (Hebbal)                           |
| 10. Veterinary Microbiology     | .... Dr. R. Raghavan<br>Professor I/c (Hebbal)                          |

#### **Fisheries**

- |                               |   |
|-------------------------------|---|
| 1. Aquaculture                | .... Dr. T. J. Verghese<br>Professor (Mangalore)    |
| 2. Fish Processing Technology | .... Dr. T. M. Rudra Setty<br>Professor (Mangalore) |

- |                         |   |
|-------------------------|---|
| 3. Fishery Engineering  | .... Mr. P. K. Salian<br>Professor (Mangalore)    |
| 4. Fishery Biology      | ... Dr. S. L. Shanbhogue<br>Professor (Mangalore) |
| 5. Fishery Oceanography | ... Dr. M. P. M. Reddy<br>Professor (Mangalore)   |

**Home Science**

- |                   |   |
|-------------------|---|
| 1. Home Economics | ... Dr. (Mrs) M. P. Vaidehi<br>Associate Professor (Hebbal) |
|-------------------|---|



## **B. General Administration**

### **(i) Activities of the Vice-Chancellor**

Dr. N. G. Perur, continued as Vice-Chancellor of the University of Agricultural Sciences, during the year. The major and important activities in which the Vice-Chancellor participated were as follows :

Attended a meeting with the Managing Director, KDDC and other Officers of the UAS to discuss the UAS/KDDC Animal Health Coverage Project on 3-4-1984.

Chief Guest at the Nepalese New Year's Day celebrations organised at the State Youth Centre, Bangalore on 13-4-1984.

Participated at the Inaugural function of the All India Sugarcane Growers' and Producers' Conference 1983 held at Belgaum and organised by the Karnataka Pradesh Krishik Samaj and District Krishik Samaj, Belgaum on 21-4-1984.

Chaired the Marketing Session of the All India Sugarcane Growers' and Producers' Conference 1983 held at Belgaum on 22-4-1984.

Attended the Selection Committee meeting at the Tamil Nadu Agricultural University, Coimbatore on 29-4-1984.

Presided over a function organised by the Central Warehouse Corporation at the UAS Hebbal Campus, Bangalore on 30-4-1984.

Attended the Research Programme Council meeting of the Potash Research Institute of India at New Delhi on 1-5-1984.

Inaugurated the All India Coordinated Sorghum Workshop at Dharwad on 3-5-1984.

Participated in G.V.K. Rao's Committee meeting with regard to starting of a Forestry College in Karnataka, held at Bangalore on 7-5-1984.

Attended the Project Funding Committee meeting of the Indian Council of Agricultural Research at New Delhi on 8-5-1984.

Presided over the Advisory Committee meeting of the INCAR-UNDP Centre for Advanced Studies in Tropical Horticulture, held at Bangalore on 10-5-1984.

Performed the 'Guddalipooja' for the Laboratory and Administrative Buildings at the Agricultural Research Station, Gulbarga on 13-5-1984.

Attended the meeting of G. V. K. Rao's Committee with regard to starting of a new Forestry College in Karnataka, held at Bangalore on 14-5-1984.

Attended the Research Advisory Committee meeting of the Central Food Technological Research Institute at Mysore on 23-5-1984 and 24-5-1984.

Attended a meeting at the chambers of the Chief Secretary, Vidhana Soudha, Bangalore, regarding starting of a Degree Programme in Agricultural Engineering, on 26-5-1984.

Delivered Key-Note Address at the National Symposium on "Factors Affecting Efficient Protein Synthesis and Utilisation in Plants and Animal Systems using Nuclear and Allied Techniques" at the Tamil Nadu Agricultural University, Coimbatore on 5-6-1984.

Participated in the Group Discussion meeting on Oil Palm Cultivation held at Agricultural College, Dharwad on 13-6-1984.

Attended the Regional Committee meeting No. 8 of the Indian Council of Agricultural Research, held at Tamil Nadu Agricultural University, Coimbatore on 9-7-1984 and 10-7-1984.

Participated in the one-day Seminar on Dryland Agriculture organised by the State Bank of Mysore, Bangalore on 12-7-1984.

Delivered the Valedictory Address at the function of the out-going batch of M.Sc. (Food Technology) students at the Central Food Technological Research Institute, Mysore on 12-7-1984.

Inaugurated the "Earn While You Learn Scheme" organised by the UAS Employment Information and Guidance Bureau, at GKVK Campus, Bangalore on 16-7-1984.

Attended the Selection Committee meeting of the Agricultural Research Scientists Board, ICAR held at New Delhi on 1-8-1984.

Inaugurated the Regional Training Programme for the Subject Matter Specialists of the National Demonstration Scheme of the Southern Region, held at Bangalore on 7-8-1984.

Delivered the Welcome Speech at the Inaugural function of the Training Programme for Executives of Rural Development, organised by the Centre for Rural Development Studies of the UAS, Bangalore and the Federation of the Indian Chambers of Commerce and Industry (FICCI), New Delhi at Bangalore on 8-8-1984.

Addressed the Independence Day Gathering at the Foot Ball Ground, Agricultural College, Hebbal, Bangalore on 15-8-1984.

Participated at the function to inaugurate the "Mangala Raitha Bhavan" at Hebbal Campus, Bangalore on 15-8-1984.

Presided over the Seminar on "Inland Fisheries" jointly organised by the Institution of Agricultural Technologists; Karnataka State Department of Fisheries; Indian Council of Agricultural Research; and the University of Agricultural Sciences, Bangalore, held at Bangalore on 18-8-1984.

Participated in the Annual Social Gathering of the Students' Association of Agricultural College, Hebbal, Bangalore on 29-8-1984.

Chief Guest at the Closing Session of the Training Programme for Management Trainees, held at Agricultural College, Hebbal on 1-9-1984.

Participated in the function of the Agricultural College Alumni Association, Hebbal, Bangalore on 3-9-1984.

Presented a paper at the Symposium on Agricultural Production and Industries, organised by the Indian Institute of Socio-Economic Studies, Bangalore on 8-9-1984.

Participated in the Project Funding Committee meeting of the Indian Council of Agricultural Research, held at New Delhi on 14-9-1984.

Chief Guest at the function organised by the Agricultural Marketing and Cooperation students of the UAS held at Hotel Kanishka, Bangalore on 21-9-1984.

Inaugurated the III International Training Programme on Biological Control of Pests, organised by the Commonwealth Institute of Biological Control, Bangalore, on 8-10-1984.

Inaugurated the function organised by the Compound Livestock Feed Manufacturers' Association at Bangalore on 10-10-1984.

Presided over "Kannada Vignana Vagmaya Vichara Sankirana"—a State Level Seminar organised by the Kannada Sahithya Parishat, Bangalore on 13-10-1984.

Presided over the valedictory function of the All India Conference of Ayurvedic Pharmaceuticals, sponsored by the Department of Postgraduate Studies of the Government College of Indian Medicine, Bangalore on 14-10-1984.

Inaugurated the State Conference of Akhila Bharatha Vidyarthi Parishad at Bangalore on 19-10-1984.

Presided over the valedictory function of the Training Programme on Ragi Production Technology, held at Regional Research Station, Mandya on 20-10-1984.

Attended the meeting with the Development Commissioner, Government of Karnataka, Bangalore, regarding VII Plan proposals on 26-10-1984.

Attended the meeting with Prof. S. Hamid, Vice-Chancellor, Aligarh Muslim University, Lucknow, regarding UGC Pay scales, held at Bangalore University Campus, Bangalore on 28-10-1984.

Participated in the function regarding handing over of lands at the Bidaranmanagudi Kaval, Tumkur District, to the UAS on 24-11-1984.

Participated in the inaugural function of the seminar on "Krishi Parisaradalli Rasayanika Adyagalu" organised by the Bangalore Chapter of the Indian Society of Soil Science at the Agricultural College, Hebbal, Bangalore on 27-11-1984.

Presided over the Human Rights Day function held at UAS, GKVK Campus on 10-12-1984.

Attended a meeting regarding Rainfall Analysis at the Chambers of the Development Commissioner, Government of Karnataka, Bangalore on 12-12-1984.

Participated in the function relating to Inauguration of the New Auditorium at the Agricultural College, Dharwad, and starting of new Ph.D. degree Programme in Foods and Nutrition at the Rural Home Science College, Dharwad on 17-12-1984.

Held discussions with the Planning Commission officials and ICAR officers regarding VII Plan proposals on 29-12-1984 to 31-12-1984.

Chief Guest at the Vivekananda Jayanthi Celebrations held at Agricultural College, Hebbal on 3-1-1985.

Held discussions with Dr. William R. Bentley, Programme Advisor, the Ford Foundation, New Delhi, and others with regard to Agro-Forestry Programme in the University on 4-1-1985.

Presided over the Annual General Body Meeting of the UAS Employees Consumers Cooperative Society, Bangalore on 23-1-1985.

Chief Guest at the Flag Hoisting function at the Republic Day Celebrations of the UAS on 26-1-1985.

Attended a meeting of Review of Externally Aided Project in Karnataka, under the Chairmanship of the Chief Secretary, Government of Karnataka, Bangalore on 30-1-1985.

Presided over the Annual Day function of the UAS Employees' Association, Bangalore on 31-1-1985.

Participated in the Inaugural Session of the Training Programme on "Location Specific..." organised by the Director of Agriculture, Bangalore and the UAS on 4-2-1985.

Presided over the National Workshop on "Monitoring and Evaluation of T & V System" held at the Conference Hall, Vidhana Soudha, Bangalore on 7-2-1985.

Chief Guest at the College Day Celebrations of Maharani Lakshmi Ammanni College for Women, Bangalore on 21-2-1985.

Presided over the Seminar on "Economics of Sericulture in Karnataka" organised at the Institute for Social and Economic Change, Bangalore on 22-2-1985.

Participated in the Golden Jubilee Celebration of the Regional Research Station, Raichur on 23-2-1985.

Presided over the "CADA Day" Celebration held at Bheemarayanagudi on 24-2-1985.

Inaugurated the Regional Workshop on the formal Pre-School Education organised by the National Institute of Public Cooperation, and Child Development, Bangalore on 6-3-1985.

Attended a Group Meeting of Scientists at the Indian Institute of Horticultural Research, Hesaraghatta, Bangalore on 7-3-1985.

Inaugurated the Training Programme on Irrigation Management at Regional Research Station, Mandya on 12-3-1985.

Attended the NARP Project Funding Committee meeting of the Indian Council of Agricultural Research at New Delhi on 14-3-1985.

Attended the ICAR Society meeting at Vignan Bhavan, New Delhi on 23-3-1985.

Delivered the Welcome Address at the Nineteenth Convocation of the UAS on 29-3-85.

Met the visiting Chinese Delegation, along with other officers of the UAS on 30-3-85.

Chief Guest at the closing session of the 18th Orientation Course of NSS Programme Officers of Mysore University, organised by the Indian Institute of Management, Bangalore at J. P. Narayana National Youth Training Centre, Bangalore on 31-3-85.

*Important visitors :* Dr. Lobo of the Indian Council for Social Sciences Research and three visiting Chinese Scientists on 19-5-1984.

Dr. Veerendrakumar, Marketing Officer, Indian Farmers Fertilisers Cooperatives Ltd., New Delhi on 19-5-1984.

Mr. Michael Brootala, Acting Representative of British Council, Madras on 11-7-1984.

Mr. Chin Saik Yoon, Regional Liaison Officer, International Development Research Centre (IDRC), Singapore on 24-7-1984.

Dr. I. C. Mahapatra of the World Bank, New Delhi on 31-8-1984.

Dr. T. C. Jain and Dr. R. Balasubramanian, Indian Council of Agricultural Research, New Delhi on 21-9-1984.

Canadian Youth Team on 22-9-1984.

Mr. Khandari, Wheat Associates, New Delhi on 25-9-1984.

Members of the U.P. Legislative Assembly on 5-10-1984.

Lt. Gen. S. L. Malhotra, Director General, NCC, New Delhi and Staff members of NDC Directorate, Karnataka on 18-10-1984.

Dr. K. B. Dickson, Vice-Chancellor, University of Cape Coast, Ghana on 6-11-1984.

Deans and Professors from Land Grant Colleges, USA on 22-11-1984.

Dr. William R. Bentley, Program Advisor, The Ford Foundation, New Delhi on 4-1-1985.

Dr. G. S. Randhawa, Retd. Director, Indian Institute of Horticultural Research, Bangalore on 23-1-1985.

Mr. J. P. Sharma, Administrator, Upper Krishna Project, Bheemarayanagudi on 23-1-1985.

Dr. Nambiar, Director, Central Plantation Crops Research Institute, Kasargod on 19-2-1985.

B. M. VENKATACHALA RAJU  
*Administrative Officer*

## **(ii) Meetings of the Authorities of the University**

### **(a) Board of Regents**

The Board of Regents held eight meetings during 1984-85. The following are some of the important decisions :

#### ***Amendments to Statutes of the University***

The Board approved the following amendment to Statute 30 (4) (a) and recommended the same to the Chancellor for approval :

“30 (4) (a) The Selection Committee for these posts shall be appointed by the Vice-Chancellor and shall be comprised of the following members :

- (i) Dean: In the absence of the Dean, one of the Directors to be included ;

- (ii) Director of Instruction concerned and/or Director of Research and/or Director of Extension ;
- (iii) One of the Professors in the University in the discipline concerned for posts below the rank of professors ;
- (iv) Two outside experts in the discipline concerned".

***Other important decisions of the Board***

1. The Board ratified the action taken by the Vice-Chancellor in permitting Mr. H. M. Nagabhushana, Comptroller, to participate in the University Administrators programme at USA under USEFI from 20-3-1984 to 6-5-1984 without any cost to the University by availing study leave.

2. The Board agreed to extend the period of deputation of Dr. Gururaj Hunsigi to the Mysore Paper Mills Ltd., Bhadravathi, for a further period of three years from 10-12-1984 on the same terms and conditions as stipulated earlier subject to the condition that he will not be sent back to the University during this period.

3. The Board ratified the action taken by the University in deputing Mr. K. Ramesh Melanta to undergo fellowship training in USA under FAO/UNDP training in Citriculture, for a period of three months from 1-4-1984 without any financial commitment on the part of the University except treating the period of absence in this regard including the to and fro journey period as on duty.

4. The Board ratified the action taken by the University in deputing Mr. A. G. Huddar to undergo fellowship training in Australia, in Post-Harvest Technology under FAO/UNDP training programme for a period of three months from 1-4-1984 without any financial commitment on the part of the University, except treating the period of absence in this regard including the to and fro journey period as on duty.

5. The Board approved the participation of Dr. R. B. Patil in the first meeting of the Advisory Panel on BNF to the FAO/UNDP programme held in the last week of July 1984 for a period of one week besides the period required for to and fro journey, without any cost to the University except treating the period of absence as on duty.

6. The Board ratified the action taken by the Vice-Chancellor in permitting Mr. N. R. Viswanath, Assistant Professor of Agricultural Microbiology to attend NIFTAL Azolla Workshop in Bangkok, Thailand, 22-1-1984 to



28-1-1984 with admissible to and fro journey period, without any cost to the University by availing leave at his credit.

7. The Board ratified the action taken by the University in permitting Mr. Mahadevappa, Professor of Seed Technology to visit various Seed Technology Institutes in U. K. from 25-1-1984 to 20-2-1984 with admissible to and fro journey period without any cost to the University by availing leave at his credit.

8. The Board agreed to extend the period of deputation of Dr. B. S. Keshava Murthy to the Institute of Animal Health and Biologicals, Hebbal for one more year from 7-1-1984 to 6-1-1985 on the same terms and conditions already agreed to by the University in this regard.

9. The Board ratified the action taken by the University in permitting Dr. K. G. Hanumantharaya Setty, to attend the first International Congress of Nematology, from 5-8-1984 to 10-8-1984 at Guelph, Ontario, Canada, without any financial commitment on the part of the University, but treating his absence in this connection, including the actual to and fro journey period as on leave at his credit.

10. The Board agreed for the continuation of Dr. A. N. Krishna Murthy as Managing Director of Bangalore Animal Food Corporation for one more year from 24-12-1983 to 23-12-1984 on the same terms and conditions already agreed by the University.

11. The Board agreed for deputing Mr. B. K. Guruprasad, Research Assistant to participate in the sixth International Biodeterioration Symposium at Washington from 5-8-1984 to 10-8-1984 besides to and fro journey period.

12. The Board approved the proposal to depute Dr. D. Joseph Bhagyaraj to attend the 6th North American Conference on Mycorrhizae at Oregon State University Corvallis, USA from 25-6-1984 to 29-6-1984 besides to and fro journey period.

13. The Board approved the proposal to extend the benefit of treating the slabs of DA at 400 points as additional basic pay for purposes of calculation of UPF with effect from 1-4-1982 in respect of teachers holding UGC pay scales and who have opted for UPF in the University.

14. The Board permitted Dr. M. R. Lakshminarayana, Instructor, to accept Post-Doctoral Fellowship at the University of Waterloo, Ontario, Canada, for a period of one year commencing from 11-4-1984 without any financial commitment on the part of the University but granting study leave for the period.

15. The Board approved the proposal to give effect to the sanction of advance increments to the Stenographers and Typists in the University in accordance with the G.O. No. FD 35 SRP 83 dated 1-1-1984 and G.O. No. FD 35 SRP 83 dated 24-4-1983 under the conditions stipulated in these orders.

16. The Board approved the proposal to add the following general provisions as paras (3) and (4) to the Cadre and Recruitment Regulations of Service Personnel, giving effect from 5-9-1981 the date on which these regulations were implemented in the University.

“(3) Every University Employee who has passed, who passes, who is deemed to have passed the Kannada Language examination prescribed in notification No. GAD 12 SSR 72 dated 8-1-1974 read with Rule 5 of the said Notification and the departmental examination prescribed as per these Regulations, if any, shall notwithstanding anything contained in the KCSR and without prejudice to the right to get the normal increments be entitled for one additional increment at the rate corresponding to his position in the time scale.

Provided that no University employee shall be allowed more than one increment under this provision during his entire service in the University.”

“(4) The employees who are appearing for the departmental examinations as prescribed for the post held by them in these Regulations are eligible for reimbursement of examination fees for the first two attempts for all obligatory examinations and for SAS examination, for first three attempts irrespective of whether he appears for the whole examination or particular part or parts, and payment of TA for attending the examinations as also to treat the period of absence to attend the examination as on duty in accordance with the Rules and Provisions as admissible to the Government employees from time to time as per provisions of KCSR”

16. The Board decided that hereafter no relaxation should be given in respect of educational qualifications, for purpose of employment in the University.

17. The Board nominated Mr. R. V. Halapanavar to serve on the State Library Authority for a period of three years.

18. The Board approved the proposal to spare the services of Dr. M. K. Badiger to Government of Afghanistan for a period of 2 years without any

financial commitment on the part of the University, on the terms and conditions indicated therein.

19. The Board approved the proposal to permit Dr. G. K. Veeresh, Senior Professor, UNDP, Agricultural College, Hebbal and Dr. K. A. Kulkarni, Associate Professor of Entomology, Agricultural College, Dharwad, to participate in the Workshop on Sorghum Insect Pests to be held at Texas, A and M University, College Station, from 23-7-1984 to 27-7-1984 without any financial commitment on the part of the University and to treat the period of their absence including to and fro journey period as on duty.

20. The Board approved the proposal to permit Mr. Siddappa to attend the 8th International course on Seed Technology for Vegetable Crops to be held from 14-8-1984 to 31-10-1984 at the University of Philippines, Los Banos, without any financial commitment to the University by sanctioning leave at his credit for the above period including journey period.

21. The Board ratified the action taken by the University in granting extension of consultancy period to Dr. G. Shivashankar, up to 15-6-1984 under the terms and conditions already agreed by the University.

22. The Board, on the recommendations of the Academic Council, approved the terms and conditions for sanction of study leave/deputation of teachers for higher studies.

23. The Board approved the following addition to the existing Regulations under Cadre and Recruitment Regulations of Service Personnel in respect of Senior Assistants (Stores) giving effect from 1-10-1981, the date on which the existing Regulations were published in the Gazette.  
Add the following under Col. 5 of the Regulations after the words "with additional allowance."

"as per Government Orders No. FD 80 SRP 79 dated 20-5-1980 and No. FD 25 SRP 82 (III) dated 29-3-1982 and as amended by Government from time to time."

24. The Board decided that the General Note given in the advertisement in respect of the posts of various officers of UAS mentioning that "qualifications may be relaxed in case of candidates otherwise well qualified and available for the post" should be immediately withdrawn and a Press Note may be given that no relaxation will be given either in respect of educational qualifications or experience for all the posts mentioned in the Advertisement.

25. The Board approved the establishment of an Extension Education Unit at the Regional Research Station, Bijapur, with the staff indicated in the item, subject to the condition that the actual implementation of this project will be in a phased manner depending upon the availability of resources.

26. The Board approved the proposal to depute Dr. K. Krishnappa, Assistant Professor of Plant Pathology to act as Co-Chairman of a session on Applied Biology and also to present his scientific papers at the First International Congress on Nematology held at Guelph, ONT, Canada from 5-8-1984 to 10-8-1984, treating the period of his participation in the conference as also to and fro journey time as on duty, and meeting 50 per cent of the International Travel Cost *plus* other charges like DA, Registration fee and incidentals etc., permissible under the scheme, the total of University contribution not exceeding Rs. 12,000 the remaining 50 per cent of the International Travel Cost being met by the ICAR.

27. The Board ratified the action taken to depute Shri T. Rudrappa, Assistant Professor of Chemistry, to attend the Second International Humic Substances Society Conference at Birmingham from 22-7-1984 to 27-7-1984 treating the period of his participation in the Conference and to and fro journey period as on duty, and meeting 50 per cent of the International Travel Cost *plus* other charges like DA, Registration fee and incidentals etc., the total University contribution not exceeding Rs. 12,000 the remaining 50 per cent of the International Travel Cost being met by himself.

28. The Board ratified the action taken by the University in deputing Dr. N. Vijayakumar, Horticulturist, to undergo Fellowship Training at USA for a period of three months from 30-8-1984 without any financial commitment on the part of the University except treating the period of absence in this regard, including to and fro journey period, as on duty.

29. The Board agreed to pay the final year undergraduate students including Diploma in Agricultural Engineering listed in the item, a MAINTENANCE ALLOWANCE at the rate of Rs. 300 per month per student for the duration indicated against each of the courses from the academic year 1983-84 onwards.

It is further decided that when this scheme of paying maintenance allowance is sanctioned to the students, all expenses on transport, stay and food will have to be met by the students themselves.

In the meanwhile, it was suggested that the University may approach different governmental and other organizations involved in this training programme for providing financial support towards payment of these allowances.

30. The Board decided to acquire the SPCA building at Hebbal Campus at cost, viz., Rs. 3,08,400 from SPCA.

31. The Board agreed to release the balance amount of Rs. 75,000 from out of the University contribution towards 'D. Rajagopal Bhavan' meeting it from out of the 1984-85 budget provision for works, pending receipt of Rs. 2 lakhs from the UAS Employees' Association or the State Government.

32. The Board approved the proposal for enhancing Caution Money Deposit for first year undergraduate students with effect from 1984-85.

33. The Board approved the proposal to spare the services of Mr. B. V. Narahari Rao, Assistant Professor of Economics, BS & H College, GKVK, to the Planning Department, Government of Karnataka on deputation basis for a period of one year at the first instance from the date of his relief in the UAS on the terms and conditions indicated therein.

34. The Board ratified the action taken by the University in deputing Dr. V. C. Patil, to U.K. to accept the Commonwealth Academic Staff Fellowship from 1-10-1984 to 31-7-1985 as per the terms and conditions indicated therein.

35. The Board ratified the action taken by the University in permitting Mr. B. G. Muthappa Rai to undergo the Fellowship Training in Landscape Gardening at Cornell University, Ithaca, New York in USA, for a period of three months from 29-8-1984 under FAO/UNDP Fellowship Training Programme without any financial commitment on the part the University, but treating the period of his absence in this regard including to and fro journey period as on duty.

36. The Board ratified the action taken in deputing Mr. K. Maharudrappa, Assistant Agronomist, AICARP, ARS, Honnaville, to undergo training in rice production programme at IRRI, Manila from 23-7-1984 to 14-12-1984 by treating his training period as on duty including his to and fro journey period from Shimoga to New Delhi and back from 18-7-1984 to 23-7-1984 and from 15-12-1984 to 17-12-1984.

37. The Board ratified the action taken by the University in permitting Dr. J. Raj, Microbiologist, to accept the Reciprocal Fellowship in Agricultural Microbiology, offered by Netherland Government for the year 1983-84 at the Agricultural University, Wageningen, Netherlands, for a period of 10 months from the date of his relief without any financial commitment on the part of the University except sanctioning of study leave.

38. The Board ratified the action taken by the University in permitting Dr. P. Vittal Rai, Professor of Agricultural Microbiology, to attend the Annual

Workshop on the use of Nuclear Techniques in improving Pasture Management at International Center, Vienna, Austria, from 26-11-1984 to 30-11-1984 without any cost to the University, treating his absence including actual to and fro journey period as leave at his credit.

39. The Board decided to grant three years time to the Stenographers in the University for passing the departmental examinations for time bound advancement benefit from the date of issue of the time bound advancement orders.

40. The Board decided that Dr. K. Krishnamurthy may attend the First Tropical Weed Science Conference in Thailand, on his own without any financial commitment to the University.

41. The Board approved the proposal for cross checking of the entry of grades and scrutiny of results by senior teachers of the University with effect from the academic year 1983-84.

42. The Board approved the change of period of training programme of Mr. A. G. Huddar from 6-4-1984 to 5-7-1984 besides availment of the to and fro journey period from 2-4-1984 to 5-4-1984 and 6-7-1984 to 9-7-1984 respectively.

43. The Board approved the proposal to sanction study leave to Mr. A. Manjunath, Assistant Microbiologist, GKVK, for a period of four years with effect from 10-8-1984 to 9-8-1988, availing the leave as indicated in the proposal to enable him to accept the East-West Centre scholarship to prosecute higher studies leading to Ph.D. programme.

44. The Board as a special case, agreed to maintain lien of Dr. R. Narayana from 4-9-1984 to 15-5-1985 against the post of Director of Instruction (BSH) without any financial involvement to UAS and allow him to accept the Mellon Visiting Lecturership in Tropical Resources at the Yale University, USA, on the terms and conditions indicated therein.

The Board further decided that in future, any person of the rank of Head of the Department and above going abroad under any project for more than one month, should be allowed to do so only after obtaining the approval of the Board. In such of the cases where the panel of names will have to be sent either to the Government of India or any of the other selecting agencies involving persons of the rank of Heads of Departments and above, and the University not knowing as to which of them will be finally selected, the University immediately after sending the panel of such names to the concerned agencies, may place before the Board the panel already sent to the selecting agency and get its approval for the entire panel with the stipulation that the person/s ultimately selected from out of the panel by the selecting agency will be deputed.

45. The Board approved the proposal to revise the scales of pay of Deputy Librarian and the Assistant Librarian/Documentation Officer in the UAS to their original positions namely, Rs. 1200-50-1300-60-1900 and Rs. 700-40-1100-50-1600 respectively, if they are duly qualified to hold those posts as per UGC norms vide Government Order No. ED 143 MUM 81 dated 13-6-1983, with the stipulation that the monetary benefit will be given only from 1-4-1982 as per G.O. No. ED 136 UNI 82 dated 21-4-1983.

46. The Board, upon the recommendations of the Finance Committee, approved the proposal to subsidise the food charges in respect of SC and ST students staying in the University hostels, to a maximum extent of Rs. 60 per student, per month, at the rate of Rs. 2 per day, from the year 1983-84 and onwards, and also not to collect the room rent in the University hostels from such students, providing separate Head in the budget for this purpose.

47. The Board, on the recommendations of the Finance Committee, as well as the Academic Council, approved the proposal to award gold medals to the first two ranks from among the diploma holders in Agricultural Engineering every year as per the conditions stipulated in the proposal. The minimum CGPA for the eligibility for the award of Gold Medals shall be the same as prescribed in the case of undergraduate degree programmes.

48. The Board, while thanking the State Government for releasing the land required for establishing an Animal Research Station, approved the proposal for establishment of an Animal Research Station at Bidarammanagudi in Tumkur District. It also approved the proposal to make available a sum of Rs. one lakh in the revised budget of the University for 1984-85 for the establishment of this research station.

49. The Board approved the proposal to transfer 2 acres of land to the Karnataka Seed Corporation and 1 acre and 20 guntas of land to the Karnataka Agro Industries Corporation leaving the remaining 2 guntas for the University use, in plot No. 1, at RRS, Raichur. The draft terms of agreement was also approved.

The Board further decided that the Agro Industries Corporation may be requested to transfer the piece of land with the structures currently in its possession at RRS, Raichur, to the University at the same time.

50. The Board decided that the procedure for preparing the panels by the various Selection Committees should be in conformity with the latest Government Orders in this regard.

51. The Board felt that whenever a specific degree, diploma of certificate is prescribed as one of the qualifications for a post, it is desirable to indicate either an alternate qualification or mention "or its equivalent".

52. The Board decided that before the local members of the Selection Committee screen the applications received for any post for determining candidates to be called for interview, the Administrative Wing of the University may scrutinise these applications and any lapses or deficiencies noticed in the individual applications in relation to the qualifications prescribed for the post may be brought to the notice of the Screening Committee for a final decision on such matters before candidates are called for interview.

53. The Board approved the proposal to establish two more Divisions, namely, (1) Division of Agricultural Economics and Rural Sociology, and (2) Division of Education and Extension.

54. The Board at its special meeting held on 28-3-1985, upon the recommendations of the Academic Council, approved the list of candidates who have successfully met the academic requirements of the University for conferment of degrees as listed in the agenda, at the ensuing Convocation, with the following corrections/additions :

1. The degree to be awarded as "M.V.Sc." in respect of two students in Poultry Science appearing on page 18 of the list be read as "M.Sc. (Poultry Science)".
2. Add the following name on page 24 under "BACHELOR OF SCIENCE (Agricultural Marketing and Cooperation)"

#### **In Absentia**

"24. SHASHIKUMARA, H. S. 3.28 MG914/June 1984"

55. The Board approved the draft Budget proposals for 1985-86, the revised budget for 1984-85 and the accounts for 1983-84.

56. The Board agreed to purchase one Computer of the model VAX-11/750 System for the University to be imported from USA through the Computer Maintenance Corporation Ltd., a Government of India enterprise, at an approximate cost of Rs. 18.5 lakhs.



### (b) Academic Council

The Academic Council met four times during 1984-85. The following are the important decisions :

1. The Academic Council decided to give weightage to Sportsmen in the matter of admissions to Undergraduate and Diploma in Agricultural Engineering courses as follows :

	<i>Weightage to the extent</i>
1. For Sportsmen/Athletes representing the Nation	20 marks
2. For Sportsmen/Athletes representing the Zone	15 marks
3. For Sportsmen/Athletes representing the State	10 marks
4. For Sportsmen/Athletes representing the University	5 marks
5. For Sportsmen/Athletes representing the College/ School	2 marks

2. The Academic Council decided to raise the minimum marks prescribed for admission to all Undergraduate courses except B.H.Sc. to 55 per cent and for B.H.Sc. to 50 per cent in the second year of the two year P.U.C.

3. The Academic Council decided that the students of various courses of the University should complete the remedial courses by the end of six trimesters. No student shall be permitted to register for Basic Sciences and Humanities courses if he is required to study a remedial course in that area.

4. The Academic Council agreed to reduce the Hostel re-admission fee in case of defaulters from Rs. 10 to 5.

5. The Academic Council approved to raise the eligibility for admission to Diploma in Agricultural Engineering from 45 per cent to 50 per cent of the aggregate marks at S.S.L.C. examination. The Academic Council also approved to add 10 marks to the aggregate percentage of marks in the S.S.L.C. or equivalent examination in respect of candidates seeking admission to DAE course whose parents/guardians (if both parents are not alive) profession is actual cultivation including Agricultural Labourer/Poultry Farming/Livestock Farming/Sericulture/Village artisan engaged in production of

Agricultural tools and implements as evidenced by a certificate from the Tahsil-dhar or a Revenue Officer of higher rank prescribed for the purpose, besides producing evidence to the effect that the candidate has studied up to and including 7th Standard in a School(s) located outside the limits of a Municipal Corporation in Karnataka as evidenced by a certificate from the Head of the concerned institution(s).

6. The Academic Council approved the following qualifications for admission to Ph.D. in Poultry Science and Ph.D. in Foods and Nutrition :

**1. For Ph.D. in Poultry Science**

The candidates should possess not less than a second class or its equivalent Cumulative Grade Point Average in M.V.Sc. (Poultry Science) / M.Sc. (Agri.) in Poultry Science / M.Sc. (Poultry Science) or an equivalent degree from a recognised University.

**2. For Ph.D. in Foods and Nutrition**

The candidates should possess not less than second class or its equivalent Cumulative Grade Point Average in M.H.Sc. in Foods and Nutrition / M.Sc. (Foods and Nutrition) or an equivalent degree from an Agricultural University.

7. The Academic Council decided that the Regulations pertaining to the award of Gold Medals for Undergraduates in the University be modified to the effect that "they should have secured an Overall Grade Point Average of 3.50 after completing the course instead of 3.75 as stipulated in the existing Regulation".

8. The Academic Council decided to modify clause (d) of Regulations relating to Reservation of seats for Government of India nominees under ICAR quota for Undergraduate and Postgraduate programmes as follows :

"(d) Special category *i.e.* students from weaker sections, students from Backward areas and the children of ICAR employees".

**Other important decisions**

1. The Academic Council approved the proposal for offering of two new courses in Horticulture as Majors for B.Sc. (Hort) students *viz.*, (1) Hort.

413 Coffee Cultivation-I (2+1) credits and (2) Hort. 414 Coffee Cultivation-II (1+2) credits.

1. The Academic Council approved the course outlines of the following courses for Master's and Ph.D. degree programme in Poultry Science :

1.	P.Sc.	501	Evolution of Modern Poultry Breeds	(2 + 1)
2.	P.Sc.	502	Poultry Breeding-I	(2 + 1)
3.	P.Sc.	503	Poultry Breeding-II	(2 + 1)
4.	P.Sc.	504	Methods of Selection	(2 + 1)
5.	P.Sc.	505	Inbreeding and Hybridization	(2 + 1)
6.	P.Sc.	506	Designs and Analysis of Poultry Breeding Data	(2 + 1)
7.	P.Sc.	511	Laboratory Techniques	(0 + 2)
8.	P.Sc.	512	Avian Metabolism	(2 + 0)
9.	P.Sc.	513	Feed Formulation and Feed Mixing	(0 + 2)
10.	P.Sc.	514	Energy Metabolism	(2 + 0)
11.	P.Sc.	515	Protein and Amino Acid Nutrition	(2 + 1)
12.	P.Sc.	516	Vitamins and Minerals	(2 + 1)
13.	P.Sc.	517	Advanced Poultry Nutrition	(2 + 0)
14.	P.Sc.	521	Poultry Products Technology-I (Egg Technology)	(2 + 1)
15.	P.Sc.	522	Poultry Products Technology-II	(2 + 1)
16.	P.Sc.	523	Advanced Egg Technology	(2 + 1)
17.	P.Sc.	524	Advanced Poultry Meat Technology	(2 + 1)
18.	P.Sc.	525	Economics of Poultry Production and Marketing	(2 + 0)
19.	P.Sc.	531	Poultry Management-I Hatchery Operations	(2 + 1)
20.	P.Sc.	532	Poultry Management-II Housing	(2 + 1)
21.	P.Sc.	533	Poultry Management-III—Equipments	(0 + 1)
22.	P.Sc.	534	Poultry Management-IV For different age group	(2 + 1)
23.	P.Sc.	535	Poultry Management-V Other species	(1 + 1)
24.	P.Sc.	551	Seminar	
25.	P.Sc.	561	Research	
26.	P.Sc.	571	Special problems	

### (c) Board of Studies

The Boards of Studies of the Faculty of Agriculture, Faculty of Animal Science and the Faculty of Basic Sciences and Humanities held 3, 3 and 2 meetings respectively during the period under report.

#### **Faculty of Agriculture**

1. The Board of Studies approved the course outlines of Ag. Mic. 529 – Biology of Mycorrhizae (2+1) and Ag. Mic. 530 – Physiology and Genetics of Nitrogen Fixers (2+1).

2. The Board of Studies approved the course outlines of Kan. 101 (2+1). The Board suggested that this course may be taken by the students who are studying in Kannada medium in place of Eng. 104 (1+1) and 105 (0+1).

3. The Board of Studies agreed for the proposal that a student who desires to drop or discontinue a course can do so within the stipulated time only after obtaining written permission from the teacher concerned.

4. The Board of Studies approved the proposal to change the name of the Department of Seed Technology to “the Department of Seed Science and Technology”.

5. The Board of Studies approved the Regulations relating to ‘F’ (Fail) grade in respect of Undergraduate students under Trimester System. While approving the above proposal the Board of Studies decided that (a) the students securing ‘F’ grade in a course should register for the course when it is offered as a non-load course, (b) marks for attendance, practical records, unannounced quizzes and assignments shall be carried forward, (c) such of the courses having only practical credits shall be repeated and (d) there shall be only one final examination for the remaining marks along with the regular students to avoid problems of monitoring.

6. The Board of Studies approved the proposal to revise the existing Regulation No. 16 relating to evaluation of Postgraduate students under the Trimester System as follows :

“A student who obtains ‘F’ or ‘EE’ Grade in any of the elective or Major course of his study shall either repeat that course when it is offered again or may register for the new elective or major course in exchange on the recommendation of the Major Professor or the Advisory Committee of the student when appointed and approved by the Director of Instruction (PGS)”. An indication should be made in the transcript as repeated/substituted. The Board of Studies also approved to delete the last

part of the sentence occurring under Regulation 14 *i.e.*, “and he will be required to repeat the course”.

7. The Board of Studies decided that :

1. There shall be only one educational tour of Southern States including the State of Maharashtra.
2. The educational tour shall carry two credits and may be conducted during the final year of the degree course concerned.
3. The tour shall be for a period up to three weeks only.
4. This shall be applicable to students registering in the University from 1985-86 onwards.

8. The Board of Studies approved the proposal for starting of Ph.D. programme in Sericulture.

9. The Board of Studies approved the revision of Postgraduate courses in Agricultural Chemistry and Soil Science.

#### ***Faculty of Animal Science***

1. The Board of Studies agreed in principle to include Kannada 101 (1+1) and Kannada 102 (1+1) courses in the Faculty of Animal Science. Kannada 101 course may be made optional for students from other States and Foreign countries, while Kannada 102 course is compulsory for all students from Karnataka.

2. The Board of Studies recommended to the Academic Council to recognise each department headed by a Professor in the College of Veterinary, Fisheries and Dairy Science as Head of the Division. In case there is more than one Professor in a department, the Senior most Professor be recognised as the Head of Division.

3. The Board of Studies recommended to the Academic Council to convert the present unannounced examination as an announced examination.

4. The Board of Studies agreed to have only one Educational Tour of 2 credit hours during the final year of the degree programme, with a duration of 21 days at a cost not exceeding Rs. 700 per student. The places of visit shall be decided by the respective Colleges.

#### ***Faculty of Basic Sciences and Humanities***

1. The Board of Studies recommended to the Academic Council regarding Educational Tour of students as follows :

1. The Study Tour should not carry any credits.
2. There shall be two tours – one shall be State Tour with a duration of 3 weeks which shall be conducted in the III year, the other shall be All India Tour of 21 days.
3. The State Tour shall be compulsory for all students and the University will meet the expenditure on these items as done now. A certificate should be given by the teacher accompanying the students.
4. The All India Tour is optional and the expenditure should be met by the students. This will be organised if sufficient number of students indicate their willingness.
5. The revised tour rules shall be applicable to the students admitted from 1985–86.

R. KRISHNAPPA  
*Registrar*

## PART II

### TEACHING

#### A. General

The outturn of graduates, number of students admitted during the year and scholarships awarded for various courses are presented below :

##### (i) Outturn of graduates

College	Course	No. completed
College of Agriculture, Hebbal	Ph.D.	17
	M.Sc. (Agri)	102
	M.Sc. (Hort)	6
	M.H.Sc.	2
	B.Sc. (Agri)	198
	B.Sc. (Agril. Mark. & Coop)	19
	B.Sc. (Hort)	34
Veterinary College, Hebbal	Ph.D.	2
	M.V.Sc.	16
	M.Sc. (D.Sc.)	7
College of Agriculture, Dharwad	Ph.D.	3
	M.Sc. (Agri)	53
	M.Sc.	16
	B.Sc. (Agri.)	72
	B.Sc. (Agril. Mark. & Coop)	19
College of Rural Home Science, Dharwad	M.H.Sc.	8
	B.H.Sc.	16
College of Fisheries, Mangalore	M.F.Sc.	20
	B.F.Sc.	23
Agricultural Engineering Institute, Raichur		
	DAE	10
Total		643

##### (ii) The number of students admitted

1. B.Sc. (Agri)	326
2. B.Sc. (Hort)	41
3. B.Sc. (Agril. Mark. & Coop)	37

4.	B.Sc. (Seri)	20
5.	B.H.Sc.	21
6.	B.V.Sc.	149
7.	B.Sc. (D.T)	24
8.	B.F.Sc.	20
9.	D.A.E.	20
10.	M.Sc. (Agri)	172
11.	M.Sc.	100
12.	M.Sc. (Hort)	20
13.	M.H.Sc.	2
14.	M.V.Sc.	23
15.	M.Sc. (D.Sc.)	13
16.	M.F.Sc.	21
17.	Ph.D.	55

Total	1064
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**(iii) Students strength at various Colleges and Institutions**

College	Course	No. on Roll
1	2	3
College of Basic Sciences and Humanities, GKVK	M.Sc.	6
	B.Sc. (Agri)	191
	B.Sc. (Agril. Mark & Coop)	24
	B.V.Sc.	121
	B.Sc. (D.T)	24
	B.Sc. (Seri)	20
	B.Sc. (Hort)	41
College of Agriculture, Hebbal	Ph.D.	109
	M.Sc. (Agri)	229
	M.Sc.	110
	M.Sc. (Hort)	48
	B.Sc. (Agri)	648
	B.Sc. (Agril. Mark. & Coop)	41
	B.Sc. (Seri)	38
	B.Sc. (Hort)	92
Veterinary College, Hebbal	Ph.D.	8
	M.V.Sc.	47
	M.Sc.	7
	M.Sc. (D.Sc)	36
	B.Sc. (D.T)	68
	B.V.Sc.	520



1	2	3
College of Agriculture, Dharwad	Ph.D.	49
	M.Sc. (Agri)	119
	M.Sc.	55
	B.Sc. (Agri)	480
	B.Sc. (Agril. Mark. & Coop)	68
College of Rural Home Science, Dharwad	Ph.D.	2
	M.H.Sc.	14
	B.H.Sc.	86
College of Fisheries, Mangalore	Ph.D.	3
	M.F.Sc.	39
	B.F.Sc.	105
College of Agriculture, Raichur	B.Sc. (Agri)	32
Veterinary College, Bidar	B.V.Sc.	28
Agricultural Engineering Institute, Raichur	DAE	67
Total		3575

#### (iv) Convocation

The Nineteenth Convocation of the University was held at the Veterinary College, Hebbal on 29th March 1985. 774 candidates took degrees in various disciplines as follows :

Sl. No.	Degree	In person	In absentia	Total
1.	Ph.D.	18	8	26
2.	M.Sc. (Agri)	73	97	170
3.	M.Sc. (Hort)	5	6	11
4.	M.H.Sc.	3	9	12
5.	M.V.Sc.	11	8	19
6.	M.Sc. (D.Sc.)	7	4	11
7.	M.F.Sc.	8	16	24
8.	B.Sc. (Agri)	177	123	300
9.	B.Sc. (Hort)	28	6	34
10.	B.H.Sc.	5	13	18
11.	B.V.Sc.	39	32	71
12.	B.F.Sc.	2	28	30
13.	B.Sc. (Agril. Mark. & Coop)	24	24	48
Total		400	374	774

Gold medals and prizes were awarded to 45 candidates for outstanding performance in their studies. In addition, one student of Diploma in Agricultural Engineering was also awarded Gold medal for 1984-85.

The Convocation was presided over by His Excellency Sri A. N. Banerji, Governor of Karnataka and Chancellor of the University. Mr. C. Subramaniam, Former Union Minister, delivered the Convocation Address.

**(v) Scholarships Awarded during 1984-85**

Name of the College	University of Agricultural Sciences			GOI & ICAR	UNDP
	Merit	General	Fee concessions		
1. <i>Agricultural College, Hebbal</i>					
i. Undergraduate					
(a) B.Sc. (Agri)	8	45	45	87	
(b) B.Sc. (Hort)	8	12	6	13	
(c) B.Sc. (Agril. Mark. & Coop)	8	3	7	12	
(d) B.Sc. (Sericulture)	6	4	6	8	
(e) Dairy Technology	8	3	2	8	
ii. Postgraduate	41	1	4	11	18
2. <i>Agricultural College, Dharwad</i>					
i. Undergraduate					
(a) B.Sc. (Agri)	8	32	10	28	
(b) B.Sc. (Agril. Mark. & Coop)	8	2	2	8	
ii. Postgraduate	23	1	1	8	
3. <i>Veterinary College, Hebbal</i>					
i. Undergraduate	10	37	26	51	31
ii. Postgraduate	20	1	8	3	
4. <i>Fisheries College, Mangalore</i>					
i. Undergraduate	8	4	4	10	
ii. Postgraduate	8	1	1	2	
5. <i>Rural Home Science College, Dharwad</i>					
i. Undergraduate	6	2	-	7	
ii. Postgraduate	5	-	-	-	
6. <i>Agricultural Engineering Institute, Raichur</i>					
Diploma	6	3	9	1	
7. <i>Agricultural College, Raichur</i>					
B.Sc. (Agri)	2	2	1	1	
8. <i>Veterinary College, Bidar</i>					
B.V.Sc.	2	2	1	1	

R. KRISHNAPPA  
Registrar

## B. Reports of the Teaching Institutions

### I. College of Postgraduate Studies, Dharwad

The programme of Postgraduate instruction in the University consists of Master's degree in Agriculture, Veterinary, Fisheries, Horticulture, Home Science, Dairy Science, Poultry Science, Statistics, Biochemistry and Sericulture and Doctor of Philosophy (Ph.D.) in Agriculture and Animal Sciences. Postgraduate Programmes in Agriculture are offered at GKVK, Hebbal, as well as Dharwad campuses. The courses in Animal Science faculty are offered at Hebbal (Animal Sciences) and Mangalore (Fisheries Sciences) Campuses.

#### *Guest/Special lectures :*

<i>Name and designation</i>	<i>Date</i>	<i>Topic</i>
1	2	3
Dr. V. P. Bhide, Emeritus Professor, MACS, Pune	16-4-85	Development of Plant Pathology in W. India
Dr. A. John Knight Ex-Director of Extension	7-12-84	Extension activities of voluntary organisations
Dr. Sangle Director of Extension	26-5-84	Extension activities in the State of Maharashtra
Prof. H. N. Patel Principal, Extension Education Institute, Gujarat Agril. University, Anand	11-8-84	Extension Education activities in the State of Gujarat
Dr. B. N. Choudary SIII, Transfer of Technology Divison, ICAR, New Delhi	11-1-85	Importance of KVK's and Lab- to-Land Programme
Dr. D. K. Uppal, Prof. & Head Dept. of Hort., Punjab Agril. University, Ludhiana	9-8-84	Adaptability of temperate fruit plants under sub-tropical con- ditions.
Dr. C. M. Rick Prof. of Veg. Crops, Univ. of California, Davis (USA) and UNDP/FAO Consultant	26-2-85	Germplasm resources in <i>Lycoper- sicon</i> species and their use in breeding
-do-	28-2-85	Male sterility and its use in breeding
Dr. D. L. Pearson Assoc. Prof. of Biology	2-6-84	Biomes of the world

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Pennsylvania State Univ. U.S.A.	9-6-84	Theory of natural selection
-do-	16-6-84	Predation
-do-	23-6-84	Competition
-do-	30-6-84	Sociobiology
Dr. R. R. Rawat Professor and Head, Jawaharlal Nehru Krishividyapeeth Jabalpur	4-12-84	Major pest problems of Madhya Pradesh
Dr. Gordon, Dean, Forestry School	15-6-84	Forestry research and education
Dr. V. K. Sasidhar, Prof. of Agronomy, AC, Vellayani	9-8-84	Sunlight harvesting — Kerala's experience
Dr. S. B. Hukkeri, Head Agro-Energy Centre, IARI New Delhi	21-9-84	Energy aspects in agriculture
Dr. U. C. Upadhyay, ADG (Edn.) ICAR, New Delhi	1-12-84	Weed control in oilseed crops
Dr. V. Rajagopalan Vice-Chancellor, TNAU Coimbatore	1-6-84	Concept, approach and strategy for Rural Development in India
Dr. A. Kandaswamy Director, CARDS, TNAU Coimbatore	16-7-84	Recent advances in Agril. Econo- mics Research in India and abroad.
Mr. D. N. Patil Jr. Research Fellow, CCMB Hyderabad	April. 84	On splicing of m-RNA
Dr. P. K. Gupta Prof. and Head, Dept. of Botany, Meerut University U.P.	29-9-84	Cytogenetics of pulses

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Dr. V. N. Gopinathan Nayar Prof. of Plant Breeding	31-12-84	Recent trends in plant breeding research
Dr. V. Ranga Rao Safflower Co-ordinator	2.1-85	Safflower development in India
Dr. R. V. Krishnamurthy Prof. of Zoology, GKVK Bangalore	12-9 84	Some recent advances in sericulture
Mr. Boedts Bruno Student from Belgium	9-3-85	My general feeling about sericultural practices in Indian village with my background in Belgium

1. Names of the students who were selected as IAS, IPS and IFS officers and commissioned officers in the army, navy, air-force, etc.

- i. Mr. P. B. Ramamurthy, Agronomy student selected for IAS during the year under report.
- ii. Mr. B. J. Hosamath, Agril. Botany Student, Dharwad, selected for IFS cadre and appointed as Assistant Conservator of Forests.
- iii. Mr. D. N. Narasimha Raju, who completed his M.Sc. (Hort.) degree programme during 1979 selected for IAS cadre during 1984.

2. Any curricular and extracurricular activities arranged for the benefit of the students of PG programme.

**Department of Agril. Extension, Bangalore**

Discussion seminars were organised under the auspicious of Karnataka Chapter of Indian Society of Extension Education in the Dept. of Agril. Extension, for the benefit of PG students.

A quarterly Newsletter entitled 'Extension Forward' has been brought out for the benefit of PG students.

3. Any other relevant information—Overseas assignments, higher studies/training, etc.

- i. Sri L. B. Kunnal, Asst. Professor of Agril. Economics Department was duputed for a period of six months from August, 1984 to March 1985 to attend an advance course in National Economic

Planning at the Central School of Planning and Statistics and Research Institute for Developing Countries, Warsaw, Poland.

- ii. Dr. G. K. Veeresh, Professor of Entomology, Hebbal, visited Cordift University, Oxford University and British Council in London at the invitation of British Council during July 1984. He also attended International Workshop on Sorghum held at A & M University, Texas, USA, during July, 84 at the invitation of the organising committee and presented papers.
- iii. Three teachers of the Horticulture Department were deputed for Fellowship Training for 3 months, under the UNDP/ICAR centre of Advanced Studies in Tropical Horticulture in areas indicated against their names.

Name and designation	Area	Place of training
1. Dr. K. R. Melanta Assoc. Prof. of Horticulture	Citriculture	Florida, USA
2. Mr. A. G. Huddar Assoc. Prof. of Horticulture	Post-harvest Technology	Australia
3. Mr. B. G. Muthappa Rai, Assoc. Prof. of Horticulture	Landscape Gardening	Cornell University U.S.A.

Dr. N. Vijayakumar, Horticulturist (Pomology) and Mr. J. V. Narayana Gowda, Horticulturist (Floriculture and Landscape Gardening) are presently undergoing training in Tissue Culture at Homstead, Florida and in Commercial Floriculture at Cornell University, Ithaca, U.S.A., respectively.

- iv. Dr. Srikanth Kulkarni, Associate Professor of Plant Pathology, AC, Dharwad, has been awarded the Nagamma Dattatreya Rao Desai award, for outstanding research in Plant Pathology.

#### *Completion of Degree Programme :*

The following students have completed their P. G. Degree programme. The topics of theses are as follows :

#### **Ph.D.**

##### **Agronomy**

1. K. T. Krishne Gowda      Agronomic investigations on the problem of poor seed set and yield in sunflower (*Helianthus annuus* L.)

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2.	S. B. Hanagodimath	Agronomic investigations on rainfed drilled paddy ( <i>Oryza sativa</i> Linn).
3.	Kamalam Joseph	Studies on the performance of rice varieties and the water requirements of rice-based cropping systems under tank irrigation.
4.	Chandrasekhara B. Kurdikeri	Investigations on control of <i>Cynodon dactylon</i> (L.) Pers.
<b>Agricultural Botany</b>		
5.	Basavaraj M. Khadi	Genetic studies on ascorbic acid content, fruit yield, yield components and accumulation of some mineral elements in chilli ( <i>Capsicum annuum</i> L.)
6.	Chikkadyavaniah	Genetic divergence in cowpea ( <i>Vigna unguiculata</i> (L.) Walp)
7.	L. R. Marangappanavar	Genetic diversity, gene action and character association in cowpea ( <i>Vigna unguiculata</i> L. Walp).
<b>Agricultural Entomology</b>		
8.	K. Srinivasan	visual damage thresholds for diamondback moth <i>Plutella xylostella</i> (Linnaeus) and leaf-webber <i>Crocidolomia binotalis</i> Zeller on cabbage.
9.	V. Govardhana Naidu	Biology, ecology and control of <i>Eriophyes eymbopogonis</i> (Acari: Eriophyidae) a pest of citronella ( <i>Cymbopogon winterianus</i> )
10.	Karanam Sudhakar	Relative abundance of termite species and crop losses due to them in an agro forest ecosystem.
11.	N. Baburaya Nayak	Studies on bioecology and chemical control of rice earhead bug <i>Leptocorisa oratoria</i> (Fabricius) (Hemiptera: Alydidae) and loss due to its damage.

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<b>Agricultural Extension</b>		
12.	Yadavalli Katteppa	A study on the subject matter specialists in the <i>Training and Visit system of Karnataka State</i> : A role analysis.
13.	L. V. Hirevenkangoudar	A scientific investigation on the impact of Dairy Development Programmes of KDDC on small farmers, marginal farmers and agricultural labourers of Bangalore District, Karnataka.
14.	A. Palaniswamy	A study on modernization characteristics and training needs of sugarcane growers.
<b>Chemistry and Soils</b>		
15.	V. P. Badanur	Studies on soil moisture and nutrient interaction in <i>rabi</i> sorghum ( <i>Sorghum bicolor</i> (L.) Moench) grown in vertisols of Bijapur.
16.	Gurupad N. Dandagi	Studies on forms, distribution and behaviour of potassium in some soil series of Ghataprabha and Malaprabha river valley projects.
17.	B. C. Sarmah	Studies on soil zinc and boron and crops responses in alluvial soils of Assam.
<b>Crop Physiology</b>		
18.	R. Uma Shankar	Moisture stress induced loss of membrane integrity, accumulation of proline and their inter-relationships.
<b>Horticulture</b>		
19.	G. Sreekandan Nair	Growth analysis and nitrogen uptake studies on Autotetraploids and Diploids of <i>Solanum viarum</i> Dunal.
20.	D. Nandakumar	Intervarietal hybridization and induction of Autotetraploids in Steroid-bearing <i>Solanum</i> species.
21.	Ashok A. Patil	Studies on correlation, path analysis, genetic divergence, heterosis and combining ability in ten parent diallel cross of tomato ( <i>Lycopersicon esculentum</i> Mill.)



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22.	Pradeep B. Patil	Studies on physiological and biochemical factors associated with fruit bud differentiation and flowering in mango ( <i>Mangifera indica</i> L.)
23.	K. R. M. Swamy	Studies on improvement of qualitative and quantitative characters in muskmelon ( <i>Cucumis melo</i> L.)
24.	P. H. Ramanjini Gowda	Evaluation of Diploids and induced autoteraploids of <i>Solanum viarum</i> Dunal for effects of growth regulators, single plant progeny yields and chromosome number.
25.	S. P. S. Raghava	Genetical investigations in China aster ( <i>Callistephus chinensis</i> (L.) Nees)

#### Agricultural Microbiology

26.	P. Sivaprasad	Tripartite interaction of Rhizobium Mycorrhiza and <i>Cajanus cajan</i> (L.) Millsp. in relation to nitrogen fixation, growth and histochemical characters.
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#### Plant Pathology

27.	Pranab Kumar Dutta	Studies on two phytophthora diseases (Koleroga of arecanut and black pepper wilt) in Shimoga district, Karnataka State.
28.	M. K. Siddappa	Studies on root and foot rots of betelvine ( <i>Piper betle</i> Linn.) caused by <i>Fusarium solani</i> (Mart.) Sacc. f. sp. <i>piperis</i> Albuquerque.

#### Agronomy

#### M.Sc.

1. S. Y. Honnannavar Intercropping of groundnut (*Arachis hypogaea* L.) and onion (*Allium cepa* L.) in chilli (*Capsicum annum* L.) and cotton (*Gossypium herbaceum* L.) under rainfed condition.
2. G. C. Basavaraja Studies on chemical weed control in drilled finger millet (*Eleusine coracana* Gaertn) intercropped with row crops.

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3.	T. B. Basavaraju	Effect of sowing dates and plant protection on growth, flower shedding, pod setting and yield of pigeonpea ( <i>Cajanus cajan</i> (L.) Millsp.) varieties.
4.	Bhimanagouda G. Sanakappanavar	Performance of sunflower ( <i>Helianthus annuus</i> L.) genotypes under varying row spacings and plant populations in dryland conditions.
5.	Sadananda Shetty	Studies on the effect of stages of harvesting and nutrients on growth, yield and alkaloid content in <i>Datura stramonium</i> L.
6.	S. N. Sudhakara Babu	Effect of levels of phosphorus and sulphur through different sources of fertilizers on growth, yield and chemical composition of sunflower ( <i>Helianthus annuus</i> L.)
7.	H. R. Prakash	Effect of incorporation of intercropped legumes on mineralization of nitrogen and phosphorus on yield and quality of sugarcane ( <i>Saccharum officinarum</i> Linn)
8.	P. P. Joy	Effect of different levels of nitrogen, phosphorus and azolla ( <i>Azolla pinnata</i> R. Br.) on azolla-rice ( <i>Oryza sativa</i> L.) productivity.
9.	S. D. Sayagavi	Studies on the fodder yielding ability of maize genotypes grown with mixed crop of cowpea.
10.	J. V. Patil	Effect of row spacing and plant population on growth and yield of rainfed spreading groundnut ( <i>Arachis hypogaea</i> L.)
11.	D. Siddalinga	Effect of quantity and time of application of prilled urea, neemcake coated urea and urea supergranules on growth and yield of maize ( <i>Zea mays</i> L.)
12.	H. M. Krishnaiah	Effect of azolla on paddy and on the succeeding maize-soybean intercrops in conjunction with straw incorporation.
13.	Anil Kumar Singh	Studies on chemical weed control in transplanted rice ( <i>Oryza sativa</i> L.)

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14.	S. M. Mutanal	Weed smothering ability of legumes in maize ( <i>Zea mays</i> L.) based intercropping system.
15.	B. Basavaraju	Performance of rice varieties to dates of planting and levels of spacing in late <i>kharif</i> under tank irrigation.
16.	Basavaraj R. Hiremath	Response of sunflower ( <i>Helianthus annuus</i> L.) genotypes to different levels of nitrogen and phosphorus under rainfed condition.
<b>Agricultural Botany</b>		
17.	D. H. Sukanya	Variability, correlation, path analysis and selection indices in three $F_2$ populations of rice.
18.	T. V. Venkatesh	Genetics of yield, oil content and resistance to powdery mildew in sesame ( <i>Sesamum indicum</i> L.).
19.	Y. G. Shadakshari	Genetic variability and path analysis in the germplasm collections of sesame ( <i>Sesamum indicum</i> L.)
20.	S. S. Hegde	A study on correlation and path analysis in four $F_2$ populations of foxtail millet [ <i>Setaria italica</i> (L.) Beauv]
21.	N. Shiva Raju	Heterosis, inbreeding depression, correlation and path coefficient analysis in selected cross combinations of sunflower ( <i>Helianthus annuus</i> L.)
22.	C. V. Paramesha	Studies on induced polygenic variability in $M_3$ and $M_4$ generations of sesame ( <i>Sesamum indicum</i> L.)
23.	Prabhu V. Kenchanagoudar	Genetics of earliness, yield and its components in cotton ( <i>Gossypium hirsutum</i> L.)
24.	T. Jyothi	Studies on genetic variability in $M_3$ and $M_4$ generations of greengram [ <i>Vigna radiata</i> (L.) Wilezek] treated with ethyl methane sulphonate (EMS)
25.	H. D. Mohankumar	Studies on mutagenic response and rectification of defects in two otherwise promising genotypes of rice ( <i>Oriza sativa</i> L.) following gamma irradiation.

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26.	Niranjana Murthy	Evaluation of sunflower ( <i>Helianthus annuus</i> L.) hybrids using fertility restorer lines.
27.	Devanagoud N. Patil	Studies on induced polygenic variability and selection response in $M_4$ generation of greengram [ <i>Vigna radiata</i> (L.) Wilczek] and blackgram [ <i>Vigna mungo</i> (L.) Hepper]
28.	Ramesh G. Kalaghatgi	Effect of out crossing in $F_1$ and $F_2$ on variability for yield, yield components and other economic characters in <i>Gossypium hirsutum</i> Linn.
29.	Jayashree, M. K.	A comparative study of mutagenic effects of gamma-rays and ethyl methane sulphonate in little millet ( <i>Panicum miliare</i> Lam)
30.	K. N. Narasimha	Studies on genetic variability, correlation and path coefficient analysis in blackgram [ <i>Vigna mungo</i> (L.) Hepper]

#### Agricultural Economics

31.	G. S. Ananth	Performance appraisal of the Bangalore Grape Growers Marketing and Processing Cooperative Society, Limited, Lalbaugh, Bangalore, Karnataka : A case study.
32.	Meenakshi, V.	An economic analysis of pesticides use by farmers in Bangalore North Taluk, Karnataka.
33.	Shivananda B. Hosamani	An economic analysis of production and marketing of cotton - A case study of small farmers in North Karnataka.
34.	B. R. Rama	An evaluation of the performance of Farmers Service Cooperative Society Ltd. (FSS), Singanayakanahalli, Bangalore North Taluk, Karnataka.
35.	M. S. Arunkumar	An economic evaluation of investment and problems in marketing of cocoa in Dakshina Kannada District, Karnataka.
36.	Linga Murthy	Impact of Agricultural Programmes - An economic analysis of intensive oil seed development programme in Raichur District, Karnataka.

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37.	N. Sampangi Rama Reddy	Impact of commercial bank village adoption scheme on socio-economic status of farmers in Bangalore North Taluk of Bangalore District, Karnataka.
38.	Doddappa G. Hasbi	Economics of cropping pattern in Malaprabha Command Area (Karnataka State)
39.	H. Venkataramanappa	An economic analysis of jowar marketing in unregulated rural markets and regulated markets of North Karnataka - A case study.
40.	K. K. Subramanya	Economic feasibility of crop insurance for coffee.
41.	H. Sripathi Acharya	Cost analysis and problems involved in processing and distribution of milk---A case study.
<b>Agricultural Engineering</b>		
42.	Shreekant V. Nadagouda	Efficiency of envelope materials and their thicknesses in a tile drainage system.
<b>Agricultural Entomology</b>		
43.	Shivamurthappa	Biology and control of sorghum shoot bug <i>Peregrinus maidis</i> (Ashmead) (Homoptera : Delphacidae) and loss estimation due to it.
44.	N. Venkatesh	Studies on phytophagous mite fauna of fruit crops around Bangalore and biology of the Fig mite <i>Eotetranychus hirst</i> (Acari : Tetranychidae)
45.	R. N. Bhaskar	Studies on sensitivity of some breeds and their hybrids of silkworm <i>Bombyx mori</i> L. to kenchu virus disease.
46.	B. G. Jayappa	Screening of cowpea germplasm for resistance to pod borers and aphids.
47.	Shivarama Bhat P.	Faunistic study of <i>Carabids</i> (Coleoptera : Carabidae) with some aspects of their ecology in Bangalore.
48.	N. Srinivasa	The influence of moonlight and some weather factors on selected species of insects caught in light trap.

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49.	G. T. Thirumalaraju	Bionomics and control of cotton jassid <i>Amrasca biguttula biguttula</i> (Ishida) (Homoptera : Cicadellidae) and screening of cotton varieties for their resistance to the pest.
50.	Basappa, H	Studies on the dung feeding termites and their role in removal of dung under dryland conditions.
51.	K. Lakshmipathy	Comparative toxicological studies of two new rodenticides—Silmurin and racumin against <i>Tatera indica cuvieri</i> (Waterhouse)
52.	Shivmurthy Naik	Investigations on <i>Tapinoma melanocephalum</i> Farbricius (Dolichoderinae : Formicidae) with special reference to some aspects of its biology, behaviour and control.
53.	G. Satish	Ecological and pathological studies on the nuclear polyhedrosis disease of the silkworm, <i>Boambyx mori</i> L.
54.	H. V. Anantha Murthy	Taxonomic studies on <i>opsiina</i> and <i>scaphytopiini</i> (Homoptera : Cicadellidae : Deltocephalinae) of the Indian subcontinent with special reference to Karnataka.
<b>Agricultural Extension</b>		
55.	Sulekha M. Patil	Influence of leaflet on balanced diet on the communication behaviour of literate farm-women... A field experiment.
56.	Jagadeesh G. Angadi	Credibility of different sources of information as related with the socio-economic characteristics of jowar farmers in Belgaum district.
57.	M. Sadananda	A study on the potentialities for the development of schedule caste farmers of Bangalore district.
58.	B. T. Chikkaputte Gowda	A study on training needs of Assistant Agricultural Officers in the area of extension education in Karnataka.
59.	Dhanyakumar, K. N	A study of the impact of village adoption programme on socio-economic development A cast study.

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60.	V. G. Hegde	A study of job performance, job usefulness and job satisfaction of Agricultural Assistants in Dharwad District of Karnataka State.
61.	M. Gunasunder Kumar	A study on the understanding of programme planning development process by Assistant Horticultural Officers of the State Department of Horticulture, Karnataka.
62.	Himantha Raju	A study on extent of extension guidance received by the contact farmers in adoption of selected practices of summer paddy cultivation in Mandya District, Karnataka State.
63.	Nagesh S. Naik	A study of factors associated with the knowledge and adoption of selected recommended practices of paddy cultivation in coastal area of Uttar Kannada District of Karnataka State.
64.	M. T. Ashoka Reddy	Knowledge, attitude and symbolic adoption behaviour of potential farmers towards Bhagyalakshmi biogas plant in Dharwad taluka.

#### Chemistry and Soils

65.	K. B. Rajanna	Studies on behaviour of simazine and atrazine in soils of Karnataka.
66.	Y. N. Lakshminarayana Murthy	Evaluation of efficacy of fenvalerate in control of pests of brinjal ( <i>Solanum melongena</i> L.) and its residues in brinjal fruits.
67.	T. N. Shivananda	Mineralisation of nitrogen from various organic manure amended soils.
68.	B. Basavaraj	Effect of certain pesticides on the activity of urease, phosphatase and dehydrogenase in black and red soils of Karnataka.
69.	Ananda Naik, K. G	Yield and composition of castor ( <i>Ricinus communis</i> L.) as influenced by fertilizer phosphorus, sulphur and boron.
70.	Y. Vishwanatha Shetty	Transformation of urea applied to soils.
71.	H. Puttaswamy	Effect of calcium and sulphur on the growth and yield of cowpea [ <i>Vigna unguiculata</i> (L.) Walp]

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		and sunflower ( <i>Helianthus annuus</i> L.) in the acid soils of Bangalore.
72.	Kaleemulla Sharieff	Effect of long term application of manures and fertilizers on soil fertility and yield of finger millet ( <i>Eleusine coracana</i> ) in alfisol of Bangalore.
<b>Crop Physiology</b>		
73.	D. M. Channaveeriah	Influence of morpho-physiological characters on productivity of rainfed cotton ( <i>Gossypium hirsutum</i> L.)
74.	Mahesh Babu, M. G.	Physiological analysis of yield in onion ( <i>Allium cepa</i> L.) genotypes as influenced by production systems.
75.	B. V. Suresh	Pod growth rate, partitioning factor and translocation of photosynthates in bunch genotypes of groundnut ( <i>Arachis hypogaea</i> L.) in relation to yield.
76.	Dileep I. Jirali	Physiological studies on productivity in some chickpea ( <i>Cicer arietinum</i> L.) genotypes under rainfed conditions.
77.	Kammane V. Somashekarappa	Genotypic differences in stomatal frequency, stomatal number per plant, photosynthetic efficiency and their relationship with productivity under rainfed conditions in finger millet ( <i>Eleusine coracana</i> Gaertn.)
78.	C. K. Ravi	Physiological studies on flowering and pod development in greengram [ <i>Vigna radiata</i> (L.) Wilczek].
79.	K. J. Ashoka	Leaf area distribution in the canopy, leaf conductances and its relationship to growth and productivity in sunflower ( <i>Helianthus annuus</i> L.) genotypes.
80.	I. S. Umesh Chandra	Regulation of senescence and abscission by phenolic compounds and ethylene synthesis inhibitors.
81.	James Jacob	Light distribution, canopy conductances, carbon exchange rates and bioproductivity in sunflower



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		( <i>Helianthus annuus</i> L.) and sorghum ( <i>Sorghum bicolor</i> (L.) Moench) canopies with different leaf area indices.
<b>Horticulture</b>		
82.	Chepudira G. Kushalappa	Storage studies in banana ( <i>Musa paradisiaca</i> L.) var Robusta.
83.	M. N. Ramesh	Studies on the effect of sowing dates and nutrients in Isabgol ( <i>Plantago ovata</i> Forsk.)
84.	T. P. Murali	Effects of certain growth regulators on growth, composition and flowering in 'Kakada' ( <i>Jasminum multiflorum</i> Andr.)
85.	Pawan Srivastava	Propagation of certain varieties of mango ( <i>Mangifera indica</i> L.) by air-layering.
86.	Dilip Kumar Dash	Growth dynamics, flowering and fruit development in pomegranate ( <i>Punica granatum</i> L.) selection GKVK-1, and its propagation by cuttings.
87.	T. Herbert Dietz	Studies on the structure and development of the cuticle and lenticels and their influence on the weight of fruits during storage in mango ( <i>Mangifera indica</i> L.)
88.	A. P. Anantha Kumar	Studies on relative economy in the use of irrigation water in sweet orange ( <i>Citrus sinensis</i> (L.) Osbec.) var. Sathgudi
89.	Basavaraj S. Hiremath	Influence of pinching and growth retardant on growth and development of marigold ( <i>Tagetes erecta</i> Linn.), cv. African Giant.
90.	Malleshappa, H.	Influence of pinching and CCC on growth and yield of China Aster ( <i>Callistephus chinensis</i> Nees) cv. Ostrich plume.
91.	M. D. Hadimani	Studies on chemical weed control in french bean ( <i>Phaseolus vulgaris</i> L.)
92.	G. S. Nagaraja	Propagation studies in some species of jasminum by cuttings.
93.	K. R. Neelakanta Murthy	Studies on <i>Catharanthus roseus</i> (L.) G. Don.

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94.	K. C. Mahadeva Swamy	Studies on the simple storage techniques for onion cv. Bellary Red ( <i>Allium cepa</i> Linn.) with preharvest treatment of maleic hydrazide.
95.	E. Mohan	Studies on the effects of pruning and growth regulators on vegetative growth and flowering in cashew ( <i>Anacardium occidentale</i> L.).
96.	N. Sulalappa	<i>In vitro</i> propagation of orchids.
97.	H. K. Shamantha Kumar	Viability of seeds of papaya ( <i>Carica papaya</i> L.) cv. 'Coorg Honey Dew' as influenced by seed maturity and storage.
98.	B. N. Srinivasa Murthy	Studies on propagation of ber ( <i>Zizyphus mauritiana</i> Lam.)
99.	K. M. Srinivasa Murthy	Influence of growth regulators and fertilizers on proliferation of suckers in cardamom ( <i>Elettaria cardamomum</i> Maton.)
100.	Govinda Narayana Dongre	Standardization of horticultural practices for commercial production of marigold ( <i>Tagetes erecta</i> Linn)
101.	H. V. Ravindra	Studies on the effect of nutrients on growth, yield and oil content in <i>Ocimum basilicum</i> L.
102.	B. P. N. Jayanthamma	Character association and stability analysis in french bean ( <i>Phaseolus vulgaris</i> L.)
103.	T. H. Kempe Gowda	Studies on the propagation of Queen Elizabeth, Maria Callas and Superstar rose cultivars by cuttage.
104.	H. B. Patil	Effect of nitrogen, phosphorus, potassium and method of their application on growth, yield and quality of radish ( <i>Raphanus sativus</i> L.) cv. Japanese white.
<b>Agricultural Microbiology</b>		
105.	Anand Titus Pereira	Multiplication of azolla ( <i>Azolla pinnata</i> R. Br.) isolates in soils of Karnataka.
106.	V. Jayachandra Reddy	Growth and inoculant production of blue-green algae and field response in paddy ( <i>Oryza sativa</i> L.)

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107.	Ravindra C. Gundappagol	Effect of pesticide seed treatment on rhizobium and symbiotic nitrogen fixation in redgram [ <i>Cajanus cajan</i> (L.) Millsp.]
108.	K. Srinivasarao	Studies on growth and nitrogen fixation of some algal species in the presence of selected chemicals.
109.	D. Girija	Aspects of inoculant production and crop response to blue-green algae.
110.	K. Ramanand	Biogas production from poultry droppings and influence of fermented slurry on soil microflora.
111.	Geeta, G. S	Aflatoxin production by <i>Aspergillus flavus</i> Link. isolated from species and its effect on growth of male wistar (albino) rats.
112.	B. R. Manu	Study of aflatoxin in stored and freshly harvested redgram [ <i>Cajanus cajan</i> (L.) Mill sp.].
113.	A. C. Siddalinga Swamy	Effect of pesticides on rhizobium seed inoculation and symbiosis in groundnut ( <i>Arachis hypogaea</i> L.).
114.	K. Giridhara Shetty	Isolation and testing of azospirillum and other diazotrophs from endorhizosphere of rice ( <i>Oryza sativa</i> L.).
115.	Anusuyadevi, S	A study on the mycotoxin isolated from sunflower <i>Helianthus annuus</i> (L.).
<b>Plant Pathology</b>		
116.	D. B. Singh	Investigations on the root-knot nematode ( <i>Meloidogyne incognita</i> (Kofoid and White Chitwood) resistance in cowpea [ <i>Vigna unguiculata</i> (L.) Walp].
117.	R. D. Savanur	Studies on leaf spot of cotton caused by <i>Alternaria macrospora</i> Zimm.
118.	Dattatraya G. Hegde	Studies on mycoflora associated with cowpea [ <i>Vigna unguiculata</i> (L.) Walp.] seed.
119.	P. Rajkumar	Studies on the response of tomato cultivars to three races of root-knot nematode, <i>Meloidogyne incognita</i> .

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120.	L. G. Dinesha	Studies on grey leaf spot of sorghum ( <i>Sorghum bicolor</i> (L.) Moench) caused by <i>Cercospora sorghi</i> Ellis and Everhart.
121.	T. Narendrappa	Studies on grain mouldness of sorghum ( <i>Sorghum bicolor</i> (L.) Moench) caused by <i>Gonatobotrys</i> Riess. Ex <i>fresenius</i> .
122.	S. N. Chattannavar	Studies on leaf blight of wheat caused by <i>Alternaria alternata</i> (FR.) Keissler.
123.	T. A. Sreerama Setty	Studies on the efficacy of TC-102 an antihelmintic antibiotic in the control of root-knot nematode <i>Meloidogyne incognita</i> (Kofoid and White) Chitwood on tomato.

#### Seed Technology

124.	N. Venkate Gowda	Estimation of loss of stored soybean due to the bruchid, <i>Callosobruchus maculatus</i> (Fabricius) and its biology, ecology and control.
125.	Sharad Deshpande	Effect of growth regulators and their spraying times on flower abscission, seed yield and quality of three cultivars of pigeon pea ( <i>Cajanus cajan</i> (L.) Millsp.).
126.	A. Nagaraja	Evaluation of quality and field performance of seeds from main and ratoon crops of rice ( <i>Oryza sativa</i> L.).
127.	R. Siddaiah	Studies on the effect of growth regulators on the induction of seed germination of trees of silvi-horticultural importance.
128.	N. V. Chandrashekar	Seed development, physiological maturity and storage studies in sesamum ( <i>Sesamum indicum</i> L.).
129.	Vijayakumar G. Koujalgi	Effect of seed blending and seed treatment on yield and seedling growth of CSH-5 sorghum hybrid ( <i>Sorghum bicolor</i> (L.) Moench).

#### Statistics

130.	Rajat Kumar B. Naik	Price and arrival behaviour of groundnut ( <i>Arachis hypogaea</i> L.) in selected regulated markets of Karnataka.
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131.	Y. N. Havaladar	Statistical evaluation of crop responses to fertilizers and other soil characteristics.
<b>Dairy Technology</b>		
132.	N. Thyagaraja	Utilisation of buttermilk in the manufacture of khoa and khoa-based sweets.
133.	Dayanand Hiremath, S.	Study of different types of rennets on yield and quality of cottage cheese.
135.	S. Krishna Prasad	Process development for manufacture of sterilized flavoured modified soymilk.
135.	N. Muniraju	Development and control of hydrolytic rancidity in ghee and renovation of rancid ghee.
136.	G. N. Siva Reddy	Studies on factors affecting flavour and grain formation in ghee.
137.	P. Ahmed Peeran S.A.	Studies on the extraction of a milk coagulant (pepsin) from domestic fowls, its characteristics and utilisation in the preparation of surti cheese.
<b>Dairy Microbiology</b>		
138.	Abbas Mahjoob	Associative growth of <i>Lactobacillus acidophilus</i> and <i>Streptococcus thermophilus</i> in the preparation of acidophilus fermented milk.
139.	Prabha, R.	Studies on the antibacterial activity of <i>Lactobacillus acidophilus</i> cells for their incorporation in ice cream.
140.	T. Prasanna	Studies on the effect of feeding milk and fermented milks on cholesterol levels in experimental rats.
<b>Dairy Chemistry</b>		
141.	M. D. Satheesh	Studies on effect of stabilizers and neutralizers on heat stability of milk.
142.	P. K. Keshava Prasad	Effect of oxygen and copper on autoxidation of milk fat fractions.

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**M.V.Sc.****Animal Genetics & Breeding**

143. S. Nagaraju                      Performance studies of jersey herds in Karnataka.

**Vety. Microbiology and Public Health**

144. Sana S. Aziz                      Studies on infectious bursal disease in relation to seroepidemiology, virus isolation and immunosuppression.
145. S. V. Subramaniam              Evaluation of leptospiral ribosomal vaccines.
146. P. V. Yathinder                  Studies on modified sheep pox vaccine—field trials with lamb testes adapted virus.
147. H. S. Nagesha                    Isolation and characterization of bovine rotavirus.
148. A. H. Nawroz                      Assay of rinderpest antibodies by an improved micro enzymes linked immunosorbent assay (*Micro elisa*) technique.

**Gynaecology and Obstetrics**

149. Suresh S.                          Studies on synchronization of oestrus and fertility in buffalo heifers during summer, using carboprost-tromethamine and its effect on certain biochemical parameters of blood and physical characters of oestrus flow.  
Honnappagol

**Veterinary Parasitology**

150. Y. B. Rajeshwari                  Studies on the acaricidal property of biotic (Propetamphos) on some ticks of domestic animals.

**Veterinary Medicine**

151. K. B. Somashekar                  The role of lectins in the detection of J blood group in cattle.

**Veterinary Surgery**

152. B. G. Rajsekharappa              Experimental onychectomy and tenectomy of flexor digitorum profundus in domestic cats (*Felis catus*).
153. H. V. Veerbhadraiah              Studies on tracheotomy and its reconstruction with prosthetic material in experimental canines.

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<b>Veterinary Pathology</b>		
154.	K. V. Susheelendra	Pathology of dermatitis in buffaloes.
155.	Vincent L. Machado	Pathogenesis of experimental allergic encephalomyelitis in guinea pigs.
156.	O. Lakshmana Reddy	Pathology of hepatic disorders in bovines.
<b>Poultry Science</b>		
157.	D. R. Gowda	Effect of subabul leaf meal ( <i>Leucaena leucocephala</i> ) and sorghum in layer diets.
158.	A. I. Basavaraja Reddy	Prediction of metabolizable energy based on dry matter metabolizability.
<b>M.F.Sc.</b>		
<b>Fish Processing Technology</b>		
159.	M. Cross Victor Raj	High temperature processing of fish sausage and its shelf life study at different storage temperatures.
160.	M. S. Suresh Kumar	Canning of pink perch ( <i>Nemipterus japonicus</i> ).
161.	G. Chandra Chud	Studies on the quality control aspects in the processing of frozen froglegs.
162.	Seetharama Shetty T.	Studies on the use of torrymeter for the measurement of freshness of fishes.
163.	R. Sudhakaran	Studies on preparation and shelflife of salted fish mince.
164.	Devaraju A. N.	Comparative study of fish bacteria from tropical cold/temperature marine waters.
165.	M. S. Satish	Production, utilization and storage studies of minced meat of oil sardine ( <i>Sardinella longiceps</i> ).
<b>Fishery Biology :</b>		
166.	P. Sukumar	Reproductive cycle and early development of the rock oyster <i>Saccostrea cucullata</i> (von Born).
167.	H. Honne Gowda	Observations on the biology of the Indian sand-whiting, <i>Sillago sihama</i> (Forsk.)
168.	D. Krishna Murthy	Some aspects of biology of the freshwater prawn, <i>Macrobrachium equidens</i> (Dana).

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169.	Gangadhara Gowda	Some biological aspects of <i>Valamugil seheli</i> (Forsk.) from Mangalore waters.
170.	Sibnarayan Dam Roy	Biology of spawning in the brown mussel <i>Perna indica</i> (Kuriakose and Nair).
<b>Aquaculture</b>		
171.	M. M. Vijayan	Effect of artificial aeration on the growth and survival of carps.
172.	Iqbal Ahmed	Studies on polyculture of <i>Macrobrachium rosenbergh</i> (De Man) and carps.
173.	Vichitra Kumar Shetty	Studies on the hormonal regulation of the testicular activity in the freshwater catfish, <i>Clarias batrachus</i> (Linn.).
174.	Sushantha Borthakur	Evaluation of cheaper proteins through supplementary diets in the culture of <i>Clarias batrachus</i> (Linn.) and carps.
175.	A. N. Ravishankar	Observations on the growth response of <i>Macrobrachium rosenbergii</i> (De Man) fed on different pelleted feeds.
<b>Fishery Oceanography</b>		
176.	G. P. Puttaswamy	Studies on bottom currents and some other oceanographic features in relation to trawl fishing off Someshwara, Dakshina Kannada.
177.	Venkatesh Prabhu	The influence of bottom currents and some other hydrographic features on experimental trawl fishing in the Arabian sea off Suratkal.
<b>Fishery Microbiology</b>		
178.	M. Subburaj	Relation between histidine decarboxylating bacteria and levels of histamine in fishes.
<b>Aquatic Biology</b>		
179.	R. Sampath Kumar	Studies on the distribution of plankton in waters off Mangalore.



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<b>M.H.Sc.</b>		
<b>Foods and Nutrition</b>		
180.	Mullapudi	Diet during pregnancy and lactation and its influence on growth of infants.
181.	Sarada M.	Microbiological and chemical quality of ice creams and water ices sold in Bangalore City.
182.	Sridevi P. Sondur	<i>In vitro</i> availability of iron from foods.
183.	Shobha G. Mummigatti	Standardization and nutrient analysis of recipes prepared from locally available food grains.
184.	Savita S. Shete	A study on motor development of infants from birth to three months.
185.	K. Padma	Consumer evaluation and protein quality of selected soy blended products.
186.	Sumangala K. Jakareddi	A study on infant feeding practices.
R. B. PATIL Director of Instruction (PGS) Dharwad		

## 2. Agricultural College, Hebbal, Bangalore

Dr. R. Ramanna, Professor and Head, Department of Agricultural Economics, took charge as Director of Instruction (Agri), consequent to the voluntary retirement of Dr. K. S. Krishna Sastry, with effect from 23rd April 1984.

**Teaching:** The academic year 1983-84 ended on 8-9-1984. The academic year 1984-85 commenced on 8-10-1984 for the Undergraduate classes and on 26-11-1984 for Postgraduate classes. The first trimester for UG classes ended on 19-1-1985. The second trimester for UG classes commenced on 11-2-1985 and ended on 25-5-1985.

The first trimester for Postgraduate classes ended on 9-3-1985 and the second trimester commenced on 18-3-1985.

As part of the course curriculum, the students of Final B.Sc.(Agri)/B.Sc. (Hort)/B.Sc.(Agri. Marketing & Coop.) were taken on All India Educational Tour for a period of 20 days during the first trimester break. The students of III year class were taken on Educational Tour within the State for a period of 10 days.

Mr. Charles Myer, an M. S. student in Agricultural Economics from the University of Tennessee, Knoxville worked in the Department of Agri. Economics, GKVK, for about 4 months towards his thesis research.

### Students Strength

	<i>Undergraduate</i>		
	II year	III year	IV year
B.Sc.(Agri)	149	235	165
B.Sc.(Hort)	35	41	35
B.Sc.(Ag.Mktg.& Coop)	17	20	31
B.Sc. (Seri)	22	19	—
	<i>Postgraduate</i>		
	Junior	Senior	
M.Sc.(Agri)	189	130	
M.Sc.(Hort)	33	16	
M.Sc.(Seri)	16	6	
M.H.Sc.	6	5	
Ph.D.	29	51	

### Students Performance

Two hundred and five (205) students have completed the B.Sc. (Agri) degree from this College during the period under report. Thirty students have completed the B.Sc. (Hort) degree and thirteen have completed the B.Sc. (Agri. Marketing and Cooperation) degree during the year 1984-85.

The performance of the Undergraduate students based on the CGPA obtained at the end of their degree programme is given below :

Degree Programme	CGPA	4.00	3.50 & above	3.00 to 3.49	2.50 to 2.99	2.00 to 2.49
B.Sc. (Agri)	—	34	57	59	55	
B.Sc. (Hort)	—	9	10	8	3	
B.Sc. (Ag. Mktg. & Coop.)	—	2	3	6	2	

Twenty students have completed their Ph.D. degree and 97 have completed Masters degree in various subjects from this College during the year.

The following students of this College were awarded Gold Medals at the 19th Convocation held in February 1985, for their outstanding performance in their respective degree programmes :

1. Dr. S. Devashikhamany, Ph.D. in Horticulture.
2. Dr. K. N. Ranganatha Sastry, Ph.D. in Agricultural Economics.
3. Dr. B. Srinivas, Ph.D. in Agronomy.
4. Joy, P. P., M.Sc. (Agri) in Agronomy.
5. A Nagaraja, M.Sc. (Agri) in Seed Technology.
6. James Jacob, M.Sc. (Agri) in Crop Physiology.
7. Rame Gowda, B.L., M.Sc. (Agri) in Agricultural Extension.
8. Meenakshi, V., M.Sc. (Agri) in Agricultural Economics.
9. K. R. Neelakanta Murthy, M.Sc. (Agri) in Horticulture.
10. Murali, T. P., M.Sc. (Hort) in Floriculture.
11. Habibur Rahman, H. R., (six gold medals) — I Rank holder in B.Sc. (Agri).
12. Kabi Raj Neupane, II Rank in B.Sc. (Agri).
13. Tilak Ponnappa, K., I Rank in B.Sc. (Hort).
14. Gopal, S. M., II Rank in B.Sc. (Hort).
15. Y. S., Prabhakara I Rank in B.Sc. (Ag. Mktg. and Coop).
16. Mawshandong Baskhem Blah, II Rank in B.Sc. (Ag. Mktg. & Coop).

#### **Extra Curricular Activities**

1. A Blood Donation Camp at the request of the Medical Services Sub-Committee, Rotary Club of Bangalore, was organised at the Agricultural College, Hebbal, Bangalore on 14-5-1984. The response from the teachers and the student community of the Campus was encouraging. 45 bottles of blood was donated.

2. The students and staff of the Department of Agricultural Botany, have formed a 'Friday Club' to conduct weekly meetings on topics of Genetics and Plant Breeding.

3. The final year B.Sc.(Agri)/B.Sc. (Hort) students organised 6 educative exhibitions as part of their village stay practical extension programme.

4. The PG students of Seed Technology Department organised a 'Thursday Group' to conduct weekly sessions on topic of interest in Seed Technology.

5. The students of this College participated in various Inter-Collegiate and Inter-University competitions.

6. The Agricultural Marketing and Cooperation Club brought out a souvenir 'SMRUTI' which was released by Dr. N. G. Perur, Vice-Chancellor on 21-9-1984.

### **Visitors**

#### *Department of Agronomy*

1. Dr. G. P. Verma, Dean, College of Agriculture, Indore.
2. Dr. S. Subramanian, Director, Soil Crop Management Centre, Tamil Nadu Agricultural University, Coimbatore.

#### *Department of Agricultural Botany*

1. Dr. C. M. Rick, Tomato Breeder, California, USA.
2. Dr. Gopalakrishna, West Virginia, USA.
3. Dr. Shanmugasundaram, AVRDC, Taiwan.
4. Dr. Lakshmi Seetha, Scientist, Indian Institute of Science, Bangalore.
5. Dr. Pauala, University of Connecticut, USA.
6. Dr. Silandar, University of Connecticut, USA.
7. Dr. Nayar, Prof. of Agril. Botany, Kerala Agril. Univ., Vellayani.
8. Dr. K. S. Prakash, Sorborne University, France.
9. Dr. Bhat, PDF, ICRISAT.

#### *Department of Chemistry and Soils*

1. Dr. G. S. Sekhon, Director, Indian Potash Research Institute, New Delhi.
2. Dr. Raymond W. Miller, Visiting Professor, Utah Logan, USA.
3. Dr. G. W. Van Loon, Visiting Professor, Canada, Toronto.

#### *Department of Agricultural Extension*

1. Dr. A. John Knight, Ex-Director of Extension, Tamil Nadu Agril. University, Coimbatore.
2. Dr. Sangle, Director of Extension, Maharashtra.
3. Prof N. H. Patel, Principal, Extension Education Institute, Gujarat Agricultural University, Anand.
4. Vice-Chancellor, Ghana University.
5. Consultants, COVERDALE Management Organisation.

*Department of Agricultural Economics*

1. Mr. P. T. Uday and Mr. M. V. Bhat, NOCIL Agro-Chemicals and Consolidated Coffee Ltd., Kodagu.
2. Farm Management Trainees from Mahatma Phule Agril. University, Akola.

*Department of Entomology*

1. Dr. Tom Wood, Tropical Dev. Research Institute, London, UK.
2. Dr. David Pearson, Penn. State University, USA.
3. Dr. Sabine, Waite Agril. Extension Station, Adelaide, Australia.
4. Dr. Whiteman, ICRISAT, Hyderabad.
5. Mr. Angus Hutton, Grain Farmer, Australia.
6. Mac Farlane, Acarologist, B. Museum, UK.
7. Dr. R. Muniappan, Assoc. Director, Guam Experiment Station, Guam.

*Department of Farm Forestry*

1. Dr. Jim Trappe, Forestry Science Laboratory, Oregon State University, USA.
2. Dr. Philip Adlard, Commonwealth Forestry Institute, Oxford.
3. Dr. John C. Gordon, Dean, School of Forestry and Environmental Studies, Yale University, USA.
4. Dr. Takee Shinohara, Assoc. Professor, Department of Forestry, University of Ryukus, Okinawa, Japan.
5. Director of Farms, Konkan Krishi Vidyapeetha, Dapoli, Maharashtra.
6. Dr. W. Wyn Ellis, Agronomist, Atkins Land and Water Management Centre, Cambridge, UK.
7. Dr. Ion R. Calder, Institute of Hydrology, Wellingford, UK.
8. Dr. M.W. Jha, Head, Forest Soils Branch, Forest Research Institute, Dehra Dun.
9. Dr. B. K. Subba Rao, Head, Forest Influences Branch, Forest Res. Institute, Dehra Dun.

*Department of Horticulture*

Dr. C. M. Rick, Professor of Vegetable Crops, University of California, USA and FAO/UNDP Consultant on Breeding of Vegetable Crops.

*Department of Rural Home Science*

Vice-Chancellor, Ghana University.

*Department of Agricultural Marketing and Cooperation*

Mr. Chandrasekhar, Asst. Secretary, Karnataka State Cooperative Union along with Mr. Das, Special Officer (Coop.) Government of Tamil Nadu and Mr. Thirunarayana, Vice-Principal, Coop. Training College, Madras.

2. Dr. Balwanth Madan, Senior Economist, NCAER, New Delhi.

*Department of Agricultural Microbiology*

1. Dr. I. Watanabe and Dr. J. K. Ladha, International Rice Research Institute, Philippines.

2. Dr. R. J. Davis and Dr. P. Singleton, NIFTAL Project and MIRCEN, Paia, Maui, Hawaii, USA.

3. Dr. Ian Napier, Forest Research Project, Overseas Development Agency, Kathmandu, Nepal.

4. Dr. L. G. Lessard, International Development Research Centre, Ottawa, Canada.

5. Dr. Cherala Sastry, IDRC, Asian Regional Office, Tanglin, Singapore.

*Department of Seed Technology*

Dr. P. K. Agarwal, Project Coordinator, NSP, IARI, New Delhi.

**Guest Lectures**

Sl. No.	Name and designation of the speaker	Topic
1.	Dr. S. Subramanian, Director, Crop & Soil Management Centre, TNAU, Coimbatore.	Agriculture in South Korea.
2.	Dr. Pacala, Univ. of Connecticut, USA.	Optimisation Theory
3.	Dr. Lakshmi Seetha, Indian Instt. of Science, Bangalore.	Tissue culture and its application in agriculture
4.	Dr. Gopalakrishna, Univ. of West Virginia, USA	Environmental Carcinogenesis.
5.	Dr. N. Sunder Raj, Prof. of Statistics, UAS	Faraday and Friday Club of London.

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6.	Dr. A. John Night, Ex-Director of Extension, Tamil Nadu Agril. Univ.	Extension activities of voluntary organisations.
7.	Dr. Sangle, Director of Extension, Maharashtra.	Extension activities in the State of Maharashtra.
8.	Dr. B. N. Choudhari, S.III, Transfer of Technology Divison, ICAR, New Delhi.	Importance of Krishi Vignana Kendras and Lab-to-Land Programme.
9.	Dr. D. L. Pearson, Assoc. Prof. of Biology, Penn. State University, USA.	Theory of natural selection on : i) Predation. ii) Competition and iii) Socio-biology.
10.	Mr. Bruce Gill, -do-	Neotropical dung beetles
11.	Dr. Sabine, Waite Agri. Experiment Station, Adelaide.	Vermiculture.
12.	Dr. R. Muniyappan, Guam Experimental Station, USA.	Biocontrol in Guam.
13.	Dr. Takeo Shinohara, Assoc. Prof., Dept. of Forestry, College of Agriculture, Rynkyus University, Japan.	Management of Forests in Japan.
14.	Dr. Macfarlane, B. Muxm. Acarologist, B. Museum, UK.	Entomology - Acarology Section in B. Museum.
15.	Dr. John C. Gordon, Dean, Yale University, USA	i) Non-leguminous N <sub>2</sub> fixing trees and ii) Tree and Water.
16.	Dr. Adam Pain, University of East Anglia, Norwich, UK.	Social Forestry Development in South India.
17.	Dr. D. K. Uppal, Professor and Head, Dept. of Horticulture, Punjab Agri. Univ., Ludhiana.	Availability of temperate fruit plants under subtropical conditions.

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18.	Dr. C. C. Maji, Assistant Director-General, ICAR, New Delhi.	New areas of research in Agricultural Economics.
19.	Dr. K. S. Dharekar	Nematode problems and progress in Maharashtra.
20.	Dr. Sarafat Ali, Nematologist, CPCRI, Kasaragod.	Nematode problems in cardamom.
21.	Dr. C. M. Rick, Prof. of Vegetable Crops, Univ. of California and UNDP/FAO Consultant.	i) Germplasm resources in Lycopersicon species and their use in breeding and ii) Male sterility and its use in breeding.
22.	Dr. K. M. Safeulla, Prof. & Head, Applied Botany, Mysore University.	Principles of seed production and seed pathology.
23.	Dr. P. C. Keshavan, Prof. of Life Sciences, Jawaharlal Nehru University, New Delhi.	Radiobiological aspects of barley seeds.

#### **Seminars/Symposia/Workshops**

1. A training programme on Irrigation Water Management was organised by the Department of Agronomy for the CADA Cauvery Basin Project Officers at RRS, Mandya, from 12/15-3-1985.

2. A one day workshop on "Annual Colloquium of Friday Group on recent advances in Plant Breeding and Genetics" was held in the Department of Agril. Botany on 9-12-1984.

3. Soil Test and Fertilizers Recommendations and Fertilizer and Manures Training Programme was conducted by the Department of Chemistry and Soils for the benefit of the personnel of the Department of Agriculture.

4. Training programme on Teaching Methods was organised by the Department of Agricultural Extension for the benefit of the personnel of the Department of Agriculture.

5. The Directorate of Extension, Govt. of India, in collaboration with the UAS initiated the conduct of management courses for Senior Officers and



middle management functionaries from different parts of the country. This programme was conducted by a team of management consultants from the COVERDALE and the Professor of Extension, Hebbal.

6. The Centre for Rural Development Studies, in collaboration with the FICCI, New Delhi, conducted the 5th Training Programme on Rural Development for the executives of the corporate and voluntary sectors.

7. IFFCO Professors' Meet was organised by the Dept. of Agricultural Extension to discuss fertilizer promotion programmes and to provide leadership in organising IFFCO Professorial Meet during June 1984.

8. The Department of Entomology organised a 3-day training programme in 'Bee Keeping' in 4 batches of about 20 candidates from Bangalore and neighbouring districts.

9. The Entomology Department conducted a short-term training programme in Acarology during January 1985.

10. The Department of Agricultural Microbiology organised a seminar on *kharif* Pulses for Subject Matter Specialists and Extension Workers of the State Department of Agriculture.

11. The Department of Agricultural Microbiology organised a Training Course on the use of Rhizobium and Blue Green Algae in crop production for the extension workers under the National Project on Fertilizers from 13.1.1985 - 18 participants took part.

12. A training course on the use of Rhizobium and Blue Green Algae in crop production was organised for the senior officers of the State Department of Agriculture.

13. The Department of Agricultural Microbiology trained the scientists from the School of Biological Sciences, Kamaraj University, Madurai, IIHRI; Bangalore; the Microbiologist, IARI, New Delhi, and scientists from Madurai, University in the techniques used in mycorrhiza study.

14. The 13th Annual Workshop of Coordinated Scheme on Microbiological Decomposition and Recycling of Farm and City Wastes was conducted by the Department of Agricultural Microbiology from 17.12-1-85 Hebbal.

15. A Workshop to develop Instructional-cum-Practical Manuals on i) Agricultural Meteorology and ii) Water Management organised by the NCERT, New Delhi, was held in the College from 1.11.84 to 5.11.1984.

**International Seminars/Workshops/Training Programmes/Study Tours**

1. Mr. Mallikarjuna Aradhya, Asst. Prof. of Agricultural Botany has been awarded the East-West Centre Study Grant for 1985-86 for higher studies at the University of Hawaii.

2. Dr. D. M. Mahishi, Asst. Prof. of Agricultural Botany and Dr. B. A. Satyan, Assoc. Prof. of Agricultural Botany attended the International Symposium on Genetics at Beijing, China and presented papers.

3. Dr. M. K. Sethu Rao, Professor of Agricultural Extension, participated in the National Conference on mid-term appraisal of T and V system at Kedumumalai, Tamil Nadu.

4. Dr. R. Ramanna, Professor of Agricultural Economics and Head, participated in the meetings of the Agricultural Prices Advisory Committee constituted by the Government of Karnataka and visited several parts of the State with the Committee.

5. The Department of Farm Forestry, organised Vanamahotsava on 7-7-1984. Dr. John C. Gordon, Dean, School of Forestry, Yale University, USA, was the Chief Guest. Dr. N. G. Perur, Vice-Chancellor, UAS, presided.

6. The following teachers of the Department of Horticulture were deputed for Fellowship Training under the UNDP/ICAR Centre for Advanced Studies in Tropical Horticulture.

Name and Designation	Area of specialisation	Place of training
Dr. K. R. Melanta Assoc. Prof. of Horticulture	Citriculture	Florida, USA
Mr. A. G. Huddar Assoc. Prof. of Horticulture	Post-Harvest Technology	Australia
Mr. B. G. Muthappa Rai Assoc. Prof. of Horticulture	Landscape Gardening	Cornell University, USA
Dr. N. Vijayakumar Horticulturist (Pomology)	Tissue Culture	Cornell University, USA
Mr. J. V. Narayana Gowda Horticulturist	Tissue Culture	Cornell University, USA

7. The Department of Rural Home Science in collaboration with the Institution of Agricultural Technologists organised World Food Day. An exhibition was also arranged in this connection.

8. The Department of Agricultural Marketing and Cooperation arranged a film show on 'Marketing of Agricultural Commodities'.

9. Dr. R. Ramanna, Professor and Head, Department of Agricultural Economics attended a seminar on the 'Aftermath of the 6th Five Year Plan and the 7th Five Year Plan' organised by the University of Mysore and the FICCI on 6th and 7th August 1984.

10. Dr. R. Ramanna, Professor and Head, Department of Agricultural Economics, participated in the seminar organised by the High Court of Karnataka for the benefit of Civil Judges and delivered a talk on "Land Acquisition and Payment of Compensation" on 28/29-9-1984.

11. Dr. K. Ranganatha Sastry, Associate Professor of Agricultural Economics delivered a lecture on 'Socio-Economic Survey and Constraint Analysis' to the Officers of the Department of Agriculture from Bangalore and Mysore Divisions on 31-7-1984.

12. The Staff of the Department of Entomology participated in the seminar on 'Integrated Control of Coconut Blackheaded Caterpillar with Parasitoids' at Tiptur, Mandya and other places.

13. The Staff of the Entomology Department participated in the following seminars/training programmes :

- i) AEP (T & V) Programme of the State Department of Agriculture.
- ii) Regional Training Programme for the specialists of National Demonstration Scheme.
- iii) Youth Training Programme at Vidyanagar, Devanahalli taluk.
- iv) Training Programme on Bee-keeping for public.
- v) Delivered two radio talks :
  - a) Plant protection on castor and avare
  - b) Household pest control.

14. Mr. Francis Xavier, Associate Professor of Agricultural Marketing and Cooperation attended a special programme for University Teachers at the Vaikuntha Mehta National Institute for Cooperative Management for 10 days from 14-5-1984.

15. Dr. P. G. Chengappa, Professor of Agricultural Marketing and Cooperation participated in a seminar on Horticultural Development in northern Karnataka.

16. Dr. P. G. Chengappa, Professor of Agricultural Marketing and Cooperation participated in the seminar organised for the benefit of Civil Judges of Karnataka on Land Acquisition and Payment of Compensation on 28/29-9-1984.

17. Mrs. Hemaltha Patil, Associate Professor, Department of Agricultural Marketing and Cooperation attended the following seminars.

- a) International Security organised by the Institute of Parliamentary Affairs.
- b) Role of Cooperatives in Public Distribution System organised by the Karnataka State Agricultural Rural Development Bank.
- c) Rural employment through rural industrialisation – the role of promotional agencies organised by KVIC.
- d) Workshop on Urban Cooperative Banks.

18. Dr. P. V. Rai and Dr. J. Raj of Department of Agricultural Microbiology attended the 4th Annual Workshop of Biological Nitrogen Fixation Scheme held at Annamalainagar, Annamalai University, from 14/16-11-1985.

19. Dr. P. V. Rai, Professor of Agricultural Microbiology and Dr. D. J. Bhagyaraj, Associate Professor of Agricultural Microbiology attended the first INDO-US Senior Scientific Panel Programme Workshop on Biological Nitrogen Fixation and Nitrogen Fertilizer Efficiency at IARI, New Delhi from 25/28-9-1985.

20. Dr. J. Raj, Microbiologist, BNF Project underwent post-doctoral programme for 10 months at the Laboratory of Microbiology, Agricultural University of Wageningen (The Netherlands).

21. Dr. S. V. Hegde, Senior Microbiologist, attended the *rabi* Pulses Workshop held at Gujarat Agricultural University, Junagadh from 17/20-9-1984.

22. Dr. P. V. Raj, Professor of Agricultural Microbiology attended the Workshop of the International Atomic Energy Agency at Vienna International Centre (Austria) during 20-30 November 1984 and presented the progress report at the II FAO/IAEA/IG/Research Coordination Meeting on the use of Nuclear Technique in improving Pasture Management.

23. Dr. D. J. Bhagyaraj, Associate Professor of Agricultural Microbiology visited USA under the INDO-US Project on Synergistic Interaction between VA mycorrhiza and rhizobium—under Senior Scientific Programme from November 21 to December 20, 1984. He also attended the Symposium on 'Mycorrhiza' at Oregon, USA.

24. Dr. S. V. Hegde, Scientist (Microbiology) visited several laboratories in the USA for a total of 28 days from November 21 to December 20, 1984, under Indo-USA senior scientific panel programme of Indo-US Rhizobium project.

25. Mr. A. Manjunath, Department of Agricultural Microbiology, was deputed for Ph.D. programme at the University of Hawaii, USA.

**R. RAMANNA**

*Director of Instruction (Agri) (i/c)*

### **3. College of Agriculture, Dharwad**

The Agricultural College, Dharwad has established new traditions of its own in giving practical training to the undergraduates. The students are given a few guntas of land during the course of their undergraduate study for growing different crops under "Earn While You Learn" arrangement. Naturally, the students get practical knowledge of growing different crops, farm operations etc., and as such, they will be full fledged agriculture graduates possessing theoretical knowledge with practical experience.

Field laboratory for Horticultural Department, Agricultural Botany and Animal Science Departments were constructed. However, to a spurt in teaching, research and extension activities, there is a great demand for additional space. It is very necessary to construct some more buildings to provide much needed space to teaching and research wings.

The new library building continues to attract many students and staff. The number of students and staff availing the library facilities has increased.

**Students strength**

	B.Sc. (Agri.)	B.Sc. (Ag. Maco.)	B.H.Sc.
I year	103	13	21
II year	136	14	40
III year	129	19	25
IV year	112	22	—
Repeaters	60	4	10
	540	72	96

**Students performance**

i) The students successfully completed their degree from this campus up to 1983-84 is as under :

B.Sc. (Agri)	....	2846
B.Sc. (Ag. Mark. & Coop.)	....	100
B.H.Sc.		165

ii) The following students have successfully passed the competitive examination conducted by ICAR and were awarded the Junior Fellowships of value of Rs. 400/ p m. each for study and research for Master's degree under 1984-85 programme.

**I.C.A.R.**

Sl. No.	Rank	Name	Department
1.	3	G. N. Kulkarni	Ag. Economics
2.	13	S. G. Gachchinamath	-do-
3.	4	D. S. Uppar	Seed Technology
4.	7	V. S. Hegde	Ag. Extension
5.	11	Geeta B. Mahale	Home Science
6.	3	N. L. Jahagirdar	Plant Breeding & Genetics
7.	17	K. S. Naik	Agronomy
8.	34	Maruti Vagge	-do-
9.	29	S. V. Rao	-do-
10.	40	P. B. Gamanagatti	Horticulture

**H.R.D.P.**

Sl. No.	Sl. No. in the notification	Name	Subject
1.	14	Shrishail S. Navi	Plant Pathology
2.	15	Malabasari T. A.	Seed Technology
3.	16	Shivaputra Loni	-do-
4.	17	Shashikant A. S. Patil	Ag. Extension
5.	18	S. N. Rao, Kuikarni	Ag. Economics
6.	41	M. S. Lokesh	Plant Pathology
7.	42	G. H. Ravikumar	Seed Technology
8.	47	S. B. Satenahalli	Ag. Entomology
9.	48	R. S. Karisomanagoudar	Ag. Economics
10.	97	Sannappa Narayan Komar	-do-
11.	98	Yashoda Hegde	Plant Pathology
12.	107	T. Narasimha Reddy	Ag. Economics

**Students participation**

- i) Quiz competition was held on 4.8.84.
- ii) Debating contest was held on 8-8-84 in Kannada and in English. The topic for the debating was "Clubbing Religion with Politics is Dangerous for the Progress of a Country".
- iii) An essay writing competition was held on 11-8-84 both in English and Kannada.
- iv) Extempore competitions in Kannada and in English were held on 16-4-84.
- v) The Photography and Painting competitions were held on 25-8-1984.
- vi) The Talents Day was held on 20-7-1984.
- vii) Sports day was held on 24/25-8-1984.

**Earn While you Learn Scheme**

The undergraduate students were given small area for cultivation and they have earned considerable net profit in the land given to them.

Two PG students in the Department of Entomology were offered graduate assistantships during the year.

**Visitors**

1. Dr. M. C. Numbiar, Project Co-ordinator, CPCRI, Kasargod visited the campus on 7-4-1984.
2. Dr. Gondon, Forestry Advisor visited the campus and participated in group discussions held on 13-6-1984.

### **Guest/Special Lectures**

#### *Department of Soils*

1. Dr. B. B. Desai, Assoc. Prof., MPAU, Rahuri delivered a guest lecture on 26-10-84 on "Recent Advances in Agril. Chemistry".
2. Dr. K. M. Ramanathan, Prof. of Soil Science, TNAU, Coimbatore delivered a guest lecture on 10-12-84 on "Soil fertility evaluation – A perspective".
3. Dr. R. W. Miller, Visiting Professor, Utah (USA) delivered a lecture on 16-1-85 on "Agricultural needs in future".

#### *Department of Farm Forestry*

1. Dr. Gordon, Dean, Yale University spoke on "Teaching, Research and Extension methods in Forestry" on 13-6-84.

#### *Department of Entomology*

1. Dr. R. R. Rawat, Prof. and Head, Department of Entomology, JNKVV, Jabalpur delivered a lecture on 4-12-84 on "Major Pest Problems of Madhya Pradesh".

#### *Department of Agricultural Botany*

1. Dr. M. V. Rao, DDG, ICAR, New Delhi delivered a guest lecture on 4-1-84 on "Research Strategies in India".
2. Dr. J. V. Goud, Prof. and Head, Agricultural College, Dharwad spoke on "An Account of his recent visit to Japan" – the 6th Wheat Genetic Symposium on 1-3-84.
3. Dr. C. Ramanujam, Head, Division of Genetics, IARI, New Delhi spoke on "Recent trends in genetic research" on 27-3-84.
4. Mr. D. N. Patil, Jr. Research Fellow, CCMB, Hyderabad delivered a guest lecture on "On splicing of m-RNA" on April '84.
5. Dr. P. K. Gupta, Prof. and Head, Dept. of Botany, Meerut, UP, delivered a lecture on "Recent trends in plant breeding research" on 31-12-84.
6. Dr. V. Ranga Rao, Safflower Co-ordinator spoke on "Safflower Development in India" on 2-1-85.



*Department of Plant Pathology*

i. Dr. P. Narayanaswamy, Prof. and Head, TNAU, Madurai spoke on "Management of groundnut bud necrosis" on 13-7-84.

ii) Dr. M. M. Payak, Head, Div. of Microbiology and Plant Pathology, IARI, New Delhi spoke on "Management of Maize disease and their control".

*Department of Extension*

1. Dr. D. B. Desai, Prof. and Head, Centre of Advanced Study in Education, MS University, Baroda spoke on "Shaping the destiny of India in classroom" on 18-12-84.

2. Dr. P. Basavaiah, Animal Geneticist, AICRP on Buffaloes, RRS, Dharwad spoke on "Dairy development and social system in USA" on 22-2-85.

**Seminar/Symposia**

*Department of Soil Science*

A training programme on soil testing and fertilizer recommendation for Northern region of Karnataka was conducted from 17-9-84 to 21-9-84 for the staff of the Department of Agriculture.

*Department of Psychology*

The Assistant Professor presented a paper at "U.G.C. Seminar on locus of control" held at University of Calicut, Calicut (October 8-14). The topic was "The System Formulation of Socio-psychological problems in the context of application to human problems".

*Department of Agricultural Botany*

Seminar on teaching methodology was organised by the college for the benefit of junior teachers from Feb. 1984 to May 1984.

The Genetic Society of the Department of Agricultural Botany arranged a study-cum-sight seeing trip to Saundatti, Navil Teertha, Gokak falls and Hidakal on 19-8-1984 for the benefit of the students and staff members.

This society also arranged a study-cum-sight seeing trip to Goa on 29/30-12-1984 for the benefit of students and staff members.

b) Dr. Srikant Kulkarni, Associate Professor of Plant Pathology, Agricultural College, Dharwad has been awarded the 'Nagamma Dattatreya Rao Desai award' for the outstanding contributions to the field of plant pathology.

R. K. HEGDE  
*Director of Instruction (Agri) (i c)*  
*Dharwad*

#### 4. Veterinary College, Hebbal

Dr. K. Trivikrama Rao was the Director of Instruction (Vety) up to 31st 31-8-1984 and Dr. A. V. Rai, Professor of Animal Genetics and Breeding is incharge of the post of Director of Instruction (Vety.) since 1-9-1984. The College has recorded a satisfactory progress in different fields of activities.

The Director of Instruction (Vety) presided over the inaugural function held in connection with "Technical Seminar on current disease problems in Karnataka State" organised by the Indian Association of Veterinary Pathologists, Karnataka Chapter.

The Director of Instruction (Vety) continued to be the Chairman, UAS Cafeteria, Hebbal, up to end of September 1984.

Bangalore Voluntary Blood Bank, Bangalore in collaboration with the Lions Club, Hebbal Chapter, organised the Blood Bank camp at the Hebbal campus (Veterinary College Hostel) and 105 students donated the blood.

The College took up Lab-to-Land programme in Chikkanahally Village (near Jakkur). Fifty families have been identified as beneficiaries under the Lab-to-Land programme. Sheep and pigs were distributed among them and it is proposed to distribute feeds and fertilizers also among the beneficiaries.

The Director of Instruction (Vety) participated in the seminar on Dairy Farming and Animal Health activities organised jointly by Syndicate Bank, Bangalore and Lions Club of Hebbal.

The University deputed 20 teachers during the year to attend the seminar, workshops, summer institutes organised at different places in the country.

The final year and pre-final year B.V.Sc. students have undertaken All India and State Educational tours, respectively, during the year as part of their curriculum.

#### **Students strength**

Undergraduate		Postgraduate	
I year	112	I year	27
II year	108	Senior	25
III year	123		
IV year	121		
V year	124		

#### **Students performance**

The academic performance of the students on the whole during the year was quite satisfactory.

The students of this college have participated in various cultural activities and competitions organised by the Kannada Balaga of the UAS and secured prizes.

The students association opened a reading room in the Veterinary College premises, for the benefit of both day scholars and hostellers. Two daily newspapers, two weekly magazines, Star and Style, Sports Week, Competition Review, Caravan, Science To-day, Science Reporter, Wisdom etc., magazines are being purchased by Students Union for the reading room.

#### **Guest/Special Lectures**

Dr. D. Gopal, Vety. Practitioner, Jacksonville, Florida, USA delivered a talk on "Vety. Practice in United States with special reference to Bovine Embryo Transfer" on 8-8-84.

Dr. T.G. Nagaraj, Asst. Prof. of Microbiology, Dept. of Animal Science, Kansas State University, U.S.A., delivered a talk on "Rumen disorders in Cattle" on 16-1-85.

Dr. P.H. Robinson, Research Scholar, Institute for Livestock Feeding and Nutrition Research, Lelystad, The Netherlands delivered a talk on "Protein digestion in ruminants" on 22-1-85.

Dr. S. Krishnaswamy, Prof. of Vety. Microbiology, A.P.A.U., Tirupati, A.P. delivered a talk on "Rinderpest in Sheep" on 11-2-85.

Dr. C. R. Balakrishnan, Cytogeneticist, Division of Dairy Cattle Genetics and Breeding, N.D.R.I., Karnal, Haryana delivered a talk on "Cytogenetics of Animals and its Application in Livestock Breeding" on 15-2-85.

Dr. Albert W. Franzman, Director, Moose Research Centre, Alaska, Department of Fisheries, Alaska, delivered a talk on "The Role of Veterinarian in Wild Game Health" on 11-3-85.

Dr. N. C. Jain, U.S.A., delivered a talk on "Haematological Parameters of Diagnostic Value in Veterinary Practice" on 12-3-85.

#### **Training Programmes**

1. One day State level seminar on "Poultry Production" for the inservice personnel of the State Department of Animal Husbandry.
2. The internship training programme was continued during the year and about 80 students completed the training programme of 6 months duration.
3. Training programme on "Physio-Pathology of Reproduction" for the Inservice Personnel of the State Department of Animal Husbandry.
4. Training programme on the "Importance of Fodder Production" for inservice personnel of the State Department of Animal Husbandry and Veterinary Services.
5. Training programme in "Dairy and Piggery" for the inservice personnel of the State Department of Animal Husbandry.
6. Training programme on "Diagnostic Techniques" for field officers of the State Department of Animal Husbandry.

A. V. RAI

*Director of Instruction (Vety.) i/c.  
Hebbal*

#### **5. College of Fisheries, Mangalore**

The academic year 1984-85 for the various classes commenced on the dates shown below :

<i>Class</i>	<i>Date of commencement</i>
II, III and IV B.F.Sc.	8-10-1984
I B.F.Sc., Jr. M.F.Sc., Sr. M.F.Sc. and Ph.D.	26-11-1984

During the academic year, 2 students were admitted at Mangalore to the Ph.D. programme, one each for Fish Processing Technology and Aquaculture respectively, while 23 students were admitted to the M.F.Sc. degree programme, 15 for Fish Production and Management and 8 for Industrial Fishery Technology. Eighteen students were admitted to the B.F.Sc. programme

The classwise break-up is as follows :

I B.F.Sc.	18	Jr. M.F.Sc.	23
II B.F.Sc.	21	Sr. M.F.Sc.	17
III B.F.Sc.	24	Ph.D.	3
IV B.F.Sc.	39		

#### **Students' Performance**

Twenty three students completed their B.F.Sc. degree programme at the end of the academic year 1983-84, while one student completed the same at the end of I trimester of 1984-85. During 1983-84, 23 candidates completed their M.F.Sc. programme, while another 4 completed the same during 1984-85.

Students who were placed on academic probation during the year 1983-84 :

Class	I Trimester	II Trimester	III Trimester
III B.F.Sc.	—	—	3
IV B.F.Sc.	13	13	12

**Student Counselling:** Twenty four teachers were involved in student counselling programme during the year.

**Gold Medal for outstanding merit:** Mr. C. G. Nagaraj and Mr. N. M. Sachindra were awarded UAS gold medal for their outstanding performance in B.F.Sc. degree programme, while in M.F.Sc. programme, gold medal was bagged by Mr. M. M. Vijayan during the year under report.

#### **G.O.I. Scholarship :**

Post-matric scholarships to SC, ST, BCM, BT and

Low Income Group 13

National Loan Scholarships (undergraduate) 2

National Merit Scholarships —

Concession to the students belonging to Backward Classes and Special Group.

Undergraduate .... 4

Postgraduate ... —

Defence Scholarships .... 1

### Meetings

Prof. H. P. C. Shetty, Director of Instruction (Fisheries) attended the following meetings :

1. Meeting of ICAR's Scientific Panel for Fisheries on 3-7-1984.
2. The first meeting of ICAR's Research and Development Forum on Fisheries on 5-7-1984.
3. Meeting of ICAR Scientific Panel for Fisheries on 12-12-1984.
4. Meeting of the Committee to suggest specific narrow disciplines of Fisheries for inclusion in the A.R.S. examination on 13-12-1984.
5. As a member of the ICAR Society attended its meeting on 23-3-1985.

### Visitors

1. Seven Veterinary/Fisheries Officers from Laos, under sponsorship by the FAO, visited on 5-4-1984 to see the activities of the College.
2. Prof. V. Krishnamurthy, Research Associate, D.S.T. Project on 'Algal Flora of India', Centre of Advanced Study in Botany, University of Madras visited on 6-4-1984 and also delivered a lecture on 'Sea Weed Culture'.
3. Technical Staff Trainees from Fisheries Training Institute, Government of Gujarat went round the College on 22-4-1984.
4. Mr. Rajavardhan, Honourable Minister of State for Fisheries, Government of Karnataka visited the College on 23-4-1984 to inaugurate the Students' Association.
5. Mr. J. K. Arora, Secretary and Commissioner for Agriculture, Animal Husbandry and Fisheries, Government of Karnataka, visited the College on 2-5-1984.
6. Mr. Mohammed Abdur Rahaman, FAO Fellow from Bangladesh visited the College from 13-5-1984 to 22-5-1984, accompanied by Mr. G. L. Rao, former Director of Fisheries, Government of Karnataka, to acquaint himself with the activities of the College and for getting training in 'Fisheries Planning' and connected areas.
7. Mr. David Cook of British Council, New Delhi visited the various departments of the College on 11-6-1984 and had discussions on the proposed ODA aid to the College.
8. Dr. L. V. Venkataraman, Scientist, Central Food Technological Research Institute, Mysore visited the College on 20-6-1984 and delivered a talk on "Algal Biotechnology Problems and Prospects".
9. Twenty Foreign Trainees and 2 staff members from CIFNET, Cochin visited the College on 29-8-1984.

10. Dr. Tyson R. Roberts, Research Biologist, Department of Ichthyology, California Academy of Science visited the College on 19-1-1985 and delivered a lecture on 'Keratinous Adaptive Features on the Skin in Cyprinoid Fishes'.

#### **Trainings/Seminars**

1. *Preparation of fish incorporated traditional products*: Training was imparted to some small entrepreneurs on the preparation of fish incorporated traditional products like spirals, sevu, pappad, etc. on 1-8-1984.
2. *Breeding and maintenance of freshwater aquarium fishes*: A 5-day training programme in breeding and maintenance of freshwater aquarium fishes, sponsored by the Marine Products Export Development Authority, was organised at the College from 20-8-1984 to 24-8-1984.
3. *Fishery Science*: A 3-week training programme on 'Fishery Science' was conducted from 27-8-1984 to 21-9-1984 for the benefit of Fisheries Supervisors, Department of Fisheries, Government of Karnataka.
4. A one-day seminar on "High opening bottom trawl" was organised at Mangalore on 23-8-1984 and another on 15-9-1984 at Malpe in collaboration with Syndicate Bank, for the benefit of operators of mechanised fishing boats of Mangalore region and Udupi region respectively.

The following staff seminars were held during the period under report :

<i>Date</i>	<i>Topic</i>	<i>Teacher</i>
13-7-1984	"Deep sea fishing on board fishing-cum-research vessel-M. V. Saraswathi"	Mr. R. N. Ramachandra Asst. Prof. of Fishery Technology.
25-1-1985	"Aquaculture in Nigeria"	Mr. B. Shantharam Asst. Prof. of Fish Genetics.
21-2-1985	"Methods of Fishery Management"	Mr. S. M. Shivaprakash Instructor in Fishery Biology.
13-3-1985	"Chilling and superchilling of fresh fish".	Mr. L. N. Srikar Assoc. Prof. of Biochemistry.
16-3-1985	"Neurosecretion in <i>Crassostrea madrasensis</i> "	Dr. M. Mohan Joseph Assoc. Prof. of Fish Physiology
18-3-1985	"On the first-cruise of FOR V SAGAR SAMPADA"	Mr. H. S. Pradeep Asst. Prof. of Fishery Biology

**Obituary**

1. Mr. Bhaskar Naik, Deck-hand died in an accident on 29-9-1984.
2. Mr. R. N. Ramachandra, Assistant Professor of Fishing Technology expired on 1-10-1984.

**Musical Evening**

Members of Music with Meaning International Club gave a programme at the College Auditorium on 15-2-1985.

H.P.C. SHETTY  
Director of Instruction (Fisheries)  
Mangalore

**6. College of Rural Home Science, Dharwad**

Classwise break-up of students during the year.

Class	III Trimester 1983-84	I Trimester 1984-85	II Trimester 1984-85
<i>Undergraduate :</i>			
I Year	40	26	26
II Year	26	40	40
III Year	16	26	26
<i>Postgraduate :</i>			
Jr. M.H.Sc.	4	6	6
Sr. M.H.Sc.	2	4	4
Ph.D.	—	1	2

*AICRP Home and Farm Management :* Four villages have been selected for the study. Data regarding general information, family resource profile, income and expenditure pattern, time expenditure pattern, decision making practices, skills and abilities and attitudes of rural women from two villages, have been collected. Along with this action oriented programme has also been taken up to introduce appropriate technology.

**Extension Activities**

1. Film shows were arranged to educate rural women in various aspects like mother-child nutrition, health and immunization, family planning, consumer awareness and guidance, pest control etc., at the selected villages of AICRP (Home Management).



2. *Lab-to-land programmes* : Staff adopted 50 families from Yerikoppa village and following programmes were taken up.

- i) Seed and seedlings distribution.
- ii) Goat distribution.
- iii) Agricultural implements.

3. *Exhibitions organised* :

- i) At Krishimela on the campus.
- ii) At Kalabhavan as a part of Indian Science Congress Exhibition organized by Karnataka University.
- iii) At Hosur as a part of Field Day.
- iv) At Arabhavi during Platinum Jubilee celebration.
- v) At Gadag, Thontadariamath.

4. *Demonstrations* :

- i) Hay box and Janata refrigerator at selected villages (AICRP).
- ii) Nutritious low cost recipes for children and pregnant mother at selected villages (AICRP).
- iii) Weaning Food at Marewad on 17-3-1985.

- iv) Bakery products and garland making on 19-12-84 At various Mahila-  
mandals and Ladies  
Clubs.

Jam, juice, pickle and chutney preparation as well as their preservation on 20-12-84.

Bakery products on 26-12-84.

Making different type of paper flowers and cloth flowers on 2-1-85.

### ***Special Lectures***

World Food Day Lectures on 16th October 1984.

- i) Mrs Rama Rao and Miss Anusuya Chandargi at Savanur Taluk in collaboration with Department of Agriculture and Lions Club.
- ii) Dr. (Mrs.) Leela Phadnis at R.D.T.C. organized by Department of Agriculture, Dharwad.
- iii) At various Mahilamandals and Clubs.

18-4-1984	Common diseases of children.	by Mrs. K. Saroja
	How to discipline children in modern times.	by Mrs. K. Saroja
	Behavioural problems in pre-school children.	by Mrs. K. Saroja
12-4-84	Basic five food groups.	by Miss Nirmala Hadimani
May 1984	Evaluation of hospital diets and their improvement.	by Mrs. Bharathi V. Chimmad
12-4-84	Pregnancy and child care.	by Mrs. V. B. Patil
17-3-85	Growth and developmental stages of children.	by Mrs. V. B. Patil
17-3-85	Nutrition for growth and development.	by Dr. (Mrs.) Leela Phadnis

#### **Seminar/Workshop**

Mrs. H. Susheela and Miss Geeta Mahale participated in Women's Study Pool in September, 1984.

Mrs. H. Susheela and Mrs. V. B. Patil attended annual AICRP workshop at G. B. Pant University.

Mrs. H. Susheela, Jr. Scientist, Mrs. V. B. Patil, Sr. Scientist (AICRP) and Mr. H. S. Surendra, Statistician attended annual regional workshop of region IV at Shimoga.

Mr. H. S. Surendra, Statistician attended annual technical meeting of Statistics at Bangalore.

#### **Radio Talks**

Date	Topic	Name of the staff
25-4-85	Anaemia and health hazard	Mrs. Nirmala Hadimani
6-7-84	Nutrition and Applied Nutrition	Dr. (Mrs.) Leela Phadnis
2-11-84	ಅಂಗವಿಕಲತೆ ಶಾಪವೇ	Mrs. K. Saroja
2-11-84	Preparation for parent food	Mrs. V. B. Patil
4-11-84	Causes of infant mortality	Mrs. Saraswathi Hunshal
14-11-84	Preschool training	Miss. T. V. Yamuna
20-1-85	Body building material—Minerals and Salts.	Dr. (Mrs.) Leela Phadnis Leela Phadnis

LEELA PHADNIS

*Director of Instruction (Home Science)*  
*Dharwad*

### **7. Dairy Science College, Hebbal**

Dr. K. Trivikrama Rao, Director of Instruction (Vety), was incharge of the Dairy Science College up to 31-8-1984 and Dr. A. V. Rai took over the position of Director of Instruction (Vety) and continued to be incharge of the Dairy Science College also from 1-9-1984.

The Dairy Science College is located in the Agricultural College building. Construction of the Dairy Technology building is in progress. The College has recorded a satisfactory progress in different fields of activities. As per the curriculum, the third and fourth year B.Sc. (D.T) students underwent the educational tour to fulfil the requirements for the award of the degree. The final year students are undergoing training in various commercial dairies for two trimesters. The University deputed four teachers during the year to attend Seminars, Workshops, etc., organised at various institutions in the country.

#### **Students Strength**

*Undergraduate* : 70

*Postgraduate* : Senior : 10  
Junior : 14

#### **Students Performance**

The academic performance of students on the whole was satisfactory during the year under report.

#### **Visitors**

1. Dr. R. S. Singh, Head, Dairy Bacteriology Division, N.D.R.I., Karnal
2. Mr. Pratap Reddy, Vice-Chancellor of Andhra Pradesh Agricultural University.
3. Dr. M. B. L. Bhardwaj, Vice-Chancellor of Chandrashekar Azad University of Agriculture and Technology, Kanpur.
4. Dr. A. Ahmed, Vice-Chancellor of J and K Agriculture University.

#### **Guest/Special Lectures**

Dr. G. K. Murthy of Food and Drug Administration of U.S.A. gave special lecture on Food Borne Intoxications on 19-4-1985.

#### **Seminars/Symposium/Training Programmes**

A training programme for six days was conducted on recent techniques of livestock production and management (Poultry, Dairy and Piggery) to inservice

personnel of Department of Animal Husbandry and Veterinary Services, Karnataka from 19-11-84 to 24-11-84 under Directorship of Dr. K. Atmaram.

A. V. RAI  
Director of Instruction (Vety.) i/c  
Hebbal

### 8. Agricultural Engineering Institute, Raichur

The academic year started on 8-10-1984 with the starting of I trimester for I and III year students. The I year classes commenced on 29-10-1984. There was good response from the interested candidates to get admission to this course. For 20 seats, 117 candidates were called for interview and 84 candidates attended the interview.

#### Students Strength

The Trimester wise students strength in different classes were as follows :

Class	III Trimester 1983-84	I Trimester 1984-85	II Trimester 1984-85
I Year	16	20	10
II Year	19	16	16
III Year	20	31	28

#### Students Performance

In all 66 regular courses amounting to 164 credit hours in addition to 26 repeat courses involving 59 credit hours were offered during the year. The condensed courses amounting 7 credit hours were also offered for the benefit of the students. A total of 12 students successfully completed the diploma during the year.

Trimesterwise break-up of students on academic probation is given below:

Class	III Trimester 1983-84	I Trimester 1984-85	II Trimester 1984-85
I Year	—	—	—
II Year	—	—	—
III Year	7	9	9

The classwise break-up of students on the basis of their CGPA is detailed below :

CGPA	III Trimester 1983-84			I Trimester 1984-85			II Trimester 1984-85		
	I yr.	II yr.	III yr.	I yr.	II yr.	III yr.	I yr.	II yr.	III yr.
4.00	—	—	—	—	—	—	II trimester is yet to complete.		
3.00-3.99	2	4	2	1	2	3			
2.00-2.99	3	6	10	3	5	11			
Below 2	11	9	8	6	9	17			

#### **Educational Tour**

Students of III year DAE accompanied by Mr. S. Rameshchandra, Instructor (FM) went on all India Educational Tour between 12-1-1985 to 4-2-1985.

Mr. Wilson Arnold, Asst. Prof. (PE) of this Institute was deputed as the UAS Kho-Kho team manager for the All India Inter-University (Men) Kho-Kho tournament hosted by Marathwada University at Aurangabad from 12th to 16th January, 1985.

#### **Visitors**

1. Mr. Hanumantha Rao Desai, MLA and Chairman, CADA-UKP, visited the Institute on 27-4-84.

2. The Deputy Commissioner, Raichur, Mr. L. B. Mannikatti, visited the Institute on 24-7-84.

3. The Administrator, CADA-UKP, Bheemarayanagudi Mr. J.P. Sharma, visited the Institute on 27-7-84.

4. Dr. Sangameshwar Sardar, Hon'ble Minister of State for Health and Family Welfare, visited the campus on 7-9-84.

5. Mr. M. P. Prakash, Hon'ble Minister of State for Transport and Labour Welfare, visited the Institute along with the Chief Mechanical Engineer of KSRTC on 17-9-84.

6. Mr. B. L. Gowda, Hon'ble Minister for Agriculture and Pro-Chancellor of the UAS; Mr. Bapugouda Darshanapur, Hon'ble Minister for Small Scale Industries; Dr. Sangameshwar Sardar, Hon'ble Minister for Health and Family Welfare; Mr. Vaijnath Patil, Hon'ble Minister of State for Horticulture and Mr. Vishwanath Reddy Mudnal, Hon'ble Ex-Minister for Horticulture and Animal Husbandry, Dr. N. G. Perur, the Vice-Chancellor and Hon'ble

Board Members Mr. D. G. Basavanagouda, Mr. Parthasarathy, Mr. Hallappanavar and Mr. Inayathulla Rehaman Siddique visited the campus and the Institute on 16-11-84 in connection with the inauguration of Agricultural College at Raichur.

7. Mr. G.K. Arora, Secretary, Agriculture, Government of Karnataka, Mr. M. G. Kadli, Managing Director of Agro-Industries Corporation and Dr. T. V. Sampath, Director of Agriculture visited the campus on 27-11-84.

8. Dr. G. V. K. Rao, Ex-Member of Planning Commission visited the Institute on 10-2-85.

9. Dr. M. V. Rao, Dy. Director General (Crops) ICAR visited the Institute on 23-2-85.

### Seminars/Symposia

The following talks were given in the students, staff seminars :

Title	Speaker	Date
Utilisation of Animal Energy in Farming Systems in India – Present Status.	Dr. N. L. Maurya, Principal	15-12-84
Renewable Sources of Energy – Solar Energy	Mr. B.S. Sundarappa, Instructor in FM	22-12-84
Weather Spells and Weather Cycles at Raichur Using Markov Chain Model – A Case study	Dr. N. Manohar Asst. Prof. of Mathematics	26-12-84
Biogas as a source of energy for rural folk.	Mr. B.K. Srinivasamurthy, Asst. Prof. of FM	5-1-85

Dr. N. L. Maurya, Principal attended the following meetings :

21/22-4-84	Chaired the Land Development Committee Meeting at NARP Bramhavar.
30-3-84	Participated as an Advisor on Selection Board of UPSC at New Delhi to select Joint Commissioner (Machinery) for the Ministry of Agriculture Department of Agriculture, Government of India.
14/15-6-84	Attended IV Meeting of Scientific Panel of ICAR in Agricultural Engineering at New Delhi.
9-7-84	Attended 18th CADA-UKP Board Meeting at Bheemarayanagudi.

- 18/19-9-84      Attended the meeting of UAS Constituted Committee regarding suggestions for development of immediate infrastructural facilities and staff requirement for starting of Agricultural College at Raichur.
- 4/5-1-85        Attended the 13th Annual Convention of the All India Agricultural University Association held at APAU, Hyderabad.
- 19-1-85         Attended Executive Council Meeting of Indian Society of Agricultural Engineers, New Delhi.
- 21 to 24-1-85    Attended the 14th Annual Workshop of All India Co-ordinated Project on Farm Implements and Machinery held at Central Institute of Agricultural Engineering, Bhopal.
- 28/29-1-85      Participated as a member of Selection Committee for the selection of Head of Engineering Division and Research Assistant (Engg.) for Coffee Board, Government of India at Central Coffee Research Institute, Balehonnur.
- 14-2-85         Attended the first meeting of Principal Investigators of Co-ordinated Research Project on 'Increased Utilisation of Animal Energy with Enhanced System Efficiency' at Krishi Bhavan, New Delhi.
- 15/16-2-85      Attended the 5th meeting of ICAR Scientific Panel on Agril. Engineering at Krishi Bhavan, New Delhi.
- 25/27-2-85      Participated in the workshop for designing of course curriculum for diploma programme in Agricultural Engineering organised by the Technical Teachers Training Institute, Ministry of Education, Government of India at Chandigarh.

#### **Other Events**

1. Dr. N. L. Maurya, Principal, was nominated as Director, Education and Research in the National Executive Council of ISAE for 1984-86.

2. A wind mill was installed in the Campus with the financial assistance of Karnataka State Council for Science and Technology through DRDS, Raichur for the purpose of monitoring its performance and also to diversify its uses.

3. The Department of Farm Machinery, and Soil and Water Management of this Institute were involved in training several batches of farmers from CADA-UKP Area in the field of improved implements and improved practices for irrigation and drainage.

An All India Co-ordinated Research Project entitled 'Increased utilisation of animal energy with enhanced system efficiency' has been sanctioned to be operative from 1-1-85 at 7 centres including Agricultural Engineering Institute, Raichur by the ICAR.

N. L. MAURYA

*Principal*

#### 9. College of Basic Sciences and Humanities, GKVK, Bangalore

The staff of the College of Basic Sciences engaged themselves during the year under review in Teaching, Research and Extension activities.

On the teaching side, the departments offered various courses both for undergraduates and the postgraduates students to fulfil the requirements of their degree programmes.

The staff also engaged themselves in pursuit of research work. Some of the highlights are mentioned hereunder.

The Department of Biochemistry had nine Research Projects on various biochemical aspects involving Indaf ragi, (Proximate Composition), sunflower (Nutritional quality and rust resistance), Italian millet (Isolation of Methionine-Rich proteins), bengalgram (Lectins), and kodo and Barnyard millets (Proteins). In addition, the studies on glutamate Dehydrogenase (GDH) in some fresh water fishes and brain glutamate dehydrogenase activities in *Bandicoota bengalensis* subjected to social stress were also carried out.

The Department of Botany had four Research Projects - two survey types. One was a survey of Wild Plants of Karnataka for their alkaloids, saponins, and essential oils and another survey project on medicinal plants around Sringeri Taluk in which 500 herbarium field numbers were collected and preserved in the Department. Besides these two, anatomical and histochemical studies were also carried out on the seeds of *Anacardium occidentale*.

The staff of the Department of Chemistry studied the allelopathic effect of volatiles of the eucalyptus leaves on the germination of ragi in closed conditions and the results point out that the ragi germination is reduced by 20 per cent compared to control experiment, where eucalyptus leaves were not used. Besides this, the department also carried out some basic research work on Prevost Woodward Reactions involving some reactions of 1-trimethylsilyl cyclo-octene with lead tetra acetate, sodium acetate and mercuric acetate.



The Department of Basic Economics took up four projects – one on the study of Socio-Economic Profile of Poultry Farmers in Karnataka (A case study in Hubli and Dharwad), a second on pulse growers in Karnataka (A socio-economic study in Raichur District), a third one on Economic viability of fragmented holdings in Karnataka, this one being sponsored by the Government of Karnataka.

In the Department of Statistics, some staff members participated in a workshop organised by the UGC on the 'Recent Developments in Statistical Theory and Applications' held at University of Madras during December 1984. Three papers were presented. A project on Design and Inference problems in non-linear models – a theoretically oriented problems is under progress.

The staff of the Department of Psychology carried out a multicentred collaborative study on the effects of intervention programme on non-medical use of drugs in the community, sponsored by the Indian Council of Medical Research (ICMR). The project was completed and a report submitted to ICMR.

The Department of Zoology had organized a one-day seminar on 'Limits of Animal Behaviour' on 16-12-1984 at Hotel Chalukya, Bangalore and 60 delegates from the city colleges participated. Dr. Kubra Bano, Instructor in Zoology, visited Philippines in January 1985 under the auspices of Exchange Program arranged by the Indian National Science Academy. She gave lectures on Vermiculture at many Institutions in Philippines. The staff also participated in seminars organized at S. V. University, Thirupati, Presidency College, Madras and Sambalpur University, Orissa. Research papers were also presented in the 'National Symposium on Soil Pest and Soil Organism' held at Varanasi during October 1984 and at 'National Seminar on Organic Waste Utilization and Vermi Composting' held at Sambalpur University, Orissa during December 1984.

The staff members of the Department of Mathematics worked on seven research projects both of fundamental and of applied nature. They are Mathematical modelling for mental test scores, pulsatile flows, some useful integrals, univalent functions and inverse of non-singular matrix. Applications of fluid dynamics to some important physiological systems and rainfall analysis are the applied aspects of research.

The staff of the Department of Physics engaged themselves in research work.

The Department of Sociology had six research projects. The work is in progress at different levels. A preliminary report on 'Socio-Economic Bench Mark Study' is completed. The projects viz., Pulse growers – A Socio-Economic

Study', 'Lambanis and their role in Agriculture', 'Impact of Debt Relief Act and Rehabilitation of Farmers in Bangalore North' 'School Drop-outs among Agricultural Families' and 'Role of Women in Rural Development Programmes' are all in progress with preliminaries being completed.

The staff of the Department of Microbiology conducted experiments on the effects of inoculation of *Azospirillum* on germination in sorghum and wheat seeds and its association with *Azolla* roots.

The Department of Kannada is primarily concerned with the promotion of Kannada in the context of Agricultural Research, Teaching and Extension activities. During the year under review the department had 23 books for translation, 8 books on various areas of agriculture needing reprints. The department also had a competition arranged for writing of books on agricultural sciences in Kannada.

The staff of the Department of English, besides engaging themselves in teaching, were actively associated with many extra curricular activities also. The Head of the Department is actively engaged in student counselling for all Foreign students studying in UAS at GKV Campus, besides associating himself actively with Indian Council for Cultural Relations, meant to promote understanding and friendship among Foreign students. Another staff member acted as UAS Co-ordinator during the sojourn of a visiting team of students from Canada under Indo-American Youth Programme.

The staff of the Department of Physical Education had arranged many annual sports and athletics events.

Dr. R. Narayana, Director of Instruction (BSH) was on a teaching and research assignment at the Forestry and Environmental School, Yale University, USA, as a A. W. Mellon Foundation visiting lecturer in Tropical Research from 3-9-1984. During his stay at Yale Forestry School he offered courses in Tropical Forest Crops and Hormonal Regulation of Tree growth and also undertook a two week field trip to the Tropical Rain Forests of Puerto Rico in the Carrebean during March '85. He visited the Universities of Wisconsin, Tennessee, Virginia State, Maryland, Connecticut State, New York State at Albany, Massachusetts and held discussions with regards to academic matters with Deans, Vice-Presidents and Presidents.

Mr. Akumal Ramachander has been away on long leave in Europe. He has the unique distinction of discovering Mr. Harold Shapinsky in the world of Abstract Expressionism. This American painter of Russian origin, who had been completely ignored for nearly four decades, has now been shot into lime light. Several reputed journals, magazines and periodicals the world over have

heralded and written about Harold Shapinsky along with Akumal Ramachander including prestigious publication, "The Newyorker".

N. SUNDARARAJ

*Director of Instruction (BSH) i/c*

### C. University Library

In teaching, research and extension activities of the University, the University Library has become the most important centre for students, teachers, researchers and extension workers. In addition, it has also been attracting scientists and researchers of the learned institutions in and around Bangalore. The year under report was marked by rapid developmental activities, by occupying the entire library building at GKVK campus. A brief report on the various activities of the University Library is furnished below.

*Library Sub-Committee:* The Director of Instruction (BSH) was the Chairman of the Library Sub-Committee, with the University Librarian as the ex-officio Secretary, and Directors of Instruction (Agri) and (Vety), Hebbal, Director of Research and Director of Extension as members. The Library Sub-Committee met four times during the period under report, to scrutinise and approve the list of titles recommended by various heads of departments and officers.

*Acquisition:* Acquisition of books and back volumes of periodicals during the year under report are as follows:

(a) <i>University Library, Hebbal/GKVK</i>		
i) No. of titles recommended by various Departments	....	2691
ii) No. of titles dropped after processing	....	611
iii) No. of titles placed before Library Sub-Committee	....	2080
iv) No. of titles not approved by Library Sub-Committee	....	64
v) No. of titles approved and ordered	....	2016
(b) <i>College of Agriculture and College of Rural Home Science, Dharwad</i>		
i) No. of titles placed before the Library Sub-Committee	....	2405
ii) No. of titles not approved by the Library Sub-Committee	....	324
iii) No. of titles approved and ordered	....	2081
(c) <i>College of Fisheries, Mangalore</i>		
i) No. of titles placed before the Library Sub-Committee	....	435

ii) No. of titles not approved by the Library Sub-Committee	....	57
iii) No. of titles approved and ordered	....	383
(d) <i>Agricultural Engineering Institute, Raichur</i>		
i) No. of titles placed before the Library Sub-Committee	....	380
ii) No. of titles not approved by the Library Sub-Committee	...	70
iii) No. of titles approved and ordered	...	310
(e) <i>Agricultural College, Raichur</i>		
i) No. of titles approved by the Vice-Chancellor and ordered	....	640
(f) <i>Veterinary College, Bidar</i>		
i) No. of titles approved by the Vice-Chancellor and ordered	....	591
(g) <i>Regional Research Station, Agricultural Research Station Libraries</i>		
i) No. of titles placed before the Library Sub-Committee	....	208
ii) No. of titles not approved by the Library Sub-Committee	....	20
iii) No. of titles approved and ordered	....	188
(h) <i>NARP Sub-Project</i>		
i) No. of titles indented	....	379
ii) No. of titles approved and ordered	....	315

**Book Exhibition :** A Book Exhibition was held at GKVK Library during the month of July 1984 to enable the Heads of Departments to select books for acquisition to the Library.

**Gift :** The University Library received a good number of publications as gifts from various donors. Particular mention must be made of the following donors for their generous donation of publications.

(1) UNDP	....	54
(2) Consulate General, Federal Republic of Germany, Madras	....	46
(3) The Royal Netherlands Embassy, New Delhi	....	46
(4) Dr. Raymond W. Miller, Visiting Professor, Utah State University, USA	....	21

(5) IRRI, Philippines	....	21
(6) ICRISAT, AP	....	13
(7) Other Institutions	....	130
	....	<u>331</u>

*Details of additions to the University Library, GKVK/Hebbal campus*

Particulars	1983-84	1984-85
Purchase	1416	1675
Gift	132	331
Pamphlets	122	152
Dissertations/Theses	241	150
Microfilm/Photocopies	—	—
Bound Periodicals	1823	1774
Maps	1	2
	<u>3735</u>	<u>4084</u>

Growth and use of the University Library, GKVK/Hebbal for the last three years :

Particulars	1982-83	1983-84	1984-85
Total Collection	1,12,752	1,16,657	1,21,038
Periodicals received	1,311	1,330	1,330
Membership	2,746	2,972	2,793
Visits	1,80,327	2,41,967	2,27,380
Books issued	44,589	40,821	39,109
Books consulted	5,00,735	8,51,803	8,85,606

*Circulation :* This Section takes care of the work of enrolment of staff and students as members, issue and return of books, reservation for books, issuing of No-due certificates, borrowing/lending books under inter-library cooperation etc. The following statement provides details of activities of the Section during the period, in respect of the GKVK and Hebbal campuses.

*Membership of University Library from 1-4-1984 to 31-3-1985*

Particulars	Potential			Actual		
	1982-83	1983-84	1984-85	1982-83	1983-84	1984-85
B.Sc. (Agri)	827	722	720	755	691	621
B.Sc. (Hort)	151	157	131	131	157	117
B.Sc.(Ag.Mark & Coop.)	91	83	90	70	83	62
B.V.Sc.	545	590	640	438	521	463
B.Sc. (D.T.)	57	64	66	53	64	54
B.Sc. (Sericulture)	19	41	59	16	35	46
Postgraduates	448	388	377	338	367	352
Ph.D.	97	119	113	77	90	72
P.G. Dip. in Sericulture	---	2	---	---	2	---
Staff				870	962	1006
Total				2748	2972	2793

*Use of Library at GKVK Campus*

Particulars	1982-83	1983-84	1984-85
Books consulted	1,17,873	1,46,279	1,66,271
Books issued	17,309	17,146	18,613
Visits	55,863	57,485	59,659
Books returned	16,169	16,454	19,438
Inter-Library Loan :			
a. Lent-in	25	28	35
b. Lent-out	80	104	94
Overdue charges	Rs. 2,953.90	Rs. 4,227.80	Rs. 5,041.10
Miscellaneous items :			
i. Loss of Membership Cards	18.00	32.00	8.00
ii. Loss of Reader's Tickets	75.00	140.00	685.00
iii. Loss of No Due Certificates	4.00	8.00	4.00
iv. Loss of Exit Pass & Tokens	4.00	2.00	---
v. Mutilated Reader's Tickets	10.00	6.00	---

*Note :* From the above table, it is clear that there has been a steady increase in the number of books consulted, books issued, no. of visits, books returned and inter-library loan (Lent-in and Lent out) and the over due charges collected, at the GKVK Library.

*Use of Library at Hebbal Campus*

Particulars	1982-83	1983-84	1984-85
Books consulted	3,82,862	7,05,524	7,19,335
Books Issued	27,280	23,675	20,496
Visits	1,24,464	1,80,482	1,67,721
Books returned	27,280	25,656	32,805
Inter-library loan :			
a. Lent-in	41	11	24
b. Lent-out	365	568	595
Book lost & cost recovered	Rs. 2003.95	Rs. 1190.65	Rs. 1084.70
Books lost & replaced	4	2	2
Overdue charges collected	Rs. 7742.55	Rs. 7446.20	Rs. 10,398.70

*Miscellaneous :*

a. Loss of Membership Cards	—	—	—
b. Loss of Reader's Tickets	160.00	120.00	160.00
c. Loss of No Due Certificate	—	—	—
d. Loss of Exit Pass & Tokens	—	—	—
e. Mutilated Reader's tickets	—	—	—

**Note :** From the above table, it is clear that there has been a steady increase in the no. of books consulted, books returned, inter-library loan (lent-in and lent-out) and overdue charges collected during the year. A slight decrease has been observed in the case of books issued and the visits of readers, which is probably due to the shifting of a good number of books from Hebbal campus to the new campus at GKVK.

**Text Book Bank :** The Text Book Bank at the University Library, GKVK campus is becoming very popular among the student clientele.

Particulars	1983-84	1984-85
Total collection	1136	1140
No. of members	190	450
No. of books issued	571	624
Amount collected and remitted	Rs. 1713-00	Rs. 1872-00

**Technical Section :** 1315 new books have been classified and catalogued. The Catalogue Cards and the Shelf List Cards for these new books have also been merged in the Catalogue/Shelf List Trays.

**Periodicals :** Out of 126 new journals indented by various departments, the Library Sub-Committee was able to recommend only 4 new journals for subscription because of the paucity of funds. A total number of 1330 journals is being received by the University Library, out of which 990 journals are by

subscription, 180 journals in the form of gift and 160 learned periodicals in exchange for the Mysore Journal of Agricultural Sciences.

Because of the generous provision of additional grant sanctioned by the University, it was possible for us to maintain a fairly good number of periodicals received/subscribed during the year under report. But for the additional grant, many titles had to be dropped from subscription due to fluctuations in conversion rates of foreign currencies and the upward increase in the subscription rates for many journals.

**Reports :** As in the previous years, this Section is being used more and more by research scholars, Postgraduate and Ph.D. students and scientists. The scientific and technical reports of several Indian and foreign institutions and organisations, theses, ISI standards, UNESCO, FAO, WHO, UAS and ICAR publications are maintained in this Section. The Seminar papers submitted by students and staff of various departments of the University are bound and kept for ready reference. A separate catalogue maintained at this Section has been helping the readers for location of reports. In order to solve the accommodation problem in the Reports Section of Hebbal campus, Agricultural reports have been shifted from Hebbal campus to GKVK library. The particulars of this Section during the year under report are given below :

(a) Total no. of reports received and processed	....	297
(b) Total no. of theses received	....	150
(c) Total no. of seminar papers received	....	132
(d) Total no. of reports consulted	....	20,785
(e) Total no. of theses consulted	....	32,876
(f) Total no. of FAO/WHO/ICAR/UAS and other publications consulted	....	30,767

**Documentation :** This Section continued to play an important role in providing the relevant information to the students and scientists as well as compiling bibliographies and reading lists.

- (a) 2000 articles of interest were indexed from primary journals relating to agriculture and horticulture.
- b) The following bibliographies were published under the University Library Bibliographical Series during the year under report.

Sl. No.	Title	Compiled by
i)	Select Bibliography on "Black Papper" (370 entries)	K. K. Manjunatha
ii)	Select Bibliography on "Bajra" (1970-1982, 1300 entries)	D. Venkatesh and K. K. Manjunatha
iii)	Select Bibliography on Betlevine ( <i>Piper betle</i> L.) (125 entries)	K. K. Manjunatha
iv)	Select Bibliography on Oilpalm (1975-1984, 438 references)	



- c) The Section has published the Current Catalogue of Periodicals – 1984.
- d) The Catalogue of Theses (Dec. 1980 – Dec. 1984) has been updated and maintained in the card form.
- e) As in previous years, “Recent Additions” and “Library Bulletin” were issued regularly providing information regarding new books and journals received in the University Library.
- f) Miscellaneous work done by the Section are given below :
  - 1) Literature on ‘Vivipary’ in plants has been compiled and sent at the request of Assoc. Prof. of Horticulture (46 references)
  - 2) Literature on ‘Silk Industry’ has been compiled and sent at the request of Prof. of Economics (100 references)
  - 3) Literature on ‘Sucker control’ (additional list) has been compiled and supplied to Mr. Sholapurkar, Board Member (20 references)
  - 4) Literature on ‘Quality in Bidi Tobacco’ has been compiled and supplied to Mr. Sholapurkar, Board Member (31 references)
  - 5) Literature on ‘Effect of Pollutants on Plants’ has been compiled and sent to Asst. Plant Pathologist, Arsikere (232 abstracts)
  - 6) Literature on ‘Tobacco Stem-borer’ has been compiled and sent to Assoc. Prof. of Entomology, Navile (17 references)
  - 7) Literature on “Insect Attractants” has been compiled and sent to Assoc. Prof. of Entomology, Navile (57 references).

*Reprographic Services:* At both the campuses, students, scientists and University offices have largely availed themselves of the reprographic services.

Details of the work done by the Reprographic Unit are furnished below :

	1983–84	1984–85
1. Requests received	5,227	5,584
2. Pages copied and supplied	49,696	56,972
3. Amount collected (Rs. )	35,622–80	39,355–50
4. Photocopies received from outside institutions	2	10

*Outstation Libraries:* The Library Sub-Committees at the Dharwad, Mangalore and Raichur teaching campuses met periodically to scrutinise and approve the list of titles recommended by the various heads of departments at the respective campuses, for procurement to the libraries.

Progress made by the College Libraries at Dharwad, Mangalore and Raichur campuses has been given below :

*Growth and use of the libraries at teaching campuses*

Particulars	1982-83	1983-84	1984-85
<b>Dharwad Campus</b>			
Total collections	45,289	48,175	53,246
Periodicals received	532	564	564
Membership	1,004	999	1,062
Visits	78,845	80,208	82,006
Books issued	17,883	21,400	22,325
Books consulted	1,22,441	1,41,426	1,45,289
<b>Mangalore Campus</b>			
Total collections	12,845	18,745	18,616
Periodicals received	298	275	253
Membership	194	223	220
Visits	49,883	26,400	16,444
Books issued	10,483	11,626	11,569
Books consulted	30,926	24,700	19,800
<b>Raichur Campus</b>			
Total collections	11,646	12,214	13,088
Periodicals received	120	148	160
Membership	148	162	191
Visits	10,876	13,950	14,682
Books issued	3,791	4,784	4,704
Books consulted	7,151	16,380	12,745

Two new Colleges—one each at Raichur and at Bidar have been started during the year under report. Steps have been taken to procure books and journals required by the Libraries of the new Colleges. Particulars related to books and periodicals ordered to these new College libraries are given below :

	No. of books ordered	No. of Journals ordered
1) Agricultural College, Raichur	640	24
2) Veterinary College, Bidar	591	36

Efforts are being made to develop the libraries of all the Research Stations on the lines of the University Library. One professional staff has been

entrusted with the task of organising the libraries at research stations. However, it is noteworthy that separate library staff, equipment and furniture to the research station libraries, if provided by the University, would ensure rapid improvement.

*Binding :* 1538 volumes have been added to the library during the period under report.

*Special Services :* A Telex (with Code No. 845 8393 UASK IN) has been commissioned in the Library to serve the University in speedy communications.

*Seminar :* Mr. K. Deve Gowda, Lib. Assistant and Mr. C. G. Patil, Lib. Assistant, GKVK, were deputed by the University to participate in the XI National Seminar of the Indian Association of Special Libraries and Information Centres, held in November 1984 at Hyderabad.

D. VENKATESH  
University Librarian i/c

## D. Student Welfare

Ever since the starting of the University, great emphasis has been laid on the essential aspects of Student Welfare, as part of university education. Activities, both curricular and cocurricular, have been geared to provide ample opportunities for a well balanced and allround development of the personality of the student.

Orientation programme was arranged for new students, coming from institutions where the traditional system of education is in vogue. In this programme the students were educated on the trimester system of education, examinations, evaluation and grading – which are all a continuous process, the evaluator being the teacher himself. In addition, the students were also informed of the facilities in hostels, library, play fields, gymnasium etc. And they were also taken out on a short tour on the campus to get themselves acquainted with library, hostels, play fields, gymnasium, cafeterias, dispensary and so on.

A modified system of students meet was introduced in which the Director of Instruction, Director of Student Welfare, Deputy Director of Student Welfare, Student Counsellors, Wardens met the students of each class once a trimester. In addition to these, monthly meetings with the members of student association and the class representatives were also conducted by the Directors of Instruction for understanding the issues involved in smooth running of curricular and co-curricular programmes.

A close vigilance on the student problems through counselling programmes, reinforced by student meets, has improved the relationship between students, teaching faculty and the University officials. Activities like NCC, Physical Education, Swimming have helped in fostering discipline among the students. More facilities by way of new hostels, additions to the existing hostels, as also providing new play fields for students at all the campuses were attempted, keeping in view increased admissions both in Undergraduate and Postgraduate courses.

The welfare activities in the University during the year under report were as follows :

*Student Counselling :* About 300 teachers have been entrusted with counselling programme in all the seven campuses. Ten to fifteen Undergraduate students were assigned to a teacher during the first trimester of the first year. The same teacher continues to be the counsellor for that group of students for the entire period of their stay in the Undergraduate degree programme, to keep continuity, to provide guidance to the student through a good rapport. In case of Postgraduate students, the counselling work is done by the Professor/Associate Professor of the Department in which the students are going to major. Efforts are made to send a comprehensive report of the students to their parents about their academic performance and other achievements in the University.

However, we feel that there is some slackness on the part of students in attending meetings for free and frank discussion with teachers. There is a need to evaluate the entire counselling programme in all our institutions in order to improve upon the system so that the teacher-taught relationship could be cordial with constant exchange of views on curricular and co-curricular issues.

*Student Associations :* Student Associations were formed by electing class representatives at first stage and the elected class representatives electing the Students' Association Executive Body. However, we could not form the Student Associations at Hebbal and GKVK Campuses during the last trimester. The following are some of the student activities carried out during the year under report :

Campus	Date	Function	Invitee/Chief Guest
Mangalore	23-4-1984	Inaugural function	Mr. Rajavardhan, Hon'ble Minister of State for Fisheries
Dharwad	10-8-1984	PG Hostel Day Celebrations	Dr. R. Y. Dharwadkar, Retired Principal, JSS College, Dharwad

Campus	Date	Function	Invitee/Chief Guest
Dharwad	14-8-1984	Home Science College Day	Dr. S. G. Desai, Vice-Chancellor, Karnataka University
Dharwad	17-8-1984	Agril. College Hostel Day	Mr. S. S. Yavagal Hon'ble Mayor, Hubli-Dharwad Corporation, Mr. Patil Puttappa, Editor, Vishva-vani and PRAPANCHA
AEI, Raichur	24-7-1984	AEI Hostel Day	Mr. L.B. Manikatti, IAS, Deputy Commissioner, Raichur
Dharwad	27-8-1984	Annual Social Gathering of Students' Association	Mr. M. P. Prakash Hon'ble Minister for Transport and Labour
Hebbal	29-8-1984	Agril. College Students' Association Day	Dr. Jeevaraj Alva Hon'ble Minister of State for Youth Services & Sports. Mr. Sundarakrishna Urs Cine Aritist
GKVK	6-9-1984	GKVK Students' Association Day	Mr. V. S. Krishna Iyer, Hon'ble Minister for Urban Development Miss Shantha Rangaswamy, Captian, Indian Women Cricket Team
Hebbal	8-9-1984	Release of Souvenir of the Final Agri. Class	Mr. Aian Thomas, Director, The Coverdale Organisation, London
GKVK	24-10-1984	UN Day	Mr. Chandrakantharaja Urs, Justice, Karnataka High Court
Hebbal	30-11-1984	Vety. College Students' Assn. Valedictory function	Mr. H. A. Narayana Gowda, Hon'ble Minister of State for Animal Husbandry and Veterinary Services

Campus	Date	Function	Invitee/Chief Guest
			Dr. H. B. Shetty, Director of Animal Husbandry and Veterinary Services, Govt. of Karnataka
GKVK	10-12-1984	Human Rights Declaration Day	Mr. V. S. Malimath, Chief Justice, Govt. of Karnataka
Dharwad	23-12-1984	Agril. College Students' Association Inaugural function	Sri Abdul Nazir Sab, Hon'ble Minister for Rural Development, Govt. of Karnataka
Bidar	26-2-1985	Students' Association Inaugural Function— Vety. College, Bidar	Dr. N. G. Perur, Vice-Chancellor, UAS Dr. Madhukar Madiyalkar, Assistant Director of Animal Husbandry, Bidar

1. *State Level Essay Writing Competition* : The Forest Department of Karnataka conducted an 'On the spot' essay writing competition on "Wild life" in connection with the Vanya Prani Saptah, on 23-9-1984 at Aranya Bhavan, Malleswaram, Bangalore. Selected students from UAS were deputed to participate in the above essay competition. The results of the competition are as follows :

English essay — College level

Second prize — Mr. Yogananda, B.D.  
M.Sc. (Agri.), Hebbal

Third prize — Mr. Pranesh R. Jahagirdhar  
Vety. College, Hebbal

Kannada essay — University level

First prize — Mr. K. M. Manjunath  
Senior M.Sc. (Hort.)

Third prize — Mr. H. D. Srihari  
Final B.Sc. (Agri.)

2. At the instance of the National Council for Co-operative Training, New Delhi, an Inter-Collegiate English Debating Competition was conducted at

the UAS auditorium, Hebbal on 1-3-1985. Teams from outside the campuses of our University participated. The following three students were declared prize winners in the debating competition :

Mr. V. Srinivasa Murthy	
Sr. M.F.Sc., Fisheries College	
Mangalore	I Prize
Miss P. B. Aruna	
II year B.Sc. (Agri. Mark.)	
GKVK	II Prize
Mr. B. M. Maheshchandra Babu	
III B.Sc. (Agri.)	
Agricultural College, Hebbal	III Prize

The first two winners were deputed to participate in the XXV Inter-University National Debating Competition in English held at Orissa University of Agril. Technology, Bhubaneswar from 12/14-3-1985.

3. Mr. Chandrika Prasad, from Fiji Island, a student of I year B.Sc. (Agri) was deputed to participate in the International Seminar on Youth and Human Unity organised by the Indian Council for Cultural Relations, Government of India, in collaboration with the Auroville Trust, Pondicherry from 1 to 28-2-1985.

4. At the instance of the Karnataka State Co-operative Union Limited, Bangalore, the following four Postgraduate students were deputed to participate in the seminar on "Youth and Co-operatives" conducted at Mangala Gangothri, Konaje, Mangalore on 16-3-1985.

i) Mr. Y. S. Prabhakar	Jr. M.Sc. (Agri. Eco.)
ii) Mr. T. M. Gajanana	Sr. M.Sc. (Agri. Eco.)
iii) Mr. Yogananda	Sr. M.Sc. (Hort.)
iv) Mr. B. Narayanaswamy	Jr. M.Sc. (Agri. Extn.)

*Hostels and Cafeterias:* In all our campuses, the hostel messes are managed by students themselves through prefects on dividing system. The Hostel Managing Committee headed by the Chief Warden is constituted for guiding students activities in the hostel. The Managing Committee also nominates prefects to run the messes for each month.

During the year under report, an additional block (1st floor) consisting of four rooms was added to the Rural Home Science College Hostel, Dharwad, in which 14 students are accommodated. Similarly, four additional rooms were constructed on the existing building of the UAS Girls' Hostel, Hebbal in which 24 students are accommodated.

A new hostel with a capacity of 144 boarder strength is constructed at GKVK Campus and it is being furnished. We expect to put it to use by the end of II trimester of 1984-85.

The University has provided funds for installation of LPG gas connections at the UAS Girls' Hostel, Hebbal Campus.

Hostel accommodation has been provided in two residential quarters at Raichur Campus for the students of newly started Agricultural College. At Bidar, about ten rooms and a dining hall of the Government College hostel were taken over and the newly started Veterinary College students are accommodated in these rooms.

Every effort is being made to procure gas installations for the hostels in all our campuses. However, the hostels are not in a position to finance the installations due to paucity of funds in the hostels. It is felt that gas installations may bring down the daily mess rate. Further, the Hostel Wardens are experiencing difficulty in getting fire wood when needed, and the cost of fire wood is also going up.

The cafeterias in all our campuses continued to work satisfactorily on no profit no loss basis.

The following members of staff were placed in charge of the UAS Hostels during the year under report:

Campus	Designation	Name of the Official
<i>Hebbal:</i>	Rector	Vacant
Agril. College Hostel	Chief Warden	Dr. K. C. Devaraja Urs
	Warden	Mr. M. A. Shankar
Vety. College Hostel	Chief Warden	Dr. K. Athmaram
	Warden	Dr. V.N.V. Reddy
UAS Girls' Hostel	Warden	Mrs. Shanthadevaraja Urs
<i>GKVK:</i>	Rector	Vacant
GKVK Hostel	Chief Warden	Dr. R. V. Ramamohan
	Warden	Mr. H. C. Sharatchandra
	Warden	Mr. A. G. Huddar
<i>Dharwad:</i>	Rector	Dr. Y.C. Panchal
Agril. College Hostel	Chief Warden	Mr. H. S. Sadath Ali Khan
	Warden	Mr. C. B. Kurdikeri
	Warden	Mr. G. N. Srinivas
R.H.Sc. Col. Hostel	Warden	Mr. V. B. Patil
P.G. Students' Hostel	Warden	Dr. H. S. Vijayakumar



Campus	Designation	Name of the official
<i>Raichur :</i>		
A.E.I. Hostel	Warden	Dr. D.S.K. Devadattam
Agril. College Hostel	Warden	Mr. T. Venkatesha
<i>Mangalore :</i>		
Fisheries Col. Hostel	Warden	Dr. T.M. Rudra Setty
<i>Bidar :</i>		
Vety. College Hostel	Warden	

The strength of students in the different Hostels of the University and the average daily food charges during 1984-85 were as follows :

Name of the UAS Hostel	No. of rooms available	No. of boarders accommodated	Daily food charges	
			Vegetarian (Rs.)	Non-vegetarian (Rs.)
1	2	3	4	5
<b>Hebbal Campus</b>				
<i>Agril. College Hostel</i>				
I Block	64			
II Block	64	390	5.11	6.45
<i>Vety. College Hostel</i>				
I Block	64			
II Block	64	390	4.98	6.08
<i>UAS Girls' Hostel</i>	13 + 4			
"D" Type Quarters	2	106	4.48	—
<b>GKVK Campus</b>				
I Block	64		5.97	6.58
II Block	65	585		
III Block	66	P.G. mess	5.33	6.50
<b>Dharwad Campus</b>				
<i>Agril. College Hostel</i>				
Suyoga Block	16		7.80	—
Spurthi Block	20	607	6.76	—
Pragathi Block	107		6.05	—
Krishik Block	128		—	
<i>P. G. Students' Hostel</i>	32	64		
<i>R.H.Sc. College Hostel</i>				
A - Block	4	20	4.14	
B - Block	4	19	(Mess charges including fuel charges)	
C - Block	4	14		

1	2	3	4	5
<b>Raichur Campus</b>				
<i>A.E.I. Hostel</i>	18	42	6.04	—
<i>Agril. College Hostel</i> (newly started on 26-11-84)				
I – Block	6	16		
II – Block	6	17	5.53	—
<b>Mangalore Campus</b>				
<i>Fisheries College Hostel</i>				
I – Block	18			
II – Block	18	134	9.09	—
III – Block	18			
<b>Bidar Campus</b>				
<i>Vety. College Hostel</i>				

#### **NCC and Physical Education**

A combined Annual NCC Training Camp for the cadets of Agricultural College, Dharwad, Veterinary and Agricultural College Coys. of GKVK Campus was conducted at Dharwad Campus from 10-9-1984 to 21-9-1984. The details of the cadets participated in the camp are as follows :

5/24 Coy. Agril. College, Dharwad	—	64 cadets
1/1 Coy. Agril. College, GKVK	—	102 cadets
2/1 Vety. College, Hebbal, Coy.	—	103 cadets
	<b>Total</b>	<b>269 cadets</b>

The following NCC cadets of our University who successfully completed the Basic Civil Defence Course for CD volunteers at the Home Guards and Civil Defence Training Institute, Bangalore, during June, 1984 were awarded gold medals by the Director General of Police and CD, Ulsoor, Bangalore for having stood first in the training.

1. Mr. Jagjit Singh, Final year B.V.Sc., Veterinary College, Hebbal.
2. Mr. Anil Kumar, Jr. M.Sc.(Agri.), Agricultural College, Hebbal.

Physical Education, Swimming and NCC are course requirements in all I year classes. Physical Education classes were handled by full time staff whereas the NCC classes were handled by part-time officers of our University with the help of the staff sent by the Directorate of NCC at Bangalore and Dharwad.

The following are the number of students that registered for NCC and Physical Education courses :

Campus	Class	Strength		
		Boys	Girls	
NCC				
GKVK Campus	All year I classes excluding Veterinary (UAS COY. First)	I	113	—
		II	113	—
		III	103	—
GKVK Campus	First year B.V.Sc. (UAS COY. 2)	I	91	—
		II	91	—
		III	102	—
Dharwad Campus	All I year classes of Agricultural College	I	64	—
		II	64	—
		III	64	—
Physical Education				
GKVK Campus	All I year classes	I	131	67
		II	104	34
		III	106	34
Dharwad Campus	All I year classes	I	75	—
		II	75	—
		III	69	—
Dharwad Campus	All I year classes of R.H.Sc.	I	—	40
		II	—	40
		III	—	19
Raichur Campus	All AEI (DAE) students	I	15	—
		II	11	—
		III	10	—
Raichur Campus	All I year B.Sc. (Agri)	I	31	—
		II	30	—
Bidar Campups	All I year B.V.Sc. classes	I	28	—
		II	28	—
Physical Education and Swimming				
Mangalore Campus	All I year B.F.Sc. classes	I	28	—
		II	28	—
		III	28	—

### **Sports and Games**

Mr. K. M. Renuka Prasad, a student of Final year B.Sc. (Hort.) led the Karnataka State Kho-Kho team in the 22nd Kho-Kho Championship (Men) conducted at Adilabad, AP from 3/7-6-1984. The Karnataka State Kho-Kho Team (Men) won the National Championships, beating the Champions of Maharashtra State Team.

It is gratifying to note that the UAS Teams are performing creditably in the South Zone and at the All India Inter-University Tournaments conducted by Association of Indian Universities, New Delhi. Our Hockey Team (Men) and Kho-Kho Team (Men) performed very well and reached South Zone League and South Zone Quarter Finals during the year under report.

The UAS Inter-Campus athletic meet for the year 1984-85 was held at Agricultural College, Dharwad Campus. The meet was inaugurated on 21-12-1985 by Mr. N. K. Joshi, veteran Cricket player, Karnataka. On 22-12-1985, Mr. Patil Puttappa, wellknown Journalist was the Chief Guest and distributed the prizes. The Individual Championship was secured by Mr. Viswanath, Final year B.Sc. (Agri.), Hebbal. The Individual Championship in women section was won by Miss Parinitha, II year Dairy Technology, Hebbal Campus.

The College of Basic Sciences and Humanities, GKVK, Bangalore secured the Overall Team Championship in Athletics by 66 points, and Agricultural College, Hebbal were the Runners-up with 44 points. The Silver Rolling Trophy instituted in memory of late Mr. B. N. M. Hegde, for the overall championship in games and sports was won by the College of Basic Sciences and Humanities, GKVK Campus.

### **Medical Services**

The dispensaries at Hebbal and Dharwad Campuses are working satisfactorily under the supervision of full time Medical Officers. In all other campuses, part-time Medical Officers are attending to the needs at Raichur and Mangalore Campuses. Efforts are being made to procure the services of full time Medical Officers with supporting staff for running dispensaries at Mangalore, Raichur and Bidar campuses. The following are the details of patients treated by the Health Centres in various campuses during the year :

Name of the campus	Vaccinations performed	Total No of patients treated during the year	Daily average No.	Referred to major hospitals for specialists opinion
Hebbal & GKVK	2446	36304	85	1825
Dharwad	1800	36348	101	50
	—			
Mangalore	—	4122	11	—
Raichur	—	3872	10	16

### **University Employment Information and Guidance Bureau**

The University Employment Information and Guidance Bureau was established at GKVK Campus on the ground floor of the 'Naik Bhavan' during 1982. In addition to registration of graduates seeking employment, the Bureau provides information about scholarships, availability of jobs, admission procedure in the other universities both traditional and agricultural and also in foreign universities. The Bureau has also conducted a training programme in the "Earn while you learn scheme — book binding" for a period of seven days for 200 students of this University. It has been publishing regularly a Monthly Bulletin entitled "Krishi Udyog Samachar" since Dec. 1983.

The following papers and periodicals are being subscribed : The Hindu, Prajavani, Employment News, Karnataka Gazettee Part -III, Commerce, Career Digest, Success to Career, Sports Week, Sports Star and Illustrated Weekly of India

In addition to the above news papers and periodicals, the Bureau also gets pamphlets from the Director General of Employment and Training, New Delhi and news bulletins from other Agricultural Universities and the same are being displayed at the Bureau. During 1984-85 about 200 individuals were given information on various aspects for furthering their careers. About 12,500 persons visited the Bureau during the year under report. The following is the break-up of the live register as on 31-3-1985.

Total Registered	S.C.	S.T.	B.T.	BCT	BCM	BSG	U.R.	R.	U.
378	48	4	2	15	46	37	166	209	109

### **National Service Scheme**

National Service Scheme is financed by the Govt. of India and Govt. of Karnataka. The main aim is to expose the student community to the rural atmosphere and also involve them in sharing their knowledge with the rural folk. As the nature and type of activities organised by the N.S.S. are akin to the activities carried out by our students during their village stay camps, there is little enthusiasm from the students to participate in this programme. However, all efforts are being made to introduce the regular N.S.S. Programme in all the institutions since 1985.

Only the College of Agriculture, Dharwad, carried out the regular NSS Programme during 1984-85. However, the University has been examining the possibility of introducing this scheme as a curricular programme. The students of Agricultural College, Dharwad have adopted a village called Ettinagudda near the Krishinagar Campus, Dharwad. The work taken up by the N.S.S. volunteers is the all round development of Ettinagudda, both agriculture and individual family development. The students are also working on some projects on the campus.

*Results of the UAS Sports for the year 1984-85 Inter-Campus and Inter-University Tournaments*

Game	UAS Inter-Campus				Inter-University		
	Venue	Date	Winners	Runners	Venue	Date	Results
1	2	3	4	5	6	7	8
Foot Ball	Hebbal	9-10-84	UAS Team Selections held		Nagpur	15-21-10-84	Lost to Andhra University
Chess	Hebbal	9/10-10-84	UAS Team Selections held		Osmania Univ. Hyderabad	15-21-10-84	23rd position out of 60 teams participated.
Badminton (M)	Mangalore	9/10-11-84	Agrico, D.	Fishco, M.	Not conducted		
Table Tennis (M)	Mangalore	9/10-11-84	Agrico, H.	Vetico, H.	Gujarat Univ. Ahmedabad	25-29-11-84	Lost to Bangalore University.
Basket Ball (M)	Dharwad	17/18-11-84	Vetico, H.	GKVK	Karnataka Univ. Dharwad	20-25-11-84	Lost to Andhra University in the first round.
Badminton (W)	Hebbal	9/10-11-84	GKVK	Agrico, H.	Not conducted		
Table Tennis (W)	Hebbal	9/10-11-84	RHSc., D.	RHSc., D.	Gujarat Univ. Ahmedabad	25-11-84	Lost to Bundelkhand University.
Cricket	Hebbal	8/11-12-84	GKVK	Agrico, H.	Andhra Univ. Waltair	25-27-12-84	Won in the 1st round against Kakathiya University, lost to Nagpur University by 36 runs in the second round.
Kho-Kho (M)	Hebbal	8/9-12-84	GKVK	Vetico, H.	Aurangabad Maharashtra	12/18-1-85	Lost in the Quarter-finals to Shivaji University.
Kho-Kho (W)	Hebbal	8/9-12-84	GKVK	RHSc., D.	Not participated		

1	2	3	4	5	6	7	8
Hockey	Hebbal	15/16-12-84	Agrico. H.	GKVK	Mysore Univ. Mysore	2/9-6-85	4th place out of 23 teams participated. Won again- st-1st round-A.P. Agri. Univ. 2nd round-Bha- rathidasan, 3rd round - Madres Univ., 4th round Osmania Univ., 5th round lost to Bangalore Univ. 6th round-drew against Nagpur. 7th round Lost to Bharatiyar. Lost to Madurai Kamaraj University.
Ball Badminton (M)	Hebbal	17-1-85	GKVK	Agrico. H.	Krishnadevaraya Univ. Ananthapur	12/16-1-85	Lost to Madurai Kamaraj University.
Athletic Meet	Dharwad	21/22-12-84	GKVK	Agrico. D.	Not participated		Lost to host University in the first round.
Kabadi	Hebbal	6/7-11-84	GKVK	Agrico. D.	Madurai Kamaraj Univ., Nagarcoil	11-11-84	
Volleyball	Hebbal	16/17-10-84	Agrico. D.	Agrico. H.	Andhra Univ. Waltair	22-10-84	Lost to Gandhigram Rural University, Tamil Nadu in the first round.
Tennis	Hebbal	29/30-12-84	GKVK	Vetico. H.	Mangalore Univ. Mangalore	4-1-85	Lost to Bombay University in the first round.

**Karnataka State Inter-University Tournament**

The UAS Teams participated in the Karnataka State Inter-University Tournament conducted at the Indian Institute of Science, Bangalore from 1/3-3-1985

The UAS got the following places :

- Men Section :* i) Mr. Viswanath, Final Year – II place in 800 Mtrs.  
B.Sc. (Agri.), Hebbal III place in 1500 Mtrs.
- Women Section :* i) Kum. M. G. Poly, Rural –  
Home Scienc College, Krishi- III place in Javalin throw  
nagar, Dharwad
- ii) Kum. Shoba Nagnur, Rural –  
Home Science College, Krishi- III place in High Jump.  
nagar, Dharwad.

P. G. CHENGAPPA  
*Director of Student Welfare i/c*



## PART III

### RESEARCH

During the period under report a new Research Station near Tiptur has been started with major emphasis on Animal Science activities. An area of 1547 acres of Amrithmahal Kaval (Bidarammanagudi Kaval) lands near Tiptur have been handed over to the University by the State Department of Animal Husbandry. Few Research Stations have been strengthened by adding additional lands for research and seed production activities. An area of 165 acres of land has been added to RRS, Mudigere; 140 acres to RRS, Brahmavar; 100 acres to ARS, Balagigapade and 130 acres of lands to ARS, Gulbarga.

During the year a number of seminars such as, Seminar on Inland Fisheries at Bangalore; Seminar on Areca Production and Protection at Sringeri; Seminar on Nephantis at Tiptur; Seminar on Research and Development of Cashew in Coastal Region at Ullal and Seminar on Fruit and Vegetable Marketing at Bangalore were conducted in collaboration with respective State Departments.

There are 39 All India Co-ordinated Research Projects, 30 I.C.A.R. Adhoc Research Projects being operated in the University. Besides, there are 41 research projects in operation, which are funded by outside funding Institutions such as BARC, GOI, UGC, KSCST, GOK and several other institutions.

The following new crop varieties were released during the year

<i>Sl. No.</i>	<i>Crop</i>	<i>Variety</i>	<i>Characters</i>
1	2	3	4
1.	<i>Rabi</i> Sorghum hybrid	KDRSH-1 (SPH-218)	Tolerant to charcoal rot
2.	Paddy	a. KMDP-1 (Avinash)	Recommended for midlands of the drilled tract in Zone No. 8 and 9.
		b. KMDP-2 (Abilash)	Recommended for drilled low land tracts of Karnataka
		c. KKP-2 (Mahaveer)	Recommended for upland of gall midge endemic area of South Kanara and North Kanara for <i>kharif</i> season

1	2	3	4
		d. KMP-39 (Karna)	Recommended for the Cauvery basin canal irrigated areas of Region-III.
3.	Groundnut	JL-4 (Bharathi)	Recommended for Region I and II as an additional variety for only <i>kharif</i> season both under rainfed and irrigated conditions.
4.	Ragi	a. INDAF-9	Suited for pre-monsoon late <i>kharif</i> , <i>rabi</i> and summer irrigated areas except for June and July sowing and is tolerant to pests and diseases.
		b. HR-911 (KBR-1)	Recommended for Region-II, III and IV as an additional variety for <i>kharif</i> and summer irrigated conditions.
5.	Bengalgram	KGB-1 (Bheema)	Recommended for Region-I and II as an additional variety.
6.	Redgram	KGT-1 (Maruthi)	Recommended for Northern Region of Karnataka where wilt is endemic.
7.	Maize hybrid	Deccan-103	Recommended for Zone 1, 2, 3 and 8 for both <i>kharif</i> and <i>rabi</i> seasons.
8.	Maize composit	G-25 (Renuka)	Recommended for short duration inter-cropping systems in Malaprabha and Ghataprabha project areas for both <i>kharif</i> and <i>rabi</i> seasons.
9.	Pomegranate	GKVK-1 (Jyothi)	It is best suited for arid and semi-arid areas of the State. The seeds are highly soft.

The Research report on Plant Science, Animal Science, Home Science, Fishery Science and Basic Science for the year is as follows :

## **Plant Science**

### **1.1 Agronomy**

#### **1.1.1 Rice**

Under All India Co-ordinated Research Project on rice, a trial on monitoring soil fertility and crop productivity under continuous rice culture at moderate levels of fertilizer application was taken up at Regional Research Station, Mandya. It was observed that, application of only nitrogen or in combination of N and P recorded significantly higher grain yield (3.70 t/ha and 3.39 t/ha respectively) as compared to no NPK, only K or in combination of P and K (2.62 t/ha, 2.4 t/ha and 2.68 t/ha respectively).

A study on dual cropping of Azolla with rice was taken up at RRS, Mandya. The results indicated that application of 60 kg N/ha + Azolla + cowdung recorded an yield of 3.32 t/ha on par with the application of 90 kg N/ha + no Azolla (3.31 t/ha).

In a nitrogen management trial for increasing the fertilizer 'N' use efficiency of transplanted rice by placement techniques under irrigated wet land conditions at RRS, Mandya, it was observed that at 87 kg N/ha level, urea super granules (USG) recorded higher yield (2.85 t/ha) compared to mercury phos coated urea (MPCU) (2.11 t/ha). Similarly at 116 kg N/ha level of urea, USG (7.5 t/ha) and sulphur coated urea (SCU) (7.87 N/ha) were on par and recorded higher yield as compared to MPCU (2.11 t/ha).

#### **1.1.2 Ragi**

Under AICRP on ragi, the crop rotation studies for rainfed ragi was taken up at the following locations viz., GKVK, ARS, Madenur and ARS, Hagari. The two years data indicated that among the one year crop rotations, cowpea in May followed by ragi in August gave significantly higher monetary returns (Rs. 12,384/ha) compared to monocrop of ragi (Rs. 10,536/ha) and farmers practice ragi + mixed crop of avare and jowar (5:1) (Rs. 9,286/ha). Among the two year crop rotations, ragi first year and groundnut second year gave significantly higher monetary returns (Rs. 17,401/ha) followed by ragi first year and mixed cropping of groundnut + redgram (4:1) second year (Rs. 15,493/ha).

In a study on split application of phosphorus for ragi under rainfed condition, basal application of entire recommended dose of phosphorus at the

time of sowing produced the highest grain yield (3,727 kg/ha) which was on par with the application of phosphorus in two split doses of 75:25 (3,592 kg/ha), 50:50 (3,577 kg/ha) and 25:75 (3,546 kg/ha). Delaying phosphorus application up to 4–6 weeks from sowing resulted in lower yield (2,835 kg/ha) which was on par with no phosphorus (2,730 kg/ha).

In a study on effect of age of seedlings and nitrogen level is under protective irrigation at GKVK, Bangalore, transplanting of 20 days old seedlings gave significantly higher grain yield (4,922 kg/ha) compared to other ages of seedlings, followed by 25 days aged seedlings (4,673 kg/ha). Drastic yield reduction was noticed when 30 days and above aged seedlings were used. 20 days old seedlings at 100 kg N/ha produced the highest grain yield (5,733 kg/ha).

In an experiment on effect of *Azospirillum brasilense* on yield of ragi under rainfed condition, full recommended dose of nitrogen (40 kg N/ha) produced the highest grain yield (4,574 kg/ha) which was followed by application of *Azospirillum* mixed with FYM plus 20 kg N/ha (4,535 kg/ha) and seed inoculation combined with application of *Azospirillum* mixed with FYM + 20 kg N/ha (4,531 kg/ha).

A study on effect of sowing/planting under protective irrigation in *rabi* season was taken up. There was significant response to time of sowing. Highest grain yield (4,326 kg/ha) was recorded when sown during first fortnight of October followed by sowing in second fortnight of October (3,700 kg/ha). Further, delay in sowing beyond October has reduced the yield drastically.

### 1.1.3 Sorghum

In a trial on response of some new sorghum entries to levels of nitrogen application conducted at RRS, Dharwad, among different hybrids and varieties (4 each) tested the variety SPV-462 recorded the highest grain yield (44.02 q/ha) giving 73.79 per cent higher than CSH-5 (25.33 q/ha) followed by SPV-346 (44.11 q/ha), SPV-351 (39.77 q/ha) and CSH-9 (38.72 q/ha) giving 62.30, 57.01 and 52.86 per cent respectively more than CSH-5. SPV-462 also recorded the highest fodder yield (95.0 q/ha) followed by SPV-346 (91.5 q/ha). CSH-5 recorded the lowest fodder yield (59.0 q/ha).

### 1.1.4 Pulses

A trial on response of new genotypes of redgram to plant population and row spacing was taken up under AICRP on Pulses at ARS, Gulbarga. Four genotypes LRG-30, MTH-1, ICPH-2 and GS-21 were tested with one row of intercrop of bajra at 3 plant population levels 50,000, 75,000 and one lakh/ha with three row spacings. Results revealed that GS-21 recorded the highest grain yield of 1,415 kg/ha and LRG-30 and ICPH-2 were on par with local check

(GS-21A). 60 cm row spacing has recorded the highest grain yield (1,398 kg/ha) which was on par with 75 cm row spacing.

In a study on fertilization in pigeonpea based intercropping system, treatments comprised applying full and half of the recommended dose of fertilizers to the base crop as well as intercrop in all possible combinations. The pigeonpea was grown under paired row planting in 2 : 1 ratio. Half recommended dose to both main and intercrop gave significantly highest pigeonpea grain yield of 1682 kg/ha. Bajra gave significantly higher yield when full recommended dose of fertilizer was applied.

An experiment on effect of *rabi* pulses on productivity and nitrogen economy in succeeding *kharif* cereal was taken up at ARS, Gulbarga. *Rabi* crops like bengalgram, linseed, safflower, *rabi* jowar, wheat were grown with recommended dose of fertilizer and hybrid bajra was grown during *kharif* as a succeeding crop at 0, 30, 60 and 90 kg N/ha. Results revealed that bajra responded up to 90 kg N/ha significantly and recorded the highest grain yield of 2,220 kg/ha at 90 kg/ha. There was no residual effect of previous crops. Highest monetary return was obtained with crop rotation of safflower-bajra.

Moisture conservation studies were taken up with redgram at ARS, Gulbarga with different methods of land layouts comprising of (1) Ridge and furrow, (2) Broad bed and furrow, (3) Broad furrow and ridge, (4) Opening a furrow at every 3 m distance, (5) compartment bund-in, and (6) Control. This is the first year of the trial and results are found to be significant. Highest grain yield of 1,374 kg/ha with pigeonpea was obtained with broad furrow and ridge layout was adopted at 150 cm.

**Redgram :** Studies to find out the extent of weed competition in redgram, intercropped with blackgram, conducted at GKVK, revealed that weed control up to 45 DAS (days after sowing) gave significantly higher yield (1,294 kg/ha) than delayed weed control after 45 days after sowing (663 kg/ha) as compared to complete weed free (1,362 kg/ha) and unweeded control (558 kg/ha). Delay in weed control up to 45 days reduced the yield to the extent of 48 per cent.

**Cowpea :** In trial on response of cowpea genotypes to dates of sowing conducted at Bangalore indicated that on an average of dates of sowing, the varieties V.16 and V.37 which were on par, gave significantly higher yield over C-152 (which was affected by rust) and other varieties tested. Sowing during last part of July gave maximum yield and delay in sowing resulted in significant yield reduction. The significant interaction of variety and time of sowing indicated that variety V-16 with end of July sowing gave maximum yield (1,258 kg/ha) which was on par with V-37 (1,252 kg/ha) as compared to recommended variety C-152 (689 kg/ha).

**Horsegram:** Under the performance of grain legume in *kharif* rice fallow at Hebbal with zero tillage. C-152 cowpea gave maximum yield (1,738 kg/ha) followed by Khargaon-3 blackgram (1,413 kg/ha). Similar results have been obtained during previous season.

#### 1.1.5 Oilseeds

**1.1.5.1 Groundnut:** A trial on response of Dh-8 groundnut for differential stand geometry was taken up at RRS, Dharwad, to find out suitable inter and interrow spacing. The treatment combination of 30 cm × 10 cm recorded the maximum pod yield of 5,780 kg/ha. The next highest yield of 5,273 kg/ha was obtained with 20 cm × 15 cm. The lowest pod yield of 4,193 kg/ha was obtained in the widest spacing of 40 cm × 20 cm.

Response of groundnut bunch (Dh-8) to varying levels of nitrogen and phosphorus was studied. The maximum pod yield of 5,048 kg/ha was recorded with 12.5:25:25 kg/ha of N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O. Whereas the minimum pod yield of 4,193 kg/ha was obtained in the treatment where N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O were applied at the rate of 50 : 75 : 25 kg/ha.

Relay cropping studies in *kharif* groundnut with different *rabi* crops and cotton was tried with 15 different cropping sequences. The results indicated that in the assured rainfall tracts like Dharwad there is no necessity to go for relay cropping. It is more profitable to grow pure crop groundnut at a spacing of 30 cm × 10 cm in *kharif* followed by jowar in *rabi*. This cropping sequence gave maximum gross returns of Rs. 26,086/ha whereas the lowest gross returns of 14,970/ha was obtained in the entire crop of cotton.

**1.1.5.2 Sunflower:** Sunflower stalk residue management study was taken up. Ragi, sunflower and soybean were grown with recommended spacing and fertilizers. Sunflower stalk at the rate of 1 and 2 t/ha was applied 25 days earlier to the sowing of the crops. Stalks were cut into small bits of 5-10 cm in length and incorporated into the soil. At the time of incorporation, 50 per cent N recommended to the crop was applied along with the residue. Out of the remaining 50 per cent N, half was given as a basal dose and remaining half as top dressing to ragi and sunflower crops. The results indicated that there was increased yield with the incorporation of residue in all the crops.

Water management studies in sunflower was conducted to find out the effect of irrigation at 40 and 80 per cent depletion of moisture, with three levels of fertilizers viz., half, full and one and half times the recommended dose, with two plant population levels of 55,555 and 74,000 plants per ha.

Seed yield of 2.233 kg/ha was obtained when irrigated at 40 per cent depletion and it decreased to 1,658 kg/ha when irrigation was given at 80 per cent moisture depletion. Highest seed yield (2,071 kg/ha) was obtained at 60 cm × 30 cm spacing. Seed yield was the lowest, with half of the recommended dose (1,665 kg/ha) while at recommended (2,046 kg/ha) and with higher level (2,124 kg/ha) there was not much difference. Irrigation at 40 per cent depletion of moisture with a spacing of 60 cm × 30 cm and application of 60 : 60 : 40 N, P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O kg/ha appeared to be optimum.

A trial on Agronomic investigations on Morden seed production was taken up with three levels each of nitrogen and phosphorus (*viz.*, 40, 60 and 80 kg/ha) at GKVK. The interaction of nitrogen and phosphorus was significant. The highest seed yield of 1,514 kg/ha was recorded at 80 N and 80 P<sub>2</sub>O<sub>5</sub> which was found to be on par with 60 N : 60 P<sub>2</sub>O<sub>5</sub> combination (1,497 kg/ha).

#### 1.1.6 Soybean

A study on performance of different herbicides on soybean in controlling the weeds was taken up with an objective to find out the better herbicides for control of weeds in soybean. Different herbicides were tried in comparison with cultural practices. The results indicated that highest yield of 1,098 kg/ha was obtained when two hand weedings were given at 30 days and 45 days after sowing followed by one hand weeding at 30 days after sowing (1,045 kg/ha). Among the herbicides tried basalin 0.5 kg a.i./ha was given the highest yield with 1,023 kg/ha.

In a study on intercropping of soybean with redgram, the performance of soybean varieties (Monetta, KHSb-5 and Hardee) as intercrops was tested. Intercropping of soybean with redgram was found to be profitable when compared to the pure crop of redgram. A gross return of Rs. 6,515 was obtained when redgram was sown with 60 cm with one row of Hardee soybean in between two rows of redgram.

In a study on nitrogen requirement for soybean with and without Rhizobial culture, four levels of nitrogen 10, 20, 30 and 40 N kg/ha were tried with and without Rhizobial culture. The results indicated that the yield of soybean was increased when the seeds were treated with Rhizobial culture.

Performance of pulses in paddy fallows was studied with six crops namely soybean (Monetta), cowpea, greengram, Mugad avare, Hebbal avare and bengalgram. The performance of soybean was superior to any other pulse crops and soybean yielded 22.77 q/ha as against 17 q/ha of cowpea. Other pulses like greengram and field bean yields gave less than 6 q/ha.

### 1.1.7 Sugarcane

A study on efficiency of weedicides on weed control and their effect on yield of sugarcane (Plant cane) at RRS, Mandya was conducted. Four weedicides viz., Simazine (80 and 50 per cent), Atrazine (80 and 50 per cent), Knockweed (34.2 per cent) 2,4-D (80 per cent Na salt), were compared with hand weeding and unweeded check. Atrazine 50 per cent chemical grade at 1.2 kg/ha as pre-emergence spray recorded maximum cane yield of 232 t/ha, which was significantly superior to unweeded check (180 t/ha) and Knockweed at 1 litre/ha, 1.5 litre/ha (203 t/ha and 218 t/ha). Atrazine controlled weed flora better than Knockweed and was on par with Simazine. In previous years, Atrazine 50 per cent chemical grade proved better in controlling weed than 2,4-D. Pol per cent in juice did not differ significantly, among the treatments.

Comparative 'N' use efficiency of (1) Urea, (2) Urea+neem cake blended, (3) Urea+neem cake coated and (4) Urea super granules were tried at four levels of nitrogen (50, 100, 150, 250 kg/N/ha) was studied for ratoon crop. Increase in yield was noticed with the increase in the levels of nitrogen irrespective of the source of 'N'. Application of 250 kg N/ha through urea super granules recorded the highest cane yield of 112 t/ha followed by urea+neem cake coated (99 t/ha), urea+neem cake blended (98 t/ha) and urea alone (96 t/ha).

An experiment on nitrogen economy by incorporation of leguminous intercrops on yield of sugarcane was conducted on plant cane. Sunnhemp, french bean, greengram and lucerne, were tried. French bean and sugarcane was found to be the best. Intercropped french bean gave yield of 76 q/ha of greengram, french bean which was an additional income. Incorporation of plant residue of french bean after 70 days increased the yield of cane substantially (153 t/ha). The next best treatment was sunnhemp+sugarcane (145 t/ha) as compared to sugarcane alone (127 t/ha).

An experiment was conducted to study the response of early, midlate and late sugarcane varieties to nitrogen fertilizer. Six varieties CoC-671, KHS-3296, KHS-3347, Co-7708, Co-7804 and Co-419 were tested at four 'N' levels viz., 0, 125, 250 and 375 kg/N/ha. Significant difference in yield due to nitrogen levels was noticed. The variety Co-7804 recorded highest yield (202 t/ha), closely followed by KHS-3247 (200 t/ha), KHS-3296 (194 t/ha) and Co-419 (191 t/ha). The variety CoC-671 recorded lowest yield (132 t/ha). The variety Co-7804 was consistently superior to Co-419 during previous seasons.

A study on response of two early duration varieties viz., CoC-671 and KHS-3296 to three spacings (60 cm, 75 cm, 90 cm) and three seed rates



(12,000, 14,000, 16,000 per acre) was conducted. KHS-3296 was significantly superior to CoC-671 with regard to cane yield. The spacing of 75 cm was found to be optimum for both.

#### 1.1.8 Cotton

A study on agronomic requirement of new varieties and promising pre-release genotypes in relation to their plant densities and fertility levels was conducted at ARS, Dharwad. The variety DCH-397 (Intra hirsutum rainfall hybrid) gave the highest yield of 1,588 kg/ha of kapas followed very closely by Sharada with an almost equal yield of 1,581 kg/ha. DP-452 (1571 kg/ha), CPD-P1-1-2 (1455 kg/ha) and LRA-5166 (1367 kg/ha) respectively. There was not much difference among the three spacings tried. On an average,  $60 \times 22.5$  cm (83,333 plants/ha) gave the highest yield of 1547 kg/ha followed by  $60 \times 15$  cm (1,11,111 plants/ha) with 1519 kg/ha and  $60 \times 30$  cm (55,555 plants/ha) with 1471 kg/ha. Among the three fertilizer levels tried 40:20:20 kg/ha NPK gave the highest average yield of 1608 kg/ha followed by 80:40:40 kg/ha NPK with 1548 kg/ha as against 1384 kg/ha of no fertilizer application.

An experiment of effect on sowing dates and spacing on yield of new hybrid variety of cotton, Jayalakshmi was taken up at ARS, Dharwad. Averaged over spacings and NPK levels 10th July planting gave the highest yield of 2879 kg/ha followed by 13th August planting with 1768 kg/ha and 12th September sowing with 984 kg/ha. Averaged over sowing dates and fertilizer levels  $60 \times 30$  cm spacing gave the highest yield of 1190 kg/ha followed by  $90 \times 20$  cm with 1956 kg/ha and  $90 \times 10$  cm with 1776 kg/ha.

Studies on the use of Bio-fertilizers in economising nitrogenous fertilizer for Jayalakshmi hybrid cotton was taken up at ARS, Siruguppa. On the average of fertilizer levels, seed treatment-soil application of Azotobacter culture gave the highest yield of 2460 kg/ha followed by seed treatment alone (2371 kg/ha) and soil application alone (2220 kg/ha) as against (2119 kg/ha) of no azotobacter treatment.

No trend was observed in economising the fertilizer level by using azotobacter treatments. However, at different fertilizer level, azotobacter culture increased the yield considerably.

Studies on cropping patterns under assured rainfall conditions was conducted at ARS, Bailhongal. The yield of entire cotton planted in *kharif* was 1527 kg/ha as against 606 kg/ha of *rabi* entire cotton; whereas in case of inter-cropping treatments, the yield of cotton varied from 1321 kg/ha in greengram+cotton 3:1 and 1323 kg/ha groundnut+cotton 3:1 rows. The yield of entire groundnut was 1124 kg/ha as against 809 kg/ha in groundnut+cotton

3:1, 849 kg/ha in groundnut+chilli 3:1, 698 kg/ha in groundnut+sunflower+bengalgram 6:1:1 and 686 kg/ha in groundnut+sunflower+safflower 6:1:1. The gross income was almost equal and highest in greengram+cotton either 3:1 or 2:1 rows (Rs. 2146 per ha and Rs. 12,123 per ha) followed by groundnut+cotton 3:1 rows with Rs. 11,578 per ha and entire cotton with Rs. 9162 per ha as against the lowest of Rs. 2,516 per ha Hy. jowar+redgram 4:2 rows. All the cropping patterns involving commercial crops gave a net income varying from Rs. 1,122 per ha in case of groundnut+sunflower+safflower 6:1:1 to Rs. 8,120 per ha in greengram+cotton 2:1 rows, as against Rs. 964 per ha in Hy. jowar+redgram 4:2 rows.

#### 1.1.9 Tobacco

A study on agronomical investigation in bidi tobacco was conducted at ARS, Nippani. The results indicated that there was significant difference in yield due to different ratios of urea and cake as N source. The highest yield of 1398 kg/ha was recorded with 25 per cent N as cake and 75 per cent N as urea. There was significant reduction in yield when 75 per cent N was applied in the form of cake. The treatment wherein no nitrogen was received gave only 715 kg of tobacco yield per/ha. This trial has been conducted since three years. On an average N applied in the form of urea seems to be the best one since it gave the highest yield of 1633 kg/ha.

The results of the experiment on relay cropping in bidi tobacco indicated that there was significant difference in yield of bidi tobacco due to different relay crops. The highest yield of 2537 kg/ha was obtained with tobacco+sunn hemp (*in situ*) followed by tobacco alone (2423 kg/ha). China mung affected the tobacco yield (1087 kg/ha) as well as quality to some extent. The tobacco yield with tur as relay crop was only 287 kg/ha. Groundnut has not affected much the yield (1967 kg/ha) of tobacco as well as quality. Tobacco with groundnut (JL-24) as relay crop seems to be the most profitable one in which gross income was maximum followed by tobacco+sunn hemp (*in situ*). On an average of two years data it was observed that Tobacco+groundnut was the most economical one followed by tobacco+sunn hemp (*in situ*) whereas other relay crops affected the yield and quality of tobacco.

The results of fertilizer trial in bidi tobacco nursery indicated that significant difference in number of transplantable seedlings due to different manurial dose was observed. Maximum number of transplantable seedlings sq.m. (530) was obtained with 200 tonnes of FYM and 200 kg N/ha whereas with 150 tonnes of FYM+250:180:100 NPK kg/ha the transplantable seedlings sq.m. was only 440.

#### 1.1.10. *AICRP on dry farming*

Under AICRP on dry farming the programme is conducted at GKVK, Bangalore. Salient findings are given below :

Subabul strip of 1.5 m width at an interval of 7.5 m reduced the ragi yield significantly. Reduction in yield of ragi with subabul strips maintained at 1.5 m height was to an extent of 32 to 39 per cent on gross area basis as compared to subabul crop maintained at 30 cm height from ground level (first year crop) which decreased the yield to an extent of 12 to 20 per cent considerable reduction in yield of first row of ragi was observed in former pattern whereas the adjacent row gave higher yield in the latter.

Redgram sown in June gave higher monetary returns (Rs. 2,396/ha) than July sown redgram (Rs. 1,361/ha). Entire crop of ragi gave the highest monetary returns (Rs. 7,958/ha) than ragi+redgram in different combinations.

An intercropping system involving maize and redgram in alternate rows at 37.5 cm apart was found profitable. This system resulted in the highest monetary return of Rs. 6,620/ha as compared to Rs. 4,835/ha in entire maize or Rs. 4788/ha in entire redgram.

A study on the compatability and crop yield in Agro-forestry system indicated that in general crop rows adjacent to forest trees were affected on the western side to a great extent compared to the eastern side. Eucalyptus affected the crops to a large extent and the influence was least in silver oak.

Redgram variety TTB-7 sown in June gave 31.3 q/ha as compared to 17.1 and 6.2 q/ha in July and August sowings respectively. Row spacing of 60 cm was found to be better (18.9 q/ha) than closer spacing of 45 cm (17.5 q/ha). Lower plant population of 55,555 plants/ha give higher yields of 18.9 q/ha than the higher plant population of 14,000 plants/ha (17.5 q/ha). However, under late sown conditions, higher plant population and closer spacing slightly improved the yield level.

#### 1.1.11 *Weed control*

Under AICRP on weed control, an experiment on integrated weed management in drilled finger millet was taken up at GKVK. The results indicated that integrating hand weeding once (30-35 days) along with 2, 4-D amine salt or sodium salt at 0.5 kg/ha appeared more remunerative than mere application of herbicide.

A study on integrated weed management in soybean was conducted at Hebbal under irrigated conditions. The results indicated that one hand weeding 30-35 DAS can be integrated with 50 per cent of herbicide recommendations for

effective weed control and better results. Mere reducing the dosage of herbicides without cultural practices did not appear to lower the weed growth.

A study on comparative evaluation of molinate and molinate + propanil was conducted at Nagenahalli for transplanted paddy and at Honnaville for drilled paddy (rainfed). In transplanted paddy molinate + propanil (1 : 1) at 5 l/ha gave yield (3304 kg/ha) comparable to hand weeding twice (3057 kg/ha), butachlor 1.25 kg/ha (3654 kg/ha), benthocarb 2.0 kg/ha (3602 kg/ha) and oxyfluorfen 0.1 kg/ha (3519 kg/ha). Unweeded control gave the lowest yield (2073 kg/ha) mainly due to the competition offered by *Rotalla fimbriata* and *Scirpus* sp. In drilled paddy, molinate 3E-I at 3.84 kg/ha (684 kg/ha), molinate 6E Ext. at 3.62 to 4.3 kg/ha (646 to 657 kg/ha), molinate + propanil (1 : 1) at 6 l/ha (772 to 1021 kg/ha) gave yield comparable to or more than hand weeding twice (686 kg/ha). Butachlor and benthocarb produced grain yield slightly lower than hand weeding (419-540 kg/ha). Unweeded control gave the lowest grain yield of 245 kg/ha.

#### 1.1.12 AICRP on saline water

An experiment, on effect of saline water on crop growth and soil properties was conducted at ARS, Dharwad. Safflower was used as test crop in the study. Best available water (BAW) treatment recorded significantly higher grain yield (23.22 q/ha) than all other treatments. The reduction in grain yield with 2 and 4 mmhos/cm irrigation water was 10.94 (20.68 q/ha) and 11.35 per cent (20.59 q/ha) respectively and they were on par with each other and significantly superior to rest of the treatments. The grain yield obtained showed the same trend as that of last year.

In an experiment on use of saline well/tube well water to supplement canal water on growth and yield of cowpea, it was found that irrigation with best available water (BAW) significantly yielded higher grain yield (5.83 q/ha) than all other treatments. The grain yield of other treatments i.e., two canal irrigations followed by the tube well, one canal irrigation followed by one tube well, one canal irrigation followed by the tube well and tube well irrigation alone were 5, 18, 4, 84, 4 and 3.22 q/ha respectively which differed significantly from each other.

An experiment to study the effect of saline water on crop growth and soil properties was conducted with maize. The best available water (BAW) treatment gave significantly higher grain yield (89.29 q/ha) than all other treatments. The reduction in the grain yield with 2 and 6 mmhos/cm treatments were 9 and 20.92 per cent respectively. With increase in the salinity levels from 8 to 16 mmhos/cm the grain yield reduced from 60.86 to 36.51 q/ha.

#### 1.1.13 *AICRP on water management*

A study on effect of various irrigation schedules and nitrogen levels on growth and yield of onion was taken up at Belavatgi. The results indicated that highest bulb yield (154.23 q/ha) was obtained when the crop was irrigated at 0.7 IW/CPE ratio at 60 mm depth at each irrigation. This works out to be about 240 mm depth of water applied 4 times with an interval of 31 to 35 days which was found adequate. Among the different nitrogen levels tried, application of 100 kg N/ha found optimum as it recorded the highest bulb yield (156.84 q/ha).

Effect of various irrigation schedules and nitrogen levels on growth and yield of chilli was studied. The highest yield (9.30 q/ha) was obtained when the crop was irrigated at 0.7 IW/CPE with 60 mm depth at each irrigation. This works out to be 5 irrigations at an interval of 22 to 30 days depending upon the rainfall received. Among the different nitrogen levels tried, application of 150 N kg/ha was found to be optimum.

An experiment on effect of various irrigation schedules and nitrogen levels on growth and yield of fodder maize was conducted. The higher forage yield (51.01 t/ha) recorded, when the crop was irrigated at 0.9 IW/CPE ratio with 60 mm depth which has received 4 irrigations at an interval of 15 to 18 days. Among different nitrogen levels tried, application of 200 kg N/ha resulted in highest forage yield (69.31 t/ha).

#### 1.1.14 *AICRP on under utilised/under exploited plants*

A study on evaluation of winged bean genotypes for green pods and seed yield potential was taken up at Hebbal. Genotype Sei-12 gave highest green pods yield of 5.43 kg/plot with a production of 641 pods.

Trivandrum local recorded highest seed yield of 647 g/plot (with the production of 292 pods yielding 1.15 kg pods).

Comparative performance of winged bean with few other common crops was studied. Soybean yielded (1084 kg/ha) nearly double compared to winged bean (554 kg/ha). In intercropping system maize reduced the yields of winged bean yield by 77 per cent compared to pure crop of winged bean but, the green cob yield of maize remained unaffected.

### 1.2 Plant Breeding

Collection, maintenance and evaluation of germplasm, crossing programmes and handling of various segregating generations are being carried out in almost all the crops. Results of only important trials carried out in various crops have been highlighted in this report.

### 1.2.1 Rice

Four varieties have been released during the year for general cultivation in the State. They are, IET-5882 (for low lands) and Gama-318 (for mid lands) from Mugud centre for drill sown conditions, KKP-2 from Mangalore centre for coastal region and KMP-39 from Mandya centre for canal irrigated conditions. Intan Mashuri (IMD-26) with 38.1 q/ha yield, is quite promising (68 per cent increased yield over Mangala and 15 per cent over Pushpa) in farm trials and has very good consumer acceptance quality.

In the project on exploitation of hybrid vigour in rice utilising male sterile lines, abilities of Pankhari 203 A and 203 B to set seeds were evaluated by planting them in 1 : 1 ratio. The 'A' line had 9 per cent seed setting and gave 3 g seeds per plant (508 kg/ha) while 'B' lines showed 73 per cent seed setting with 16 g/plant yield (265 kg/ha).

In uniform varietal trial-I (110-115 days) at Mandya, IRBPHN-89 resistant to brown planthopper (59.4 q/ha) was better than the best check Mangala (57.9 q/ha) while at Mugad check D-6-2-2 (57.72 q/ha) out yielded all other entries.

At Mugad, IET-7727 (120-125 days) tolerant to BPH was on par with check D-6-2-2 (60.8 q/ha).

IET-8110, a BPH resistant variety, was the best among 7 varieties tried at Mandya and Siruguppa with an average yield of 66.6 q/ha as compared to check Mashuri with 55.7 q/ha yield.

At Kathalgere, IET-5722 (70.8 q/ha) a medium long duration variety was superior to IR-20 (64.7 q/ha).

At Kutrahally seed farm, IR-30864 was the best (26.52 q/ha) with check Rasi yielding 16.8 q/ha under drilled conditions.

Under late sowing condition IR-20 (45.5 q/ha) was the best compared to Jaya (34.1 q/ha) at Mudigere while IR-4819-77-3-2 (52.7 q/ha) was the best at Sirsi (Jaya-45.9 q/ha). Among long duration varieties tried at Mudigere IR-10781-75-3-2 recorded the highest yield (49.9 q/ha) followed by the best check Puttabhatta (43.6 q/ha). In the large scale trial of long duration varieties at Mudigere, Sirsi and Ponnampet, on an average IET-7191 ranked first (62.2 q/ha) while the best check Puttabhatta gave 46.4 q/ha yield.

### 1.2.2 Wheat

At Dharwad, in the project on development of rust resistant varieties for rainfed conditions, in initial trials, 36 cultures out of 108 tried, were found to give more than 10 per cent increased yield over Bijaga Yellow.

In the project on development of rust resistant varieties for irrigated conditions, in the initial evaluation trials, 22 out of 106 cultures tried yielded 11 to 38 per cent more than the highest yielding check. In the nine farm trials in Dharwad district DWR-39 (32.9 q/ha) gave 30 per cent more yield than the checks HD-2189 and UP-301 (24.5 q/ha).

In the coordinated trials under low fertility, rainfed conditions in initial evaluation trial, N-8758, N-5439 and DWR-92 yielded more than 15 per cent over Bijaga Yellow (11.6 q/ha). In uniform regional trial (URT) N-5439 recorded the highest yield 10.5 q/ha 25 per cent more than Bijaga Yellow (8.4 q/ha). DWR-59 gave 16 per cent higher yield.

Under high fertility condition, in IET, NI-8763 gave the highest yield of 29.6 q/ha as against 22.3 q/ha of HD 2189. DWR-90 and DWR-89 recorded 17 and 13 per cent increased yields over check. In URT, NI-8535 gave 27.3 q/ha compared to 23.3 q/ha of HD-2189. Among multilines of durum wheat evaluated NIML gave the highest yield of 19.1 q/ha, 25 per cent more than Bijaga Yellow (15.2 q/ha).

### 1.2.3. *Kharif sorghum*

*Kharif* sorghum hybrid DSH -1 released by the University during last year has also been released on all India level during this year by Central Variety Release Committee.

In the project on testing new varieties and hybrids for yield and reaction to pests and diseases, among 16 advanced hybrids evaluated in 3 locations (Dharwad, Bailhongal and Arabhavi), SPH-296 gave the highest yield of 63 q/ha while the check CSH-9 gave 52.6 q/ha. SPH-196 (DSH-1) ranked fourth with 55.6 q/ha yield. Out of 12 advanced varieties tried at these locations, SPV-462 gave 63.6 q/ha yield compared to 53 q/ha yield of check hybrid CSH-1. In preliminary hybrid trial, out of 36 hybrids, SPH-346 gave 61.3 q/ha yield as against 31.1 q/ha and 42.6 q/ha yield of CSH-5 and CSH-9. In preliminary varietal trial 49 varieties were evaluated and SPV-707 was found to yield 62.5 q/ha compared to 33.3 q/ha and 44.8 q/ha yield of CSH-5 and CSH-9 respectively. Among 34 parental lines evaluated, AKMS-3 among B lines and SB-1085 among R lines gave 49.5 q/ha and 56.2 q/ha yields respectively while CS 3541 gave 49.1 q/ha.

In the project on developing high yielding varieties and hybrids with wider adaptability and other characters, out of 26 varieties tried at four locations (Dharwad, Bidar, Bailhongal and Bagalkot) on an average, SB-2434 gave the highest yield of 45.2 q/ha as against 31.5 q/ha yield of SB-1079.

In the project on developing new male sterile lines for use in production of hybrids, out of the 7 male sterile lines, only three were found to be stable. They have been crossed with different restorer lines and the resultant hybrids will be evaluated.

Variety SB-1079 and hybrid CSH-9, DSH-1, 323A  $\times$  SB-5501 and 323 A  $\times$  A-535 were found to be promising when saline water was used for irrigation.

#### 1.2.4 *Rabi sorghum*

During this year, one hybrid SPH-218 developed at Dharwad has been released for general cultivation in our State. This hybrid has also been released at All India level by the Central Varietal Release Committee.

At Bijapur, in the project on development of *rabi* sorghum varieties, culture 'Bold type' (42.8 q/ha) out-yielded the best check 5-4-1 (25.2 q/ha). In multilocation trial, the selection (5-4-1  $\times$  IS 3691)-2 recorded the highest yield (35.4 q/ha) followed by (M-35-1  $\times$  IS-84)-2 (34.7 q/ha). The best check SPV-86 gave 28.1 q/ha yield.

In the project on development of *rabi* sorghum hybrids, 26 A  $\times$  LSR-1 (28.3 q/ha) and 33 A  $\times$  LSR-1 (27.5 q/ha) were superior to the best check 5-4-1 (22.6 q/ha).

#### 1.2.5 *Maize*

One late maturing hybrid Deccan 103 and one early maturing composite G<sub>25</sub> have been released during this year general cultivation in the State. In trial at Dharwad and Arabhavi, Deccan 103 (71.3 q/ha) and G-51 (66.7 q/ha) showed superiority followed by Vijaya Composite (62.5 q/ha) and G-63 (61.9 q/ha).

Deccan 103 and composite EU-B21 have been found to be suited for saline water use.

In trials on cultivators field in Kollegal area, EH-5131 with field resistance to downy mildew and leaf blight has been found to give more than 20 per cent increased yield over Deccan 103.

#### 1.2.6 *Ragi*

The two varieties Indaf-9 from Mandya centre and HR-911 from Bangalore centre have been released during this year for general cultivation in the State.

#### 1.2.7 *Foxtail millet* (*Setaria italica*)

At Hagari in IET, SIC-19 and SIA-2573 gave the highest yield of 10.5 q/ha as compared to the best check H-1 (5.5 q/ha), while at Bijapur SIC-20 was



the best (14.8 q/ha). In advanced trial at Hagari, TNAU-46 was the best (15.4 q/ha) among 28 cultures tried, with Arjun yielding 9.3 q/ha. At Bijapur over 3 seasons SIA-67 (24.4 q/ha) was far superior to check K 221-1 (10.3 q/ha).

#### 1.2.8 *Common millet* (*Panicum miliaceum*)

In the advanced trial at GKVK, three cultures gave more than 31 q/ha yield and found to be better than checks Varada (27.2 q/ha) and Co-1 (25.4 q/ha) while Varada (22.6 q/ha) out yielded all other varieties at Hagari.

#### 1.2.9 *Barn yard millet* (*Echinochloa frumentacea*)

Twenty one cultures out yielded the check K1 in the advance trial, with ECC 17 giving the highest yield of 25.2 q/ha as against 17.2 q/ha yield of K1 at GKVK. At Hagari, ECC-6 yielded 14.8 q/ha followed by ECC-17 and ECC-7 with 12.6 q/ha yield. The check K1 gave 8.9 q/ha yield.

#### 1.2.10 *Pearl millet*

In IET of populations MP-122 (25.5 q/ha) and MP 123 (23.1 q/ha) along with six other populations gave higher yields than check BJ-104 (18.3 q/ha). In advance trial, the population MP 106 (15.6 q/ha) was superior to BJ-104 (11.4 q/ha).

Among hybrids in IET, MH-182 (35.7 q/ha) was far better than BJ-104 (24.7 q/ha). MH-182 stood first at Bijapur also. In advance trial, Hybrid MH-143 performed well (23.5 q/ha) compared to BJ 104 (14.9 q/ha).

In MLT of population WB 20-4-1-1 (16.1 q/ha) was better than check BJ-104 (7.5 q/ha) at Hagari while at Bagalkot (PAC 3J-934)-1 (24.7 q/ha) performed better than check BJ 104 (17.3 q/ha). At Bijapur, RHR-1 was the best with 16.4 q/ha yield compared to check BJ-104 (12.3 q/ha).

#### 1.2.11 *Redgram*

In the farm trials, wilt resistant variety ICPL-8863 gave 37 per cent higher yield than local over eight locations and it has been released for general cultivation during this year. The variety GS-21 is in adaptive trials.

At Arsikere, during summer, ICPL-8863 gave 3066 kg/ha followed by ICPL-399 (2928 kg/ha) and DL-82 (2434 kg/ha).

Among early cultures, Phule T-14 (958 kg/ha) was superior to check GS-1 (616 kg/ha) at Bidar.

Among medium maturity cultures, BDN-5 gave 20.1 q/ha yield compared to 18.2 q/ha of GS-1 at Bidar and at Gulbarga NRG-67 (12.3 q/ha) and BDN-5 (11.4 q/ha) were better than check (8.0 q/ha). At Bheemarayanagudi, C-24-93 yielded 13.7 q/ha as compared to 9.7 q/ha of GS-21.

In the trial of wilt resistant material at Gulbarga, BWR-370 gave 15.4 q/ha and ICPL cultures 840002, 840008 and 84016 gave more than 10 q/ha while the check varieties PT-221 and GS-1 could not give any yield.

Selection C-32-33 has been found to be the best for intercropping with bajra.

#### 1.2.12 **Greengram**

In Coordinated trial, ML 326 (403 kg/ha), Pusa-108 (392 kg/ha), Pusa 115 and MUP 125 (338 kg/ha) gave significantly higher yield than check PS-16 (194 kg/ha) at Gulbarga, while ML-323 (1084 kg/ha), MH-309 (1050 kg/ha) and Pusa 115 (1021 kg/ha) performed better at Sirguppa. At Mandya, during summer 84, Pusa-115 gave the highest yield of 23 q/ha compared to 19.2 q/ha of PS-16 and during *kharif*, UPM-79-3-4 (799 kg/ha) performed better than PS-16 (415 kg/ha).

#### 1.2.13 **Cowpea**

At GKVK in CVT, V-276 gave the highest yield (9.6 q/ha) among 24 varieties tried compared to check C-152 (5.9 q/ha) and S-488 (W) (4.1 q/ha). In KLT at GKVK, COVU-2 (12.9 q/ha), V-16 (12.4 q/ha), KBC-1 (11.8 q/ha) and KBC-2 (11.6 q/ha) were better than C-152 (7.7 q/ha), while none were superior to C-152 (25.2 q/ha) at Mandya.

#### 1.2.14 **Bengalgram**

Variety 2375 has been released for general cultivation during this year in the State. Varieties GBS-1, GBS-2 and GBS-3 are in adaptive trial.

In a large scale trial 554 x A-1-89 (206 q/ha) and 69 4-1-1 (80.9 q/ha) were better than A-1 (14.7 q/ha).

#### 1.2.15 **Horsegram**

HPK-6 (639 kg/ha) and Kuruvai (633 kg/ha) performed better than Hebbal Huruli (408 kg/ha) at GKVK. In late *kharif* condition, IC-11095 (1249 kg/ha) and CGDB-6 (1185 kg/ha) were far superior to check HH-2 (502 kg/ha) in seed yield.

#### 1.2.16 **Soybean**

In initial evaluation trial at Bangalore, cultures AKSS-63 (22.5 q/ha), JS-79-277 (21.4 q/ha) and MACS-56 (19.6 q/ha) were found to be early and superior to check (16.3 q/ha) in yield.

In two Elite trials at Dharwad, PK-471 (19.3 q/ha) and KHSB-5 (24.3 q/ha) were superior to National check Bragg (15.7 q/ha) and State check KHSB-2 (22.3 q/ha) respectively.

#### 1.2.17 **Groundnut**

One bunch type variety JL-24 has been released during this year for general cultivation in the State.

In farm trials in Dharwad district, DH-8 gave 11.6 and 8.2 per cent higher yield over JL-24 and DH-3-30 respectively.

ICRISAT cultures ICGS-30 and ICGS-31 gave 24 per cent higher yield than DH-8 (23.5 q/ha) at Dharwad.

In the trial of spreading/semi-spreading varieties at Bheemarayanagudi, five varieties gave significantly higher yield over check S-230 (7.5 q/ha). M-13 was the best with 12.5 q/ha yield. At Sankeswar, TGS-1 (21.5 q/ha) and TGS-2 (21.0 q/ha) were far superior spreading varieties compared to M-13 (8.3 q/ha). Among semi-spread types, ICGS-50 was the best (24.9 q/ha).

#### 1.2.18 **Sunflower**

In the coordinated hybrid trial-I at Dharwad, MSFH-10 (14.9 q/ha) out yielded BSH-1 (8.2 q/ha). At Raichur MSF-10, MSFH-11 and CGP-1 recorded 10 per cent more yield than BSH-1 (21.8 q/ha). In the trial II at Bangalore, MSFH-6 (20.8 q/ha), KBSH-1 (20.5 q/ha) and KBSH-4 (17.8 q/ha) were superior to BSH-1 (14.1 q/ha) while at Dharwad MSFH-8, MSFH-9 and KBSH-2 gave more than 40 per cent higher yield over BSH-1 (7.2 q/ha) and at Raichur MSFH-8, MSFH-9 and MSFH-6 recorded more than 25 per cent increased yield over BSH-1 (16.5 q/ha).

Out of 12 new hybrids (single cross) developed, six hybrids out yielded check BSH-1 (13.7 q/ha) by about 35 to 50 per cent, with KBSH-1 being the highest yielder (21.4 q/ha). In a trial of seeds from different sources (Modern variety) those obtained from farmers gave 688 kg/ha yielded with 34.9 per cent oil while seeds from Breeder's source gave 1040 kg/ha yield with 35.4 per cent oil content.

In the sunflower germplasm unit 188 new collections including 12 cm lines and 10 restorers, have been acquired during the year. In the available collection, 14 lines resistant to rust, 4 lines resistant to *Alternaria* and 3 lines resistant to sunflower moth have been identified.

#### 1.2.19 **Sesamum**

In multilocation trial at Bidar, RCR-3 (346 kg/ha), Kanakapura local (346 kg/ha) and PDP-1-2 (297 kg/ha) were significantly superior to E-8. At Raichur also similar results were obtained, RCR (304 kg/ha) and PUD-1-2 (220 kg/ha) and E-8 (195 kg/ha). At Bheemarayanagudi, RCR-4 (548 kg/ha) was superior to E-8 (498 kg/ha).

### 1.2.20 *Safflower*

Variety 83 consistently superior to A-1 has been advanced to adaptive trials during *rabi* 1985-86.

### 1.2.21 *Cotton (1984-85)*

Among *hirsutum* cultures under irrigation at Arabhavi and Siruguppa, in PVT, ACP-71-27-1/1 ranked first at both the locations with 36.3 q/ha kapas yield and had better fibre qualities as against 29.4 q/ha of the best check Sharada.

At Arabhavi, AS-104 (40.9 q/ha), AH 107 (39.3 q/ha) and ACP-71-19-1 1 (36 q/ha) were found to be early, well suited for double cropping and far superior to checks Mysore Vijaya Sharada DS-56. ASP-71-42-2 (33 q/ha) was the best among 12 cultures for mixed cropping with maize.

Among intra-*hirsutum* hybrids at Siruguppa, M<sub>9</sub>T<sub>1</sub> hybrid gave the highest kapas yield (45.7 q/ha), 17 per cent more than the best check, while at Dharwad, DCH-397 (21.82 q/ha) gave 40 per cent higher yield over the best check LRA 5166 (15.5 q/ha).

Among interspecific hybrids at Siruguppa, H-224 yielded 35.9 q/ha followed by DCH-32 (33.1 q/ha) while at Raichur H-224 topped the list with 30.9 q/ha kapas yield and DCH-32 was least with 13.2 q/ha yield.

Among *arboreum* cultures, HP 11 (15.6 q/ha) significantly out yielded the checks AK 235 (12.2 q/ha) and G-22 (10.8 q/ha) at Bidar.

### 1.2.21 *Sugarcane*

In the final yield trial (Plant cane) at Mandya, KHS-3347 was the best with 183 tons/ha yield while in Ratoon cane trial, CO-7804 gave the highest yield of 116 tons/ha. In pre-final yield trial, out of 10 clones tried KMS-2295 was the best with 99 tons/ha cane yield while KMS-2300 gave the highest sugar yield (7.6 tons/ha).

### 1.2.22 *Potato*

The variety Kufri Badshah (385 q/ha) has been found to give 18 per cent higher yield than Kufri Chandramukhi (325 q/ha). Its superiority was more marked in *rabi*/summer than in *kharif*. Therefore, this variety has been advanced for adaptive trials in five districts during *rabi* summer of 1985-86.

Among early cultures JI-547 (330 q/ha) and EM H-1601 (328 q/ha) were found to yield on par with check Chandramukhi (303 q/ha) at full maturity. But they have quick bulking ability as evidenced by their significantly higher

yields on 45th day (nearly double yield) and 60th day (about 50 per cent more yield). These two are advanced to multilocation trial during *kharif*-85 under rainfed conditions.

Among late cultures JH-544, BS/E-775 and JS-1857 gave more than 30 per cent increased yield over check Kufri Sindhuri (226 q/ha).

#### 1.1.23 Tobacco

*Navile centre (Cigarette tobacco)*: The culture L-621 which is consistently superior to VFC special in yield of cured leaf, bright leaf and TBLE and in drought tolerance, has been advanced to Farm trial. The line L-1494 resistant to powdery mildew and on par with VFC special in yield has been advanced to farm trial in powdery mildew endemic areas of Zone-7.

In the project on development of high yielding superior quality VFC varieties, over sixty elite lines were evaluated in six trials. The cultures L-621, PCT-7, COR-5, COR-6, MDC-55, MDC-57 and FCH-6314 have given significantly superior TBLE value over check VFC special.

*Nippani centre (Bidi tobacco)*: In final yield trial, one selection 148-110-28-26 (27.7 q/ha) was slightly superior to PL5 (27.2 q/ha), but all the 12 cultures tried were significantly superior to S-20 (15.2 q/ha).

#### 1.2.24 Cardamom

Twenty eight single plants giving cumulative yield of more than 4 kg green capsules per plant during the past eight years have been identified from 30 crosses involving 6 parents.

#### 1.2.25 Fodder crops

At Dharwad, eight promising bajra cultures with ZM-850 giving the maximum fodder yield (34.2 tons/ha) have been isolated out of 101 evaluated. In cowpea, selections from crosses Chinese Red  $\times$  Russian Giant and Chinese Red  $\times$  Iran Gray produced 6.5 tons/ha dry matter compared to 5.5 tons/ha of check IGFRI-913.

Among horsegram cultures at Dharwad, Avanashi was superior in both grain (13.6 q/ha) and fodder (72.1 q/ha) yield to the local which gave 11.5 q/ha grain yield and 62.5 q/ha fodder yield while at Mudigere, Bailhongal local yielded the highest (9.42 q/ha) grain and (20.1 q/ha) fodder.

At Mudigere, Napier-Bajra hybrids BH-18 (103 tons/ha) and BH-8 (92 tons/ha) were far superior to NB-21 (71 tons/ha) in the total fodder yield from 4

cuttings under protective irrigation. Among hay grasses, Dina grass had potential yield up to 40 tons under dry conditions and one non-flowering Sudan grass yielded 72 tons/ha under protective irrigation.

At Brahmapur, BH-18 hybrid grass was the best with 205 tons/ha yield as compared to 184 tons/ha of NB 21. As an intercrop with cashew, NB-21, yielded 25 tons/ha followed by Guinea 15 tons/ha in two cuttings.

#### 1.2.26 Cytogenetic studies

In *Mactrotyloma*, interspecific hybridization has been affected to transfer yellow mosaic virus resistance and some economic traits.

In a study of  $F_2$  of cross *M. uniflorum*  $\times$  *M. axillare*, 45 plants showed complete resistance to YMV even after grafting with infected scions. Four cultures among them with determinate growth habit showed more than 50 per cent pollen fertility.

### 1.3 Entomology

Under a study on insect systematics, in larval taxonomy of white grubs, so far nearly 45 species of white grubs have been described based on the larval characters. Three species have been added to the list during the period under report.

Crazy ant, *Anoplolepis longipes* suddenly appeared over 2000 ha in Karkalli-Maddur area causing panic among the cultivators. A detailed investigation has been taken up and based on some of the preliminary findings, control measures have been advocated. A University extension leaflet (No. 108) on Crazy ant has also been brought out.

Under biological control, biological control of white grub using milky disease, *Bacillus popilliae* is attempted. Gross infection studies are in progress.

A study on development of optimum spray schedule for the control of tur pod borer was conducted at ARS, Bidar with an objective to find out the optimum time and number of insecticidal applications for the control of tur pod borer. The result of the study indicated that three sprays of endosulfan 0.07 per cent starting for pod initiation stage at 15 days interval has given maximum control of pod borer and grain yield.

A study on chemical control of greengram pod borer was taken up. Spray of endosulfan 0.07 per cent at full flowering has given maximum control of pod borers by recording highest grain yield of 311.12 kg/ha.

A study on chemical control of blackgram stem fly was conducted at ARS, Bidar. The results indicated that soil application of phorate 10G at 2.5 kg a.i.

per ha at the time of sowing has given maximum control of stem fly and has recorded maximum grain yield of 191.67 kg/ha.

A study on chemical control of sorghum earhead midge was conducted. Endosulfan 0.07 per cent spray has given maximum control of ear midge and also gave highest grain yield.

An experiment on chemical control of bengalgram pod borer was taken up at Bidar. One spray of Ekalux 0.05 per cent or malathion 0.01 per cent or phenthoate 0.1 per cent or endosulfan 0.07 per cent at full flowering recorded nil incidence and better grain yield.

#### 1.4 Plant Pathology

##### 1.4.1 **Wheat**

The wheat varieties viz., HD-2270, HD-2297, HD-2347, HD-2367, HD-2376, HD-2379, HD-2382, CPAN-1922, VL-622 and HW-964 were found resistant to stem and leaf rust diseases. The following virulent races have been detected during the season.

- (a) Stem rust: 75G5 (21A-2)
- (b) Leaf rust: 45R31 (77), 109R31 (77A), 109R23 (77A-1), 17R25 (104) and 29R23 (104B).

##### 1.4.2 **Sorghum**

IS-8763, IS-9353 and IS-10301 belonging to brown sorghum group were found to be highly resistant to grain moulds. IS-14332, IS-3443 and IS-8283 were found to possess high level of multiple disease resistance to major diseases of sorghum.

##### 1.4.3 **Linseed**

Two sprays of Calixin at 0.05 per cent or 12 kg of sulphur dust per ha were found to be effective and economical for the control of powdery mildew of linseed.

##### 1.4.4 **Groundnut**

Two to three sprays of Deconil at 0.2 per cent was found to be effective against rust and tikka disease of groundnut. Bud necrosis virus was reduced considerably giving two sprays of monocrotophos followed by Rogor.

##### 1.4.5 **Mulberry**

Three sprays of bavistin at 0.05 per cent or benomyl at 0.05 per cent or dithane M-45 at 0.2 per cent at an interval of 15 days commencing 45 days after pruning are effective in controlling the leaf spot.

Five sprays of agrozim 0.5 per cent or bavistin 0.05 per cent or wettable sulphur 0.3 per cent at an interval of 15 days commencing soon after the first incidence was noticed, were effective in controlling the powdery mildew.

#### 1.4.6 *Bajra*

Ergot disease incidence was significantly reduced by giving two sprays of bavistin (0.05 per cent) or ziride (0.2 per cent) during pre-anthesis period compared to unsprayed control.

#### 1.4.7 *Tomato*

Mocap at 10 kg a.i. per ha was comparatively most effective in inhibiting the development and reproduction of the root-knot nematode. However, furadon at 8 kg a.i. per ha was effective in improving the growth of tomato plants.

Among the fungicides screened against *Alternaria macrospora*, reveal and econil were effective. Streptomycin sulphate + copper oxychloride were effective against bacterial blight. A survey in Bidar district has shown about 6.53 per cent incidence of root rot in one location.

#### 1.4.8 *Pigeonpea*

The phyllody of pigeonpea was confirmed to be caused by MLO, which was detected in the sieve tubes of the infected plant through electron microscopy.

#### 1.4.9 *Greengram*

Bavistin, karathane and sulphur dust were effective in controlling powdery mildew disease. Loss estimation study showed about 40 per cent increase in yield when the crop was chemically protected.

#### 1.4.10 *Tobacco*

Bayleton 25 wp at 0.025 per cent was found to be effective in controlling powdery mildew. In oriental tobacco, two varieties Dubeck 565 and 566 were found to be resistant to powdery mildew both under field and controlled conditions. Fenamphos was found to be effective in control of root knot nematodes both in nursery and field conditions.

In Bangalore centre advance field trials involving 11 white and two brown types, Indaf-11, Co-9, WR-9, OUAT-1 and OUAT-2 showed resistant reaction to neck and finger blast.

When one thousand fifty lines of cowpea were screened against powdery mildew, rust and *Cercospora* with severe incidence of powdery mildew and moderate incidence of rust and *Cercospora* leaf spot. APC 98, 99, 101 and



184 were completely free from powdery mildew and 118 lines showed moderate reaction.

In sunflower, four lines out of 55 were found to be resistant to rust and 22 were moderately resistant. Among the fifty five cultures tested under uniform disease nursery, one culture EC 132361 showed resistant reaction.

Dithane M-45 sprayed thrice at ten day interval was found to be effective in controlling *Alternaria* leaf spot of sunflower and was slightly better than Dithane Z-78. Epidemiological studies have revealed that *Alternaria* leaf spot to be maximum in crop sown on July 28th and rust in crop sown on August 25th.

*Lycopersicon glandulosum* EC 66603 – *L. glabratum* LA386, *L. hirsutum* LA 1777 did not develop leaf curl symptoms when inoculated with the virus using whiteflies.

Mocap 10G at 10 kg a.i. per ha was found to be effective against *Meloidogyne incognita* in tomato by inhibiting its reproduction and development.

### 1.5. Crop Physiology

Management trial laid out at Handigodu showed recovery of areca palms suffering from Sagar-Syndrome. Changes of recovery are greater if symptoms are less severe. At Vatgaru and Koppa-Shringeri, the palms suffering from yellow leaf syndromes responded positively to the management trial.

In a study on genotypic differences in canopy diffusive processes in rice, the field experiment was conducted with 50 medium duration rice cultivars to study the relationship between canopy conductances and productivity. Genotypes which showed higher canopy conductances also showed higher biological yield and grain yield. Based on the results, genotypes associated with high dry matter production are grouped as :

1. High LA, high stomatal frequency and high biomass types.
2. High LA, low frequency and high biomass types.
3. Low LA, high frequency and high biomass types.
4. Low LA, low frequency and high biomass types.

Since the genotypes achieved high biomass by different physiological characters, there is possibility for enhancing either mesophyll or stomatal conductances by choosing appropriate genotypes as parents.

In a study on regulation of ethylene biosynthesis, a few potent ethylene synthesis inhibitors were identified by using cucumber root growth inhibition test. Silver thiosulphate, silver nitrate, benzoic acid, cobalt and nickle salts were found to overcome the inhibitory effect of ethylene.

### **Sunflower**

Studies on viability, germination and seedling vigour suggests that seed from the outer 8 to 10 whorls of the earhead only can be used for sowing, since the seeds from these whorls show higher germination percentage and early seedling vigour.

Studies on spatial distribution of leaves and its relationship to productivity suggested that highest leaf area distribution in lower canopy level increases the root activity, ion uptake and productivity under stress conditions.

Under AICRP on weed control, to enhance penetration and translocation of foliar applied 2,4-D, experiments were conducted with additives of varying concentrations of ethophan. Ethophan enhanced the movement of 2,4-D into the root to a greater extent in intact plant.

To screen different herbicides to suppress the regeneration capacity of underground parts of *Solanum* and *Oxalis*, experiments were conducted using 2,4-D, dicamba and glyphosate along with additives – sucrose and ammonium sulphate. In *Solanum*, 54 days after spray, all treatments effectively killed the plant and no new sprouting were seen, whereas in *Oxalis* 45 days after sprays all the foliage were killed and by about 54 days after spray, new foliage emerging was observed.

## **1.6. Horticulture**

### **1.6.1 Mango**

Out of 35 commercial varieties introduced and evaluated at GKVK, Bangalore, the North Indian cultivars 'Mallika' has been doing extremely well. It has been found to be fairly tolerant to powdery mildew, besides being regular bearing.

Studies on the development of midget mango orchard for increased production was conducted at GKVK, Bangalore. Seven best hybrids Neeluddin, Neeleshan, Neeigoa, Swarna Jahangir, A.U. Rumani, Mallika and Amrapali have been identified as promising scions. Rootstock seedlings of a polyembryonic variety 'Nekkare' have been raised. The technique of root grafting and double working have been standardised.

In a study on the performance of mango varieties conducted at RRS, Raichur, the varieties like Khader, Alampur Baneshan, Baneshan, Neeleshan (Hybrid) were found to perform well.

The studies on regular bearing in mango have indicated, early initiation of flowering, more number of lengthy panicles due to ethrel treatment as compared to CCC (3000 ppm) which delayed flowering.

### 1.6.2 *Citrus*

Research on relative economy in the use of irrigation water in horticultural crops conducted at GKVK, Bangalore indicated that drip irrigation with sweet oranges, 12 litres of water per day per tree was found to induce better vegetative growth, flowering and fruiting.

Studies on yield and quality of Coorg mandarin on different rootstocks conducted at RRS, Raichur indicated that the quality of fruits of Coorg on mandarin and Kinnow mandarin was better on Rough lemon as compared to Trifoliate orange.

In a study on evaluation of rootstocks of Coorg mandarins conducted at RRS, Mudigere, the performance of Coorg mandarin on Trifoliate rootstock was found best followed by Rough lemon and Rangapur lime among the six rootstocks evaluated. Trifoliate orange rootstock was found to dwarfen the Coorg mandarin scion.

### 1.6.3 *Papaya*

Studies on interrelation between moisture regime and nutrition in the growth and yield of fruit crops was conducted at GKVK, Bangalore. The investigations have revealed a considerable increase in the weight of the fruit and also total yield, when the plants were irrigated at weekly intervals. A definite beneficial effect of phosphorus was found in improving the growth, yield and quality aspects of papaya.

### 1.6.4 *Sapota*

Performance and economic evaluation studies in Horti-Silvicultural intercropping systems in fruit crops conducted at GKVK, Bangalore, revealed the better performance of sapota plant under *Eucalyptus citriodora* and *Inga dulcis* sp. as compared to its growth in association with other species. The growth of silver oak and *E. citriodora* was faster in comparison with the growth in other species. The yield of sapota was however more under Subabul and *E. citriodora*.

A study on improvement of sapota by hybridization was taken up at RRS, Dhawad. Out of 500 hybrid seedlings obtained by intervarietal crossings and planted for evaluation, 307 hybrids have started yielding well. Some of them have been found to be promising, however, none has been found to be completely free from leaf spot.

### 1.6.5 *Guava*

Standardization of propagation techniques for large scale multiplication of guava were conducted at GKVK, Bangalore. In the standardization of air

layering in guava. highest percentage of rooting (80 per cent) was found in the treatment where girdling + 500 ppm IBA + etiolation for 3 days was carried out and least (20 per cent) success was observed in freshly girdled and layered shoots.

#### 1.6.6 *Tamarind*

In the survey of the existing seedling trees in the tamarind groves at Devanahalli, Chintamani and Srinivasapur areas, fruits of varying shape and size have been observed. Fruits which are curved and bulged appeared to be better yielders. Biennial bearing phenomenon has been reported to be operating in tamarind. The pods from the outstanding trees have been collected for raising seedlings and such selected trees will be used for preparation of air layers.

#### 1.6.7 *Cashew*

Cultural management of cashew (ARS, Ullal) : Studies on the requirements of major nutrients of cashew were conducted. The studies indicated that the application of NPK at 500 : 250 : 250 g per tree respectively increased the yield (2.29 kg/tree) as against a meagre yield in case of control (0.81 kg/tree).

Studies on the foliar application of nutrients along with insecticides indicated that spray of 1 per cent urea with endosulfan increased the yield (2.13 kg/tree) as against a poor yield (0.5 kg/tree) in control.

Introduction and evaluation of betelvine (RRS, Dharwad) : In the evaluation of different varieties Chikkodi yale, Cholachagudda yale, Savanur Ambadi yale. Nagabally, Mysore Chigaru, Savanur Kariyale and Lakkaballi. Lakaballi have been found to grow vigorously. In terms of leaf yield per vine, Chikkodi yielded maximum, followed by Lakkaballi and Cholachagudda.

In an evaluation of elite clones of cardamom (518 Nos.), thirteen clones have been finally selected and they are being evaluated against the promising clones at RRS, Mudigere (P series of which p-I has been already released). Out of these 13 clones, 6 clones have been found to be more promising and they are being proposed for multilocation trials which include CL-683, CL-679, CL-726, CL-681, CL-664 and CL-668.

#### 1.6.8 *Vegetables*

In a study on physiological aspects of breeding for bacterial wilt resistance in brinjal and tomato (GKVK, Bangalore), the brinjal genotypes WCGR 112-8, 38-45 and *Solanum macrocarpa* were found to be tolerant to bacterial wilt with an average yield of 1.0 kg/plant. However, the highest

yield of 10.65 kg/plot was obtained from the line 7-13 however, had 18 per cent incidence of bacterial wilt.

In tomato, the  $F_2$  segregating lines of NTDR-1  $\times$  AVRDC indicated that lines 3-4-7, 3-5-12 and 3 were resistant to bacterial wilt and had an average fruit size of more than 90 g. These 3 genotypes are being subjected for advanced purification.

Studies on genetical improvement of Chikkaballapur Red onion were conducted at GKVK, Bangalore. Two selections BRR-3181 and BRR-1167 selected from the open pollinated populations of Bellary Red onion were free from splitting of bulbs and pre-mature bolting. The bulb size was found to be reduced because of selfing.

In a study on improvement in cucurbits, 24 and 17 exotic varieties and hybrids respectively and 39 indigenous varieties have been evaluated to find out their suitability for Dharwad region under rainfed conditions. Evadon, Grebelle, SS 844, Cherkin and 1700 among exotic varieties (yielding about 16 fruits/plant). Pusa, Sanyo, Poinsetie, Begllom, Green Long Naples and Koto-kumal among indigenous varieties (yielding about 5 fruits/plant) were found to perform better. Among the indigenous varieties, all the 4 high yielding ones were from IARI, New Delhi.

In an investigation on production of sweet potato in lighter soils of Gulbarga Division/TBP area (RRS, Raichur), the variety Co-1 was found to record the maximum yield (29.78 t/ha). Generally white varieties were found to be more susceptible for tuber weevil as compared to the red varieties. The yield in the local variety was poor, but it showed better resistance to weevil.

Under AICRP on potato, the preliminary yield trial conducted at GKVK on early and medium types, Kufri Jyoti yielded highest (23 t/ha). In adaptive trials, JF-4864 (25.96 t/ha), K. Jyothi (22.38 t/ha) and K. Sindhuri (29.0 t/ha) were found to yield higher in early, medium and late maturity types respectively. In agronomic trials, 180 kg N, 100 kg  $P_2O_5$  and 150 kg  $K_2O$  recorded the highest yield (25 t/ha).

In an AICPCI scheme, the culture BS/E-775 was found consistently superior for over 7 years at Hassan and therefore, it was adjudged fit for release. In the entomological studies, aphid population was found below the critical level on the crop sown in August till harvesting, indicating the possibility of seed production by sowing in August.

Under All India Coordinated Tuber Crops Improvement Project, the NPK trial on tapioca was conducted at ARS, Ullal. The highest yield (18.6 t/ha) was recorded under 120 kg N and 180 kg  $K_2O$ /ha. In the trial on stage of harvest, the optimum stage for harvest was found 7 months after planting.

In sweet potato, highest yield (11.8 t/ha) was recorded with 30 kg N and 90 kg K<sub>2</sub>O/ha. The 'Tier' system of deep and shallow planting in this crop indicated no significance. But as a solo crop, when planted with closer spacing, it yielded much better.

In the All India Vegetable Improvement Project, maximum yield (24.0 t/ha) in French bean was recorded in the exotic variety 'Wade' followed by S-5 and S-9 at GKVK.

#### 1.6.9 *Post Harvest Technology*

In Dashehari and Mallika cultivars mango varieties, the fruits treated with 1.5 per cent of TAL prolong recorded the least physiological loss of weight (PLW) (13.18 and 13.16 respectively), followed by the treatments, 1.0 and 0.5 per cent and control throughout the 15 days of storage. The fruits treated with 1.0 and 1.5 per cent TAL in both the cultivars recorded higher TSS, reducing and total sugar content as compared to control. Fruits treated with 1.5 per cent of TAL in Dashehari and 1.0 per cent in Mallika recorded higher ascorbic acid content on the 15th day of storage.

The fruits dipped in aqueous solutions of calcium, magnesium and benzyladenine retained their colour for a longer time and the fruits were firm as compared to the condition of those fruits dipped in water. All these three chemicals reduced the physiological loss in weight (PLW) and acidity. The ascorbic acid content was however increased. The benzyladenine treated fruits showed a slight decrease in sugar content while Ca and Mg treatment did not affect the sugar content.

### 1.7 *Agricultural Microbiology*

In a study on evaluation of enriched compost and its effect on crop yield, compost was prepared from sugarcane trash with and without microbial inoculations and with or without rock phosphate combinations. Two cellulolytic fungi, a phosphate solubilizing fungi and a nitrogen fixing bacterium were used for inoculation. The cultures were inoculated individually or in combination. Inoculation of cellulolytic fungi were found to decompose the sugarcane trash rapidly and it was similar to the inoculation of 10 per cent cowdung. The compost prepared from sugarcane trash with microbial inoculation was found qualitatively superior than the compost prepared without the inoculations.

In screening of *Rhizobium* strains for effectiveness in the field (cowpea) among five selected *Rhizobium* strains, TAL-169 gave maximum seed yield increase of 25 per cent over uninoculated control followed by UAS 1 Vu. In avare, *Rhizobium* inoculation gave 21 per cent increased grain yield over

control but with application of 25 kg N/ha along with *Rhizobium*, there was an increase of 46 per cent over the control.

In a Vienna project on nitrogen balance study in mixed pasture employing  $N_{15}$  techniques; the dry weight of grass, legumes total fodder yield, total nitrogen content and the amount of biologically fixed nitrogen were recorded, in grass legume association experiment. The initial establishment of pasture took about 4 months, when the first cutting was taken. The total fodder yield per hectare was higher in grass legume establishments irrespective of treatments or cuttings. This indicated a beneficial interaction of buffal grass and siratro resulting in higher fodder production over pure stands of either grass or legume. The *Rhizobium* inoculation had no marked effect either on legume or associated grass yields. Inoculation of Buffal grass with *Glomus fasciculatum* interestingly had a beneficial effect on the associated siratro than the grass *per se*. Combined inoculation of *Rhizobium* and mycorrhiza had same effect on the total nitrogen content of siratro. Inoculation of mycorrhiza as well as dual inoculation of *Rhizobium* and mycorrhiza had a significant effect on the amount of fixed nitrogen over the control and *Rhizobium* alone as estimated by using  $N_{15}$  ammonium sulphate.

### 1.8 Seed Technology

Under a project on improvement of native rices adapted to cold climate, a study on rice cold tolerant nursery was initiated. In that, a total of 230 lines of paddy germplasm which included exotic (IRCTN) and local collections were screened under field conditions for cold tolerance at Hebbal and Mudigere. Of them, 19 lines were found better in respect of panicle exertion and grain filling.

Fifty nine local and elite collections of paddy cultivars were evaluated under cold tolerant variety trial, at 2 dates of planting. Among them 14 varieties thrived well during the season.

In a study on effect of growth regulators and their spraying time on flower abscission, seed yield and quality of three cultivars of pigeonpea, Foliar application of TIBA (50 ppm) increased the yield of all the cultivars significantly over both NAA and control. Similarly NAA (10 ppm) increased the seed yield significantly over control, but not to the extent TIBA did. Spraying at flowering initiation was found more beneficial. Neither TIBA nor NAA had any noticeable direct effect on seed quality. The seeds of all the three varieties could be stored for 120 days without any severe deterioration in quality.

## 1.9 Agricultural Engineering

### ***Biogas Plant***

The following are the highlights of recommendations : 1) In fixed dome biogas plant, high pressure is developed inside the dome and digester. In order to withstand high pressure, joint at dome and digester and joints of masonry work should be perfect. It is recommended to plaster the external surface of the digester.

2) To avoid the cracks at the dome and digester joint, it is recommended to provide hooks on the top of the digester circumferentially to hold the ring provided in the dome. This must be done while fabricating the steel reinforcement.

3) Connecting a simple manometer to the gas pipe line helps to indicate the pressure and volume of the gas inside the dome. This manometer acts as a pressure relief valve also, and hence avoid the damage to the plant. This manometer also helps to detect the leakage of the gas.

4) To avoid the scum formation on the top of the slurry inside the digester, it is recommended to complete the charging of the digester within 3-4 days of starting of charging, prolonged charging for long time, causes the scum formation.

5) It is also recommended to provide manhole on the dome to break and remove the scum.

6) Daily use of spent slurry improved the gas production and daily disturbing the slurry at inlet and outlet improved the gas production.

In a study on the efficiency of envelope materials and their thickness in a tile drainage system, it is observed that graded gravel used as envelope material around tile drains is superior to organic materials, in respect of tile out flow. Minimum soil loss throughout flow and least accumulation of soil in the tiles. Wheat straw and sugarcane bagasse were found to be next best whereas groundnut husk and cotton stubble envelope materials were not suitable for prevention of sedimentation. Fifteen cm thick envelope were found superior to 5 and 10 thickness for enhancing discharge as minimizing soil entry into drains.

Under AICRP on biogas technology a study on acceleration of biogas production with stimulators was taken up at RRS, Dharwad. Following are the results obtained when tried with 3 different stimulators : (1) Use of vermiculite; vermiculite is a byproduct of mica mining industry and has a high cation exchanging capacity and stimulates biogas production at 4 per cent level. The increase in gas production is 24 per cent compared to cattle dung alone.



(2) Use of lignite powder : Addition of 4 per cent lignite powder in field units stimulates gas production. In field units it is observed that there is an increase of 46 per cent of gas production as compared to cattle dung.

Effect of mineral salt solution : A mixture of mineral salts (Mn, Co, Cu, Na, Zn, Li, Stomnous B, K) at 10 ml per 20 lit slurry produced 18 per cent more gas as compared to cattle dung alone.

#### 1.10 Sericulture

The survey on crop production and cocoon loss was conducted. In the traditional silk raising districts, 71 to 91 per cent of the respondents grew local mulberry cultivar while only 2.85 to 19.6 per cent grew it in the new area. In the traditional area, intercultivation practices were followed only twice a year whereas in the new area, majority practiced it 3-4 times in a year.

In the areas surveyed, a minimum of 7.8 to 51.7 per cent in Bangalore (South) and Mysore districts experienced losses of varying intensities affecting mulberry production due to the hairy caterpillar *Spilosoma obliqua*. Farmers in Bellary (7.4 per cent) and Raichur (1.7 per cent) used insecticides (Dimethoate/DDVP) to control insect pests of mulberry. Powdery mildew disease was rampant in all the areas surveyed and it occurred during the winter months. However, in Bellary and Raichur under irrigated conditions the disease was observed even in summer. Root rot diseases was recorded only in Bellary (7.4 per cent) during winter, while leaf curl was recorded in Raichur (1.7 per cent) during rainy season. Only 1.7 per cent of farmers in Raichur used Dithane M-45 against the diseases of mulberry. The high average yield (more than 47 kg/100 laying) in North Kanara district was consistent where pure Bivoitine (NB 18 and NB 7) races were reared. In the traditional area, over 70 to 92 per cent sericulturists reared worms in dwelling houses and the rest in separate rearing houses.

In a microbial survey of silkworm diseases, it was established that the white muscardine fungus *Beauveria bassiana* infecting silkworms requires optimum temperature between 25°C and 38°C and the RH of 80-90 per cent for its epidemics. A few fungal diseases, Aspergillosis of mulberry and eri silkworms were identified for the first time in India causing losses to a tune of 20 per cent in the early stages in the Chawki rearing. Application of formation chaff 1 to 4 per cent or dusting Bavistin I in 98 parts of kaolin was found to be effective in checking the spread of the disease.

#### 1.11 Farm Forestry

Studies on compatability and yield in Agro-forestry system under dryland conditions have indicated that eucalyptus hybrid has adverse effect on the yield of dry land agricultural crops such as cowpea, ragi and maize.

Under the studies on inter-cropping forest trees in the fruit tree orchard, eucalyptus, silver oak and soobabul (K-8) have performed better. There is better yield of sapota trees under this treatment when compared to control.

In studies on high density tree plantings, the 2 years old high density plantations have showed that eucalyptus, casuarina and silver oak respond to irrigation and fertilizer application. Eucalyptus hybrid has attained maximum height and girth (height 5.18 and girth 1.96 cm) followed by casuarina (4.57 m height and girth 0.19 m) and silver oak (height 3.35 m and 0.13 m).

In a study on performance of trees from Western Ghats in the dryland areas, *Toona ciliata*, *Acrocarpus fraxinifolius*, *Ailanthus malabarica*, *Garcinia cambogia* and a few other trees originally growing in Western Ghats were introduced to dryland area for afforestation. Out of them *Ailanthus malabarica* has established markedly well and has put up promising growth in dryland. Interestingly, the young as well as the old roots of *Ailanthus malabarica* are covered with root hairs which seem to be responsible for its better establishment and growth.

In a study on reclamation of saline marshy land through silvicultural methods, in just one year period, eucalyptus has shown promising growth and in some patches trees have attained 10 to 15 ft. height. Eucalyptus seems to perform better in such adverse sites and also seem to drain out excess soil moisture.

Studies on chemical weed control in forest nursery have indicated that Basoline (1.5 kg/ha) is more effective in controlling both dicot and monocot weeds in eucalyptus nursery. Simazine was observed to be lethal both for eucalyptus and seed germination. Seedlings in Basolin treated beds were more in number (152/sq.ft) and taller (24 cm) and healthier compared to other treatments.

## 2. Animal Science

### 2.1 Anatomy

In a project work on fatty cushions on the aorta and pulmonary trunk in the buffalo, four fat cushions which were nodular in shape were observed in addition to fat pads found in the region of coronary groove and those situated between the pulmonary veins. A variable amount of fat deposition was also seen on pericardium especially at the base of the heart. Presence of a fat cushion between the anterior and posterior vena cavae has been reported for the first time.

## 2.2. Veterinary Microbiology

*Leptospirosis*: The ribosomal vaccine prepared from two serovars *bijlaxa* and *pomona* have been shown to be potent against experimental challenge studies in hamsters and the vaccine prevented carrier status in challenged animals.

*Yersiniosis*: The incidence of yersinia infection in pigs was investigated. Hyperimmune sera against standard cultures have been raised for this purpose. The incidence of this infection in buffaloes, dogs and cattle have been taken up. The antigen required for plate and standard tube test have been prepared for serological studies.

*Campylobacter*: The incidence of *C. jejuni* in poultry is under investigation. A total of 67 isolations have been made. Of these 25 have been typed and are grouped under biotypes 1, 1A and 2. Biotype 1 was the most frequent type found.

*Rinderpest*: The Avidin-Biotin micro-ELISA technique was employed to determine the maternal antibody level in calves of different ages and post-vaccinal response in adults. 60.3 per cent of calves, 78.6 per cent of once vaccinated heifers, 88.8 per cent of twice or more vaccinated adult crossbred, 70.9 per cent of non-descript cattle and 100 per cent of R.P. recovered animals had antibodies.

*Neonatal calf diarrhoea*: Eight isolations of rota virus were made from cases of neonatal calf diarrhoea. The isolates were identified by using ELISA and serum neutralization tests performed using reference antiserum raised against UK strain. The segmented nature of viral genome was established by PAGE. The viral morphology was demonstrated by electron microscopic studies.

*Infectious bursal disease (IBD)*: The incidence of IBD infection in the affected flocks was as high as 19.5 per cent. Birds of different age groups, were having seroconversion. Four isolations were made from clinical cases using either chicks or chicken embryos as indicator systems. Immuno-suppression studies indicated that the virus suppressed antibody response in chicks to 'F' and 'R2B' strains of Ranikhet vaccines.

*Bovine sterility*: A survey on the incidence of brucellosis in cattle from cases of abortions and infertility was undertaken. 2.2 per cent of the animals had brucella infection and as per the history almost all the positive animals had a history of abortion except in ten cases where the owners were not aware of such complaints. The tests were performed subjecting the samples to two routine and two supplemental tests (Rose bengal and heat inactivation tests). Besides, brucella infection, role of other agents as *E. coli*, *Strepto*, *Staph.*, *Corynebacterium* and *Klebsiella* was also investigated.

### 2.3 Veterinary Pathology

In a study on the incidence of pathology of kidney break down complex in poultry, materials with kidney lesions in poultry have been collected and subjected to detailed histopathological examination. Various types of lesions have been classified.

As a part of the neuro pathological studies in canines programme, a comparative study on the pathogenesis of experimental allergic encephalomyelitis in guinea pigs, sero-protein profile, histopathology of central-nervous system and lymphoid tissue organs have been completed. The role of *T. lymphocytes* in the pathogenesis of EAE has been identified. The same has been confirmed by passive transfer of sensitized cells in healthy guinea pigs by radio-isotope studies.

In an etiopathological study on fatty liver kidney syndrome in broilers (FLKS), the materials from cases of FLKS from birds have been collected and subjected to detailed histopathological examination. A thorough investigation was done during the first visits and identified, nutritional deficiencies as one of the major cases of this syndrome. Field trials by supplementation of biotin and molasses have shown reduction of mortality due to FLKS.

### 2.4 Animal Genetics and Breeding

Under an ICAR adhoc project viz., Polymorphism of haemoglobin and transferrin in normal cattle affected with theileriasis, performance studies of Jersey herds in Karnataka was taken up. The data analysed from two jersey herds maintained at Red Dane Project, Dharwad, Kudige and Kodagu, revealed that animals imported from Dharwad had significantly lower age at first calving (776.11 days) against farm born jersey calves (857.88 days). The imported jersey animals produced significantly higher yield (2468.52 kg) than those of locally born (1961.80 kg). Further, higher fat per cent (5.96 per cent) was recorded in imported jersey against 5.44 per cent of fat in locally born jersey cattle. The imported jersey cattle had shown significantly lower dry period of 63.99 days against 71.87 days in locally born jersey cattles.

### 2.5 Poultry Science

In a study on performance of reciprocal crosses, recurrent reciprocal selection programme (RRS) was adopted to evaluate the possibility of improving the eighth week body weight of the parent line, through selection on crossbred performance. In the reciprocal crosses made during 1984-85, the fertility percentage was generally high, but slightly higher in IR.2 × IC.2 cross than its reciprocal while there was no difference in fertility percentage among IC.3 and IR.3 crosses. The hatchability percentage was higher in IR.2 × IC.2 than in

IC.2 × IR.2, while IR.3 × IC.3 crosses showed higher hatchability than its reciprocal crosses.

In a study on Random Sample Test for broilers, the performance of the breed crosses developed at this farm, one each from AICRP on poultry for Meat and UAS Research project were evaluated at the 13th Random Sample Test Centre, Hessaraghatta, conducted from October 1984. Body weights were more with UAS strain at 6 and 8 weeks compared to AICRP strains.

### 3. Fishery Science

#### 3.1 Fishery Biology

Studies on the parasites and diseases of spawn, fry and fingerlings of cultivable carps and their control 'Ich' disease of aquarium fishes was recorded in Mangalore. The parasite was identified as *Ichthyophthirius multifiliis*. Experimental infection studies were conducted to know the pathogenicity and duration of life cycle of the parasite.

*Dactylogyrus* infection was observed on the gills of major carp fingerlings in the College Fish Farm. Laboratory studies on the pathogenicity of the parasite and the effects of common therapeutics *in vitro* on live parasites yielded encouraging results.

In a study on the formulation of medicated feeds and their efficiency in treating systemic diseases and gut parasites of cultivable fresh water fishes, medicated feeds were prepared using antibiotics like tetracycline trimethopatin and chloramphenicol. Indian major carp fingerlings were used in feeding experiments to study the acceptability of medicated feeds. Mixing of drugs to feed before pilletining was found to be better than coating of drugs to dry feed using oil or gelatin.

#### 3.2 Aquaculture

In a study on the effect of phased manuring on the growth of carps, the influence of poultry manure was significant, when employed in a phased manner on the growth rate of carps, catla, rohu, common carp and mahseer stocked in the ratio of 1 : 1 : 1 : 1 at a density of 8,000 fingerlings/ha. Over a period of 3 months, the performance of catla and rohu was the best in daily manuring treatment and that of common carp in weekly manuring treatment : mahseer registered the best growth in cisterns manured at fortnightly intervals.

The effect of aeration on the growth and survival of Indian major carps was studied over a period of 4 months by stocking catla, rohu and mrigal fingerlings at a density of 10,000/ha. Growth of all the three species were better in aerated cisterns, but survival of only rohu and mrigal was superior under aeration. The results of the study indicated that, aeration enhances growth as well as survival of Indian major carps.

The utility of gobargas slurry on plankton and carp production was studied over a period of one month and 3 months respectively. Slurry resulted in good plankton production and enhanced the growth of carps. The effect of slurry on plankton production and fish growth was found to be dose dependent.

*Inland Fisheries :* Common carp fingerlings were fed on subabul meal based feed with four different percentages for a period of 143 days to study the effect of feed on the growth of fish and to observe whether it would have any ill-effect on the fish. The daily ration given to the fish in various groups, was 5 per cent of their body weight. It was found that the formulated feed did not have any bad effect on fish. There was a marked decrease in the weight gain with the proportional increase in subabul leaf meal in feeds.

Hemavathy river stretch starting from Mudigere up to Hemavathy reservoir was taken up for studying the fish and fisheries. Five sampling stations were selected covering the length of the river stretch of about 45 km. It was observed that the hydrological features of the river did not indicate any significant difference and were found to be congenial for fisheries. Although Indian major carps are introduced into the reservoir which is connected to the river, their establishment in the river stretch is insignificant. The study clearly indicates that for the establishment of major carp fishery in the river stretch, it is very essential to stock advance fingerlings of these species in larger numbers.

Investigations are under progress to study the fish and fisheries of Hemavathy reservoir, Gorur. Samples for hydrobiological studies are being collected from 5 different points located at different regions of the reservoir. 17 species of fishes belong to various groups have been identified and recorded. The dominant species among them were predatory fishes viz., *Wallago attu* and *Glassogobius giuris*. The hydrobiological conditions of the reservoir are highly conducive for the propagation of carp species. It is necessary to intensify stocking of advanced fingerlings of major carps for getting better fish production.

A detailed study was undertaken to estimate the productive potential of Mugad tank and there upon to improve the socio-economic condition of the fishermen community who have depended on this tank for their livelihood. So far 18 tonnes of fishes have been harvested. It is expected that another 12

tonnes of fish may be available. This works out to an average production of about 800 kg/ha. The study indicates that it is possible to increase the production to about 1500 kg/ha/yr, by stock manipulation alone.

An experiment was conducted to study the growth performance of fish in earthen ponds treated with cowdung alone, cow shed washing alone and a combination of both. The present study indicates that it is advisable to use a mixture of cowdung and cow shed washings for production of carps economically.

Studies made on the utilization of biogas slurry as fertilizer and its comparison with cowdung gave encouraging results. This indicates that the biogas slurry is more effective as fertilizer in fish ponds compared to cowdung.

### 3.3. Fishery Oceanography

Studies on vertical temperature and salinity distribution in the Arabian sea off Mangalore was taken up with objectives to understand the monthly and seasonal variations of vertical temperature and salinity distribution in the Arabian sea off Mangalore and to study the water masses and upwelling in the region. The results of the study indicated that, during the months of April and May, temperature showed reduction with depth at all the stations in the sea off Mangalore. Temperature values increased at all depths during October and November. A decrease in temperature with nearly isothermal feature was noticed in December and January. Temperatures again showed an increasing trend at surface and sub-surface depths during February and March. A general increase in salinity was noticed with depth in the region of study. Maximum surface salinity of 36.3 per cent during April and minimum surface salinity of 33.4 per cent during September were recorded in the sea off Mangalore.

Though the effect of salinity on demersal fish catch was minor, a direct correlation between bottom water salinity and trawl catch was observed. Similarly, a positive correlation was found between average bottom water temperature and trawl catch.

Investigations to study the influence of bottom currents and some other hydrographic features on experimental trawl fishing in the Arabian sea off Suratkal were carried out along two sections with two stations in each section, one at 20 m and the other at 30 m depth. The studies revealed that bottom currents were generally directed towards north from November till March and towards south from April to October, with maximum velocity during September. Air and sea water temperatures showed a double oscillation with two maximum values during April and October and two minimum values during January and

September/December. The maximum salinity was recorded during May and minimum during December. Highest dissolved oxygen values were recorded during January and December and lowest during April.

In general, an increase in trawl fish catch was achieved whenever trawling was carried out against the current direction. Trawl catches showed a positive relationship with bottom temperature only in few months but a direct relationship with salinity was observed during most of the months. Higher trawl catches were associated with higher standing crop of benthos and vice versa.

### **3.4 Fishery Microbiology**

A study on the occurrence of paralytic shellfish toxin in shellfishes of Karnataka was taken up at Mangalore during the period under report. The studies indicate that the paralytic shellfish toxins did not occur in our shellfishes during the study period, but diarrhetic shellfish toxins were observed in a few samples.

### **3.5 Fish Processing Technology**

Microbial spoilage in canned fish sausages spoiled canned fish sausages were analysed for the type of spoilage. The causative bacteria were isolated and identified up to genus level. It was found that the spoilage was caused by 'flat-sour' type of organisms belonging to the 'Bacillus' genus.

The use of paraben ice for the preservation of fresh fish in semi-commercial trials significantly increased the shelf life of fish from a period ranging from 4-18 days over and above the control (fish stored in ordinary ice), depending on the initial freshness, method of handling and the variety of fish.

In a study on production of Patis (fish sauce) and its quality evaluation, initial experiments conducted with carrangids and Anchoviella fish species, revealed that, a fish to salt ratio of 3:1 was best among the different ratios tried in this study.

### **3.6 Fishery Engineering**

In project on design of equipment for painless killing of frogs, the equipment has already been designed and the working of the same will be demonstrated in Cochin.

## **4. Home Science**

Another study on effect of varietal differences on consumer acceptability of ragi products was conducted. The 8 varieties of ragi were used to prepare



typical ragi products of Karnataka such as ragi *roti*, *dosai*, *mudde* and *porridge*, Indaf 11 was found to be acceptable for *dasai* but not for *mudde*. A study on varietal differences in milling, malting and popping of selected varieties of ragi was conducted. Indaf-5 had the highest malting rate and Indaf-11 had the lowest malting rate. When malt yield was considered Indaf-7, 8 and 9 were found to be the most suitable and these varieties could be made use of for malt products, weaning foods etc. Indaf-3 had the highest popping rate. But on the whole Indaf-8 and Indaf-5 were considered to be best for popping purposes.

A study on varietal differences in physical and cooking characteristics of soybean and soydhal was taken up. Among the nine varieties analysed, all the varieties except Hardee and KHSB-2 had bright colour. Different varieties were found to be acceptable for different food products. The variety DS-7437 was found to be most suitable for *idli* and *dosai* and PK 7392 best for *vadai* and mashed dhal, as scored by a panel of judges.

Varietal effect on horsegram physical characteristics, germination and cooking quality was taken up at Hebbal. When these varieties were scored for acceptability in typical dishes like *Usli* and mashed dhal, BGM 1 ranked highest and was found to be very much acceptable.

High protein biscuits from cereal malts, soya and defatted peanut flour were prepared. Biscuits prepared from a combination of defatted soya flour with rice flour was found to be best and it was concluded that rice flour with any form of soya flour (fulfat, defatted and malt) was acceptable.

Consumer survey on selected cereals and pulses in rural and urban families was taken up. On urban and rural families belonging to high, middle and low income groups, the preference was found to be for high yielding varieties such as Vani, Jaya and Rasi in rice, and Indaf-8 and Indaf-5 in ragi. Even the rural women had preference for highly polished rice, ragi varieties which had higher yields of grains with reddish brown colour and higher water uptake were preferred. Both rural and urban families preferred rice with sweetish taste and shorter cooking time.

A pilot study was conducted at villages under Malaprabha irrigation project. It was very clear that, the major fuel used in rural families was the firewood. Most of the families had smoky kitchen, due to the existence of the traditional firewood chullahs which does not have a proper smoke outlet. So to minimise the drudgery on the part of women 'ASTRA' being a smokeless chullah has been installed at the Aanganawadi centre in all the selected villages as a demonstration unit. The fuel efficiency is approximately 37 per cent in case of 'ASTRA' designed by Indian Institute of Science at Bangalore. The smokeless

chullahs have been installed in collaboration with Block Development Office and the District Rural Development Services.

## **5. Basic Sciences**

### **5.1 Biochemistry**

In a study on the nutritional quality of sunflower seeds, the solubility fractionation showed that albumins and globulins constitute the major storage proteins of sunflower seeds. The phenolics are mainly associated with the low molecular weight fractions of the sunflower albumins. The amino acid composition of the albumin fraction was determined and was found to be rich in essential amino acids.

About 20 varieties of sunflower were screened for presence of trypsin inhibitor activity and it was found to be absent.

### **5.2 Statistics**

In a study on devising suitable sampling methods for the sampling of trees for experimental purposes, a new scheme of sampling of branch with probability proportional to branch magnitude has been suggested and this new scheme is compared with the one suggested by Raymond J Jesson and found to be superior.

A survey in constraints limiting the adoption of Package of Practices in sunflower was conducted during 1983-84 and 1984-85 in the districts of Bangalore, Bellary, Bijapur, Mysore and Raichur, by interviewing 267 farmers. The important findings are: (1) the seed yield/acre was found to be more by adopting dibbling method of sowing over other methods. (2) Under irrigated conditions 4.6 to 5.24 q/acre of seed yield was realised by applying over 50 kg nitrogen and phosphorus/acre. Where as in the rainfed conditions 3.0 to 3.06 q/acre was obtained by applying more than 40 kg of N and P. (3) There seems to be no difference in the oil content of the seeds obtained from the irrigated and rainfed conditions.

### **5.3 Economics**

Under All India Coordinated Project on Technology Transfer for the Socio-economic Upliftment of Scheduled Castes and other Backward Communities, in Crop Production Programme, improvement have been effected with the introduction of technological modules in crop production. The base line survey conducted during the year 1984-85 revealed that:

(a) All the land owning households fall into category of small and marginal farmers. Out of 138 land owning families only 18 have land more than one hectare.

(b) Over 90 per cent of the area is rainfed.

(c) Ragi-avare fodder jowar was the dominant cropping pattern, occupying 80 per cent of the area.

(d) Hardly, 25 per cent of the area was planted with high yielding varieties of ragi. The yield level of local variety of ragi was 2.5, 4.7 and 7.0 q/ha, with no manuring, manuring with FYM alone and FYM + fertilizer practices respectively. About 30 per cent of the land owning households have not even applied any kind of manure. Manuring practice is far below the level of crop requirements.

Better crop production programmes were undertaken on transfer of technologies to improve the farming practices taking into account, bench mark status, rainfall level and distribution and existing cropping practices.

The livestock programmes implemented have been : (a) *Genetic upgrading* of local breeds by introducing two local improved Bannur rams ; and artificial insemination of cows. (b) Advisory services on management practices such as housing, cleaning, disease prevention etc., (c) Technical advice on the rearing of crossbred cows supplied under special component programmes ; (d) Camps for sterility and pregnancy tests of cows ; (e) Introduction of improved layer birds ; and (f) Promotion of fodder development.

The working population of the project area have expressed their willingness to learn new skills in the area of mushroom cultivation, preparation of soap, energy food preparation, tailoring, kitchen gardening and other crafts. About 30 per cent of them have expressed their willingness to learn skills in mushroom cultivation and preparation of soap, 25 per cent tailoring and 15 per cent kitchen gardening.

Under transfer of technology, 30 smokeless chullahs were distributed. This has saved 30 per cent of fuel, with advantages such as less smoke and less cooking time.

K. KRISHNAMURTHY  
*Director of Research*

## **PART IV**

### **EXTENSION**

#### ***Extension Education Council***

The twenty sixth meeting of the Extension Education Council was held on 11-2-1985. The following are the important recommendations made by the council.

1. Seminars on topical interest should be organised in the Research Stations two weeks in advance of the conduct of Field Days involving 30-40 progressive farmers and extension workers of the area to ascertain the needs of the farmers of the areas and problems faced by them.
2. The council noted that the following 12 taluks will be covered by the Extension Education Unit, Bijapur :

1. Bijapur	7. Bagalkot
2. Sindhgi	8. Badami
3. Indi	9. Hungund
4. Bagewadi	10. Muddebihal
5. Jamkandi	11. Mudhol
6. Bilgi	12. Athani

#### ***Agricultural Information***

The University of Agricultural Sciences in collaboration with the State Departments of Agriculture and Horticulture has brought out the following joint publications during the year :

1. Cultivation Practices for vegetables – May 1984 (Eng)
2. Addition/Deletion/Modifications to the Package of Practices for High Yields – May 1984 (Eng)
3. Addition/Deletion/Modifications to the Package of Practices for High Yields – May 1984 (Kan)
4. Cultivation Practices for Fruits—1984 (Eng)
5. Cultivation Practices for Flowers — Nov. 1984 (Eng)
6. Cultivation Practices for Plantation Crops — Feb. 1985 (Eng)

Twenty three information folders were brought out in kannada during the year as indicated below :

- |                                    |                          |
|------------------------------------|--------------------------|
| 1. Paddy brown hopper              | 12. Hybrid bajra         |
| 2. Control of paddy blast          | 13. Tur                  |
| 3. Control of areca yellow disease | 14. Soybean              |
| 4. Earthworm cultivation           | 15. Watermelon           |
| 5. Fashion fruit and its use       | 16. Banana               |
| 6. Crazy ant control               | 17. Grapes               |
| 7. Paddy                           | 18. Guava                |
| 8. Hybrid jowar                    | 19. Sapota               |
| 9. Hybrid maize                    | 20. Cardamom             |
| 10. Irrigated ragi                 | 21. Coconut              |
| 11. Rainfed ragi                   | 22. Sericulture          |
|                                    | 23. Bakery training unit |

*Fortnightly Press Releases :* Twenty three sets of Press Releases were issued in collaboration with the Karnataka State Department of Agriculture and 23 sets of fortnightly Press Releases in collaboration with the Karnataka State Department of Horticulture in Kannada and English languages.

*Question and answer columns in newspapers :* Information, to the question and answer columns of 'Prajavani' and 'Kannada Prabha' has been provided by the University of Agricultural Sciences, as indicated below :

1. Prajavani — 42 sets (Kan)
2. Kannada Prabha — 41 sets (Kan)

*Tips to farmers :* Twelve sets of 'Tips to Farmers' in Kannada language issued (one for each month) to each of the 3 periodicals of 'Krishi Varthe', 'Vyavasaya Patrike' and 'Belaku'.

*Special Press Releases :* The following special press releases were issued covering the various technologies.

1. Control of paddy brown plant hopper
2. New crop varieties released by the UAS
3. Cultivation of earthworm
4. Starting of bee keeping training programme at UAS.
5. Harmful effects of using boric acid in grain storage.

*Participation in exhibition :* The UAS has participated in Horticultural Show at Lalbagh on the eve of Independence Day Celebrations, 1984 from 8-8-1984 to 15-8-1984.

**Farm Advisory Service**

The various sections and units and the Departments have attended 1165 queries of the farmers pertaining to various aspects of agriculture and allied fields. In addition 122 farm visits have also been made. The details are given below :

Unit, Department	No. of replies given to queries of farmers	No. of Farm visits
1. Consultancy Unit of the Directorate of Extension	881	—
2. Extension Education Units		
Hebbal	15	2
Dharwad	31	19
Raichur	21	23
Mandya	15	69
Mudigere	77	19
3. Farmers Training Institute	125	—
4. Research Stations and Teaching Departments	6138	412
Total	7303	544

*Correspondence Course on Paddy :* The fourth Correspondence Course on Paddy has been organised during the year 1984-85 and 84 farmers participated in the programme.

**Field Days at Research Stations**

During the year 22 University Research Stations have conducted Field Days and Krishi Melas as detailed below, wherein the extension workers and farmers were exposed to the research activities conducted in different research stations.

Month of organising Field Day, Krishi Mela	Research Station
August 1984	Agricultural Research Station, Madenur
August 1984	Agricultural Research Station, Navile
September 1984	Regional Research Station, Dharwad
September 1984	Agricultural Research Station, Kankanady
October 1984	Agricultural Research Station, Arasikere
October 1984	Agricultural Research Station, Kathalagere
October 1984	Agricultural Research Station, Sirsi (Paddy)

1	2
November 1984	Regional Research Station, Mandya
November 1984	Agricultural Research Station, Honnavile
November 1984	Regional Research Station, Mudigere
December 1984	Agricultural Research Station, Nagenahalli
December 1984	Agricultural Research Station, Nippani
December 1984	Agricultural Research Station, Hiriyur
December 1984	Regional Research Station, Bijapur
December 1984	Agricultural Research Station, Nagamangala
January 1985	Agricultural Research Station, Sankeswar
January 1985	Agricultural Research Station, Arabhavi
January 1985	Agricultural Research Station, Bheemarayanagudi
January 1985	Agricultural Research Station, Bidar
January 1985	Agricultural Research Station, Hebballi (Dharwad)
January 1985	Agricultural Research Station, Annigeri
February 1985	Agricultural Research Station, Ullal
February 1985	Regional Research Station, Raichur

### **Farmers Training**

1. *Training of farmers by Farmers Training Institute, Hebbal*: The Farmers Training Institute during the year has organised 24 training programmes under WYTEP (DANIDA Project) and 64 production-cum-training programmes. In addition 13 special programmes on Biogas have also been organised.

	No. of training programmes	No. of persons trained
a) <i>Institutional</i>		
i) WYTEP (Danida Project)		
1. For men	12	356
2. For women	12	434
ii) For convenors of Charchamandals	4	85
iii) Other Special Programmes		
1. Kitchen gardening	1	19
2. Biogas technology	4	63
b) <i>Non-Institutional</i>		
i) Production-cum-demonstration		
1. For men	36	1048
2. For women	28	797
ii) Special training for users of biogas	13	650
<b>Total</b>	<b>110</b>	<b>3452</b>

2. *Krishi Vignana Kendra, Hanumanamatti* : The Krishi Vignana Kendra, Hanumanamatti has organised 41 on-campus training programmes and 89 off-campus training programmes involving 1,272 and 2,739 participants respectively.

Discipline	On-campus training programmes				Off-campus training programmes			
	No. of training programmes	No. of participants trained			No. of training programmes	No. of participants trained		
		Male	Female	Total		Male	Female	Total
Agronomy Extension	16	520	32	552	30	749	36	785
Soil and Water Management	2	27	—	27	14	436	20	456
Animal Science	10	231	54	285	3	22	30	52
Home Science	8	49	270	319	1	8	2	10
Agricultural Engineering	5	82	7	89	41	673	763	1,436
Total	41	909	363	1,272	89	1,888	851	2,739

#### **Extension Education Units**

3. *Extension Education Units* : The different Extension Education Units of the Directorate of Extension have organised 1077 group meetings, 393 training sessions and 49 field days involving 28,312 farmers as detailed below :

Extension Education Unit	Group meetings		Training sessions		Field Days	
	No. of group meetings	No. of farmers participated	No. of training sessions	No. of farmers trained	No. of field days	No. of farmers participated
Bangalore	480	8732	126	2475	14	1825
Dharwad	78	1612	185	2435	12	660
Raichur	268	3381	50	1057	4	710
Mandya	186	2308	20	465	5	970
Mangalore	65	1000	12	194	14	488
Total	1077	17033	393	6626	49	4653



4. *Training of Extension Workers*: The Staff Training Unit of the Directorate of Extension has organised the following training programmes for the benefit of the extension workers of the State Departments of Agriculture, Horticulture, Animal Husbandry and Veterinary Services, and Fisheries.

Date	Name of the training programme	No. of participants
1	2	3

*Department of Agriculture*

14-5-84 to	Orientation-cum-Communication workshop	
19-5-84	under T & V System	20
30-7-84 to	Training Programme on Dryland Agriculture	
31-7-84	and Water Shed Management	20
17-9-84 to	Soil testing and fertilizer recommendation	
21-9-84	(Northern Region) at Dharwad Campus	10
7-1-85 to	Soil testing and fertiliser recommendation	
11-1-85	(Southern Region) at Hebbal Campus	10
21-1-85 to	Training programme of teaching methods	
25-1-85	at Hebbal Campus	15
4-2-85 to	Area specific land development and crop	
5-2-85	production technology to suit the rainfall	
	pattern ( red soil regions)	53
7-2-85 to	-do-	52
8-2-85		
11-2-85 to	-do-	40
12-2-85		
11-2-85 to	Dry farming technology in black soils	20
13-2-85		
14-2-85 to	Area specific land development and crop	
15-2-85	production technology to suit rainfall	
	pattern (red soil region)	57

*Department of Horticulture*

8-4-84 to	Workshop of Subject Matter Extension	
19-4-84	Education and Administration	13
17-9-84 to	Training programme on teaching method	13
21-9-84		
19-11-84 to	Special course on plantation crops	15
22-11-84		

*Department of Animal Husbandry and Veterinary Services*

18-6-84 to	Physio-pathology of reproduction and	
28-6-84	artificial insemination	9

1	2	3
5-11-84 to 10-11-84 to 24-11-84 11-3-85 to 15-3-85	Training programme of fodder production Recent techniques in live-stock production (Poultry, Dairy and Piggery) Training programme of diagnostic techniques	20 17 9
<i>Department of Fisheries</i>		
27-8-84 to 21-9-84	Training programme in Fisheries Science	13
<i>Programmes in collaboration with Coverdale Organisation and Govt. of India :</i>		
9-4-84 to 14-4-84	Coverdale course—Southern regional work- shop on extension management for senior officers of the Department of Agriculture from Kerala, Tamil Nadu, Andhra Pradesh and Karnataka	24
20-8-84 to 25-8-84	Coverdale course—Training programme for senior officers of the Dept. of Agriculture from different parts of the country on the practice of management principles from 9 different States	24
27-8-84 to 1-9-84	Coverdale course—Training programme for senior officers of the Dept. of Agriculture from different States of the country on the practice of management principles for participants from Karnataka, Andhra Pradesh, Tamil Nadu and Kerala	14
3-9-84 to 5-9-84	Coverdale course—follow-up workshops for trainees who participated in the previous courses	7
10-9-84 to 14-9-84	Special course for senior officers of CADA (Upper Krishna Project of Karnataka) on the practice of management principles in agriculture	16
<i>Other Adhoc training programmes—Sponsored by Govt. of India</i>		
i) Rice (Mini-kit)		
19-6-84 to 22-6-84	Rice Production Technology	12

1	2	3	4
21-8-84 to 24-8-84	Rice Production Technology		30
3-9-84 to 6-9-84	Rice Production Technology (Drill sown region)		25
26-3-84	Rice Production Technology		30
ii) Millets			
26-6-84 to 29-6-84	Maize Production Technology		23
9-10-84 to 12-10-84	Wheat Production Technology		30
17-10-84 to 20-10-84	Ragi Production Technology		30
6-11-84 to 9-11-84	Maize Production Technology		30
26-11-84 to 29-11-84	Jowar Production Technology		30
iii) Pulses			
16-8-84 to 18-8-84	Pulse Production Technology ( <i>khariif</i> )		26
<i>Sponsored by ICAR</i>			
7-8-84 to 9-8-84	Regional Training Programme on Dry Farming, oilseeds and pulses for Subject Matter Specialists under N.D. Project, Southern Region.		19

*T & V monthly Workshops:* The training Unit in collaboration with Scientists of the different Departments of the University has been implementing the programme of organising monthly training-cum-workshops for the benefit of the staff of State Department of Agriculture under T & V System in all the 19 districts of the State.

*Special State Level Workshop for monthly workshop of T & V:* State Level Workshop on Advance Monthly Workshop under T & V at the Rural Development and Training Centre, Dharwad was jointly organised by the State Department of Agriculture and the University from January 8-10, 1985. The UAS specialists have helped in training the Subject Matter Specialists in the workshop.

**Field Extension Work**

a) *Block Demonstrations* : Extension Education Units of the University have organised 18 Block Demonstrations involving 312 small and 99 big farmers. The details of the Block Demonstrations organised are given below :

Extension Education Unit	Season	Crop	No. of Block Demonstrations organised	No. of farmers involved		
				Small	Big	Total
Bangalore	Kharif	Ragi	3	93	36	129
		Paddy	1	8	4	12
		Groundnut	3	57	4	61
		Pure redgram	1	28	12	40
Dharwad	Kharif	Greengram	1	6	9	15
	Summer	Groundnut	2	29	8	37
Raichur	Kharif	Paddy	1	11	—	11
	Rabi	Safflower	1	8	2	10
		Brinjal	1	12	—	12
Mandya	Kharif	Paddy	1	12	8	20
		Sunflower	1	18	—	18
	Summer	Ragi (Indaf-5)	1	20	10	30
		Paddy	1	16	6	22
Total			18	318	99	417

b) *Farm trials conducted by Extension Education Units* : Extension Education Units of the University organised 92 kinds of trials in 497 locations during the year. The details are as follows :

Extension Education Unit	No. of trials conducted							
	Kharif 1984-85		Rabi 1984-85		Summer 1984-85		Total	
	No.	Location	No.	Location	No.	Location	No.	Location
Bangalore	15	160	3	31	5	52	23	243
Dharwad	8	16	5	10	—	—	13	26
Raichur	10	46	6	54	1	2	17	102
Mandya	9	25	—	—	4	17	13	42
Mangalore	2	12	5	8	2	2	9	22
Mudigere	2	14	—	—	12	44	14	58
Asst. Prof. of Extn.								
Kathalagere	1	1	—	—	—	—	1	1
—do—								
Honnavile	1	2	—	—	—	—	1	2
—do—								
Hiriyur	1	1	—	—	—	—	1	1
Total	49	277	19	103	24	117	92	497

Important trials conducted by various Extension Education Units have been listed below :

**Extension Education Unit, Bangalore**

*Kharif 1984-85*

Comparison of HR 911 ragi with Indaf 8  
 Comparison of KMP 41 with Sona  
 Comparison of TV x 22 KBCI with C-152 cowpea  
 Comparison of Pusa 150 vs local scented paddy  
 Comparison of ragi mixed with DAP with farmers practices  
 Comparison of Mandya hybrid maize with Deccan Hybrid  
 Use of mussorie phos/superphos on yield of groundnut  
 Use of cowdung treated super vs super  
 Seed treatment of ragi with vitavax  
 Seed treatment of cowpea with mancozeb  
 Control of bacterial wilt of tomato by bleaching powder  
 Comparison of mosaic resistant bhendi with Pusa Sawani  
 Comparison of bacterial wilt resistant tomato variety with Pusa Ruby  
 Comparison of S1 and S2 Chillies with Gowribidanur variety  
 Comparison of bacterial wilt resistant brinjal variety with Pusa Purple Long.

*Rabi 1984-85*

Control of bacterial wilt by use of bleaching powder in tomato  
 Comparison of bacterial wilt resistant tomato variety (IIHR) with Pusa Ruby  
 Comparison of GKVK ACE 5 French beans with Arka Komal/Bangalore Local

*Summer 1984-85*

Weed control in paddy by use of weedicides  
 Efficiency of quinolphos granules to control paddy pests at a reduced dosage  
 Evaluate IET 7575 a new paddy variety for its tolerance to brown plant hopper  
 Comparison of bacterial wilt resistant brinjal with Pusa Purple Long  
 Comparison of yellow vein mosaic resistant okra with Pusa Sawani

**Extension Education Unit, Dharwad***Kharif 1984-85*

Fertilizer levels for rainfed hybrid cotton  
 Performance of SPV 351 vs Hy. jowar  
 Field trials of Sel. 11, Sel. 13 and Sel. 14 vs Bellary red onion  
 GKVK-3-15-15 and GKVK-4-12 vs local ridge gourd  
 ICP 8863 wilt resistant vs local red gram  
 Pay off insecticide × endosulfan in control of bollworm in cotton

*Rabi 1984-85*

Performance of A-83 vs A-1 safflower  
 Field trials of Sel. 22 vs Pusa Rubi tomato  
 Field trials of Sel. 13 vs California Wonder in capsicum  
 High density of banana planting (4' × 4') vs  
     Recommended spacing (6' × 6')  
 Irrigation schedule to safflower vs no irrigation

**Extension Education Unit, Raichur***Kharif 1984-85*

JL-24 vs KRG-1 groundnut  
 RCH-11 vs Rc-8 castor  
 RCR-18 vs IGP-76 and No-71 niger  
 RDS-7, RDS-164 vs DB3-12(C)  
 Sharada, DS70 480 vs Jayalakshmi cotton  
 RAS-304, CPD 8-1 vs Jayalakshmi cotton  
 Application of higher dose of fertilizers for better yields in brinjal  
 Popularising fig cultivation  
 Popularising pummelo cultivation  
 Popularising pomegranate cultivation.

*Rabi 1984-85*

JL-24 vs KRG-1 groundnut  
 Spraying iron sulphate to groundnut (0.5%)  
 DWR-39 vs local wheat  
 Bengalgram varietal trial 2375, GBS-1, GBS-2 vs local  
 Better yields of brinjal by application of higher dose of fertiliser  
 Weed control in onion by baseline weedicide.

*Summer 1984-85*

Iron sulphate spray to groundnut (0.5%)

**Extension Education Unit, Mandya***Kharif 1984-85*

- Trial on paddy varieties Pusa 150 vs local scented varieties
- Trial on paddy varieties KMP 41 vs Sona
- Trial on paddy varieties for saline soils IR 30804 vs Pragathi
- Trial on cowpea varieties KBC-1 vs C-152
- Trial on performance of new weedicide
- 1) Oxidiazon, 2) Benthocarb and 3) Pendamethalin vs Butachlor
- Varietal trial of groundnut DH-3-30 vs Spanish Improved
- Comparison of Sel. 13 capsicum with California Wonder
- Comparison of Arka Nishanth with Japanese white radish
- Comparison of Sel-1, ACe-14 chilli with local variety.

*Summer 1984-85*

- Trial on comparison of groundnut varieties DH-3-30 vs TMV-2
- Trial on comparison of soyabean varieties Jupiter vs KHSB-2 and Hardee
- Comparison of Sel-4 bottle gourd with Pusa Summer prolific long
- Comparison of Sel-4 tomato with Pusa Ruby

**Extension Education Unit, Mangalore***Kharif 1984-85*

- Varietal trial of IET 7575 paddy
- Comparing rock phosphate vs superphosphate on paddy

*Rabi 1984-85*

- KKP-2 vs local paddy
- Comparing rock phosphate vs superphosphate on paddy
- Trial on the use of BGA for paddy to reduce 'N'
- Performance of Mandya Vani
- TMV-2 groundnut.

*Summer 1984-85*

- Comparing biogas slurry to compost on paddy
- Comparing the performance of Mandya Vani

**Extension Education Unit, Mudigere**

*Kharif 1984-85*

Paddy varietal trial  
KMP-40 x KMP-39 x PS-140 x local  
Cardamom seedlings vs Suckers

*Summer 1984-85*

Groundnut varietal trials  
Application of  $\text{ZnSO}_4$  in paddy  
Intercropping in sugarcane  
Performance of pulses in rice fallows  
Paddy varietal trial  
Weedicidal trial  
Multilocation trial cardamom  
Efficiency of rock phosphate vs superphosphate  
Intercropping in coconut  
Performance of suckers vs seedlings  
Testing of cucumber in rice fallows  
Ragi varietal trial

**Assistant Professor of Extension,  
Agricultural Research Station, Kathalgere**

*Kharif 1984-85*

Performance of Pusa 150 variety of paddy (Pusa 150 vs Jaya)

**Assistant Professor of Extension,  
Agricultural Research Station, Honnavale**

*Kharif 1984-85*

Performance of DH-8 vs DH-3-30 of groundnut crop

**Assistant Professor of Extension,  
Hiriyur**

*Kharif 1984-85*

Study the performance of Sel-9 (IIHR variety)  
vs Burpee Stringless of beans crop



(c) *Results of important trials reported by Extension Education Unit :*  
Following are the results of important trials conducted by the Extension Education Units.

Name of the trial	No.	Yield in kg. acre		Per cent increase over check
		Check	Treatment	
1	2	3	4	5

**Extension Education Unit, Bangalore**

*Rabi 1983-84*

Use of mussorie phos/super phos on potato	16	9486.8	9424.8	- 0.7
Control of bacterial wilt of tomato by bleaching powder	9	4955.2	5332.8	+ 7.62
Comparison of Sel-2, 9 french beans with Burpee Stringless	5	4392.0	(S.2)3670.0	- 19.5
			(S-9)5332	+ 21.3

*Summer 1983-84*

Comparison of KMP 41 with Sona 8		2431	2550	+ 4.9
Use of mussorie phos/super phos on Groundnut	8	443.2	487.2	+ 9.9
Comparison of 61-B cowpea with S-288	12	2101.9	2334.4	+ 11.1

*Kharif 1984-85*

Comparison of HR-911 ragi with Indaf-8	35	584.8	648.4	+ 10.9
Comparison of Pusa 150 vs local scented	3	2384.8	2280.8	- 4.4
-do- of KMP-41 with Sona	19	2286.4	2339.6	+ 2.3
-do- of TV x 22 KBC-1 with C-152 cowpea	12	132	(KBC-1)112.8	- 17.02
			(TVX)126.0	- 4.9
-do- of ragi mixed with DAP with farmers practice	39	485	533.6	+ 10.02
Comparison of mandya hybrid maize with DEc-H. maize	8	1686	1786	+ 5.93
Use of mussorie phos/superphos on yield of groundnut	18	235.6	276.4	+ 17.2

1	2	3	4	5
Use of cowdung treated super/ super	3	2210	2346.4	+ 6.2
Seed treatment of ragi with vitavax	10	577.2	630.0	+ 9.5
Seed treatment of cowpea with mancozeb	7	122.4	139.6	+ 13.98
Control of bacterial wilt of tomato by bleaching powder	6	4967.6	5516.0	+ 11.04

#### Extension Education Unit, Dharwad

##### *Late Kharif 1983-84*

Performance of LH 299-1 vs Jayadhar cotton	1	236	224	— 5.3
Performance of DP-224, DP-452 vs Jayadhar cotton	1	236	180	- 31.1
ICP 8863 × BDN-1 vs Local tur	7	62.14	113.80	+ 83.13

##### *Rabi 1983-84*

Performance of KDW-39 vs recommended wheat	3	1039	1205.3	+ 16.0
Arkamanik × Ashai Yamato watermelon	2	5700	7200	+ 26.31
Field trials of Sel. 22 vs Pusa Ruby tomato	3	3873.33	4963.33	+ 28.14
Scheduling of irrigation to bengal- gram vs farmers method	2	365	540	+ 48.0

##### *Summer 1983-84*

Dh-8 vs recommended TMV-2 Groundnut	3	746.8	840	+ 12.0
Sel. 22 vs Pusa Rubi tomato	3	3873.33	4963.33	+ 28.14

##### *Kharif 1984-85*

Performance of SPV 351 vs CSH-5 jowar	2	821	688	— 19.3
Fertilizer dose to rainfed cotton	2	464	540	+ 17
Adaptive trial of pay off chemical for Jayalakshmi bollworm control	3	1420	1533.3	+ 8.03

1	2	3	4	5
Field trials of GKVK 3-15-15 and GKVK 4-12 vs local ridge gourd	3	2693.33	2693.33 3333.33	+ 23.76
Field trials of Sel-11, Sel-14 vs Bellary Red onion	2	3880	4030 4140 4270	+ 3.88 + 6.70 + 10.05

### Extension Education Unit, Raichur

#### Rabi 1983-84

Intercultivation of niger in sunflower (1:1)	2	480.00	520	+ 8.3
		560.00	600	+ 7.0
Chemical weed control in onion	2	5220.00	5840	- 11.80
	1	5800.00	6000	+ 3.45

#### Summer 1983-84

Iron sulphate spray in Groundnut (0.5 per cent)	1	600.00	800	- 33
	1	700.00	850	- 21.4

#### Kharif 1984-85

JL-24 x KRG-1 Groundnut		1676.5	1552	- 8.02
	11RF	448.75	512.5	+ 14.2
RCH-1 x RC-8 castor varietal trial	3	356.67	423.33	+ 18.9
RCR-18 x IGP-76 and No. 71 niger varietal trial	No. 71	275.0	290	+ 5.45
	21GP. 76	292.5	290	- 0.86
RDS-7, RDS-164 vs DB 3-12 cotton varietal trial	Continued			
Sharada, DS-70-480 vs Jayalakshmi cotton				
RAS-304 CPD-8-1 vs Jaya- bhini cotton				
Application of higher dose of fertiliser for better yields in brinjal				
	5	12739	14480	+ 13.7

### Extension Education Unit, Mandya

#### Summer 1983-84

Trial on comparison of groundnut varieties DH-3-30 vs TMV-2	2	777	978.4	+ 25.9
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1	2	3	4	5
Trial on comparison of soybean varieties Jupiter vs 1) KHSB-2				
	4	555	578.75	+ 4.28
2) Hardee				
	4	415		39.45
Comparison of Sel. 4 bottlegourd with Pusa summer prolific long				
	4	211.68	242.41	+ 14.52
Comparison of Sel-4 tomato with Pusa Ruby				
	4	17806	20643	16.12
<i>Kharif 1984-85</i>				
Trial on paddy varieties Pusa Vs local scented varieties				
	2	1980	2140	+ 8.08
Trial on paddy varieties for saline soils SR 30864 vs Pragathi				
	3	1735	2267	+ 30.66
Trial on paddy varieties KMP-41 Vs Sona				
	3	2403	2561	+ 6.58
Trial on cowpea varieties KBC-1 Vs C-152 in dryland				
	2	205	280	+ 36.58
Trial on performance of 3 new weedicides with check <i>i. e.</i> Butachlor				
1. Pentamethalin	3		2335	—65.35
2. Oxidiazon		3861	2537	—60.07
3. Benthocarp			4208	+ 8.99
Varietal trial of groundnut DA-3-30 Vs Spanish improved				
	2	782	1023	+ 30.81
Comparison of Sel-13 capsicum with California Wonder				
	3	9966	13581	+ 36.27
Comparison of Arka Nishanth with Japanese white raddish				
	4	1035	18950	+ 83.09
Comparison of Sel-1, Acc-14 chilli with local variety				
1. Local			19457	+ 71.00
2. Sel-1	3	11382	20582	+ 80.79
3. ACC-14				

*Trials of Fisheries*

	No.	Water Spread area	Average yield of fish in kg	Remarks
Culture of common carp in irrigation wells	1	200 M	44	Stock (for first time)
1	2	3	4	5

**Extension Education Unit, Mangalore***Khariif 1984-85*

Varietal trial of IET-7575 in paddy	3	—	1066.66	—
Comparing the effect of NPK vs PK on groundnut	6	415	431.66	+ 4.01

**Extension Education Unit, Mudigere***Khariif 1984-85*

Varietal trial in paddy				+ 14.00
1) KMP-40			5070	
2) KMP-39 vs Intan (Check)		4447.5	4927.5	+ 10.79
3) PS-140			7328.75	- 64.78

**Assistant Professor of Extension, Agricultural  
Research Station, Kathalagere***Summer 1983-84*

Performance of different varieties of paddy under saline condition	1	2000		
Jaya(Check)			1560	—28.21
IET-4679			1160	—72.20
Mangala			1560	—28.21
Pragathi			1720	—16.28
KMP-55914-4-6				

*Khariif 1984-85*

Performance of Pusa-150 varieties of paddy				
Jaya (Check)	1	1920	1152	—66.67
Pusa 150				

**Assistant Professor of Extension, Agricultural  
Research Station, Honnavile***Khariif 1984-85*

Performane of DH-8 vs DH-3-30 (Check) of groundnut crop	2	3080	1944	—58.44
		1712	1528	—12.04

**Assistant Professor of Extension, Hiriyr**

To study the performance of French

beans of Sel-9 (IIHR variety) vs

Burpee Stringless (Check) 1 2350 2940 + 25.10

Performance of Sel-9 (IIHR variety) vs

Pusa Ruby tomato (Check) 1 8340 9420 + 12.94

*Demonstrations organised by the Extension Education Units:*  
Extension Education Units conducted 124 kinds of front line demonstrations in 1084 locations as per details given below :

Extension Education Unit	No. of demonstrations conducted						All Seasons	Total		
	Kharif 1984-85		Rabi 1984-85		Summer 1984-85					
	No.	Loc.	No.	Loc.	No.	Loc.	No.	Loc.	No.	Loc.
Bangalore	11	571	4	20	4	22	—	—	19	613
Dharwad	13	34	6	12	3	17	—	—	22	63
Raichur	8	38	12	105	0	0	—	—	20	143
Mandya	1	3	2	4	2	4	—	—	5	11
Mangalore	6	33	8	36	5	28	9	64	28	161
Mudigere	13	63	—	—	6	13	—	—	19	76
Asst. Prof. of Extn.										
Kathalagere	1	1	—	—	3	4	—	—	4	5
Asst. Prof. of Extn.										
Honnavele	2	2	—	—	—	—	—	—	2	2
Asst. Prof. of Extn.										
Hiriyur.	3	6	2	4	—	—	—	—	5	10
	58	751	34	181	23	88	9	64	125	1084

*Important demonstrations conducted:* Following are the titles of important demonstrations conducted by the various Extension Education Units.

**Extension Education Unit, Bangalore**

*Kharif 1984-85*

Entire crop of redgram in place of ragi

Mixed cropping of redgram with groundnut

Mixed cropping of redgram with ragi

Dry farming practices in dryland ragi  
 Mixed cropping of avare with ragi  
 Dairy demonstration  
 Poultry demonstration  
 Piggery demonstration  
 Subabul demonstration  
 Fish culture in tanks and wells  
 Mushroom cultivation.

*Rabi 1984-85*

Mushroom cultivation  
 Potato demonstration  
 Cabbage demonstration  
 Banana demonstration with closer spacing

*Summer 1984-85*

Fish culture in wells, ponds and tanks  
 Apiculture demonstration  
 Sericulture demonstration  
 Tomato demonstration

#### **Extension Education Unit, Dharwad**

*Kharif 1984-85*

Demonstration of DSH-1 with CSH-5 jowar  
 Use of basaline herbicide in hybrid cotton  
 Package of practices for chrysanthamum vs local method  
 Recommended spacing in potato vs farmers method  
 Recommended dose of fertiliser on potato vs local method  
 Recommended dose of fertiliser vs farmer method in chilli  
 Control of Murda in chillies  
 Control of leaf blight of maize  
 Control of late leaf blight of potato  
 Alternate furrow irrigation to hybrid cotton  
 Composite fish culture in earthen ponds  
 Fish culture in irrigation wells.

*Rabi 1984-85*

Recommended dose of fertilizer to safflower vs farmers dose  
 Recommended dose of fertilizer to bengalgram vs farmers dose  
 Recommended dose of fertilisers in cauliflower vs farmers dose  
 Control of safflower pests  
 Irrigation schedule to wheat and farmers method  
 Irrigation schedule to safflower vs farmers method.

*Summer 1984-85*

Leaf miner control in groundnut  
 Seed treatment vs no seed treatment in groundnut  
 Border strip irrigation to groundnut and local method.

**Extension Education Unit, Raichur***Kharif 1984-85*

Reclamation of salt affected lands  
 Popularising gypsum application for groundnut  
 Fertiliser management in paddy  
 Introduction of Mangala paddy in saline lands  
 Popularising Mandya Vani paddy  
 Composite fish culture  
 Popularising vegetable cowpea  
 Fodder demonstration (NB-21).

*Rabi 1984-85*

Cultivation of entire safflower  
 Gypsum application to groundnut  
 Certified seed vs farmers seed in M. R. jowar  
 Fertilizer and pest management in R. jowar  
 Pest management in safflower  
 Cultivation of South African maize  
 Popularising Keerthi wheat  
 Popularising vegetable cowpea  
 Composite fish culture  
 Cultivation of NB-21 fodder  
 Reclamation of salt lands

**Extension Education Unit, Mandya***Kharif 1984-85*

Demonstration on cultivation of Hyd-3c redgram

*Rabi 1984-85*

Demonstration on cultivation of watermelon  
 Demonstration on cultivation of cabbage

*Summer 1984-85*

Demonstration on cultivation of groundnut—use of correct seed rate and gypsum  
 Demonstration on cultivation of paddy—use of weedicide and zinc sulphate.



**Extension Education Unit, Mangalore***Kharif 1984-85*

Supervised control of paddy pests  
 Spraying of Ekalux EC 25 on paddy pests  
 Cashew air layer demonstrations  
 Control of stem bleeding in coconut  
 Control of Koleroga in arecanut  
 Application of rock phosphate to paddy in place of superphosphate

*Rabi 1984-85*

Control of *Nephantis serinopa* on coconut  
 Comparing NPK vs PK on groundnut  
 Blast control on paddy using Hinosan vs Bavistin  
 Supervised control of paddy pests  
 Control of Tea Mosquito on cashew  
 Control of Gummosis on coconut  
 Ekalux EC 25 spray on paddy to control pests  
 Root grub control in coconut

*Summer 1984-85*

Control of *Nephantis* on coconut  
 Root grub control in coconut  
 Control of Tea Mosquito on cashew  
 Control of Gummosis on coconut  
 Cashew air layer demonstrations.

*Fisheries 1984-85*

Composite fish culture using Indian major carps and exotic carps  
 Common carp culture  
 Air breathing fish culture  
 Biological control of aquatic weeds using Chinese carps.  
 Application of mahuva oil cake as piscide  
 Preparation of prawn pickles using small prawn  
 Preparation of food products using F.P.C.  
 Use of fish protein content (F.P.C.) in food products  
 Prawn pickle and fish pickle demonstrations.

**Extension Education Unit, Mudigere***Kharif 1984-85*

Blast management and improved practices in paddy  
 Lime application to paddy  
 Mushroom cultivation

Composite fish culture  
 Cultivation of pepper - Paniyur hybrid  
 Application of potash to coconut  
 Improved practices in arecanut  
 Control of Katte disease in cardamom  
 Pure crop of hybrid Hyd-3C redgram  
 Plant protection in cotton  
 Introduction of Mangala arecanut  
 Improved practices in cultivation of tobacco  
 Improved practices in sugarcane.

*Summer 1984-85*

Clonal multilocation and improved practices in cardamom  
 Package of practices in paddy  
 Improved package of practices and intercropping in banana  
 Cultivation of sapota variety Kalipathi  
 Kitchen gardening  
 Potato variety - Kufri Badshah and Kufi Jyothi

**Assistant Professor of Extension  
 Agricultural Research Station, Honnavile**

*Kharif 1984-85*

Fertilizer demonstration on sugarcane crop  
 Fertilizer demonstration on coconut plants.

**Assistant Professor of Extension,  
 Agricultural Research Station, Kathalgere**

*Kharif 1984-85*

Advantages of growing improved redgram (Hyd-3C) instead of local variety.

*Summer 1984-85*

Adoption of all package of practices in respect of HYV  
 paddy (Jaya) (Recommended practices vs farmers own practice)  
 Adoption of all package of practices in respect of HYV ragi (Indaf-5)  
 (Recommended practices vs farmers own practice)  
 Adoption of all package of practices in respect of improved groundnut  
 crop (TMV-2) (Recommended practices vs farmers own practice).

**Assistant Professor of Extension  
Agricultural Research Station, Hiriya**

*Kharif 1984-85*

Demonstration of package of practices vs local practices in cotton crop

Demonstration of package of practices vs local practices in groundnut under rainfed

Adoption of recommended practice Vs local practices in sunflower crop.

*Rabi 1984-85*

Demonstration of package of practices vs Local practices in sunflower crop.

Demonstration of package of practices of *rabi* jowar vs local practices.

e) *Results of important demonstrations reported by Extension Education Units*: Some of the results of demonstrations reported by the Extension Education Units are given below :

Name of the Demonstration	No.	Yield in kg/Ac.		% Increase over Check
		Check	Treatment	
1	2	3	4	5

**Extension Education Unit, Bangalore**

*Rabi 1983-84*

Mushroom demonstration	10	—	1.27 Bottle spawn	
Fish culture in ponds and wells	18	—	72.8	
Cabbage (P. P. measures)	12	9650	11,550	+ 19.6
Watermelon (Arka Manik)	7	7610	12,850	+ 68.8
Dairy Units	3	5 Lit.	8 Lit.	+ 60

*Summer 1983-84*

Mushroom cultivation	52	—	1.1 Spawn bottle	
Paddy cultivation	2	2820	3025	+ 7.3
Ragi cultivation	2	860	1080	+ 25.5

*Kharif 1984-85*

Subabul	38	—	1.5 tons	
Fodder	20	—	10 tons	
Pure crop of redgram	39	—	240	—
Mixed cropping of redgram with groundnut compared with Extn. Unit	48	220	182 (Groundnut) 82 (Redgram)	20
Mixed crop of redgram with ragi compared with entire ragi	47	575	545 (Ragi) 72 (Redgram)	7.3

1	2	3	4	5
Dryfarming practices of dryland ragi	132	460	635	+38.0
Mixed crop of avare with ragi	38	400	325 (Ragi) 150 (Avare)	18.75 ,,
Dairy demonstration	25	7	8.5	+21.4
Poultry demonstration	13	Layers in progress		
Piggery demonstration	8	in progress		
Fish culture	91	150 kg/1000 fingerlings		
Mushroom cultivation	12	1.2 kg/spawn		

**Extension Education Unit, Dharwad**

*Late kharif 1983-84*

Performance of DB-3-12 × Jayadhar cotton	2	279	364	+30.46
Recommended dose × higher/lower dose of fertiliser to hybrid cotton (Irri)				
Recommended × higher dose	7	1347	1223	—10.1
Recommended × lower dose	2	1102	1267.5	+15.01
Chemical control of chilli				
Murda complex	3	216.6	216.6	—
Plant protection in potato crop	4	3597	3725	+3.7
Termite control in groundnut				
heptachlor × no chemical	5	315	345	+9.5

*Rabi 1983-84*

Performance of Keerthi × 4D 2119 wheat (increase)	3	1003	1086	+8.28
Economics of entire safflower × wheat + safflower	2	223 + 60 467	352 690.5	+47.86
Irrigation schedule to wheat × farmers method	5	800	800 +	10 given irrigation
		800	800 +	10 ,,
		820	820	given one more irrigation
		1320	1320	Yield did not differ
		1284	1284	

1	2	3	4	5
Improved cultivation practices (spraying + fert. appln) × local method				
	2	830	950	14.45
<i>Summer 1983-84</i>				
Gypsum application to groundnut (Irri)	8	939.3	997.5	+ 5.8
<i>Kharif 1984-85</i>				
Performance of DSH-1 CSH-5 jowar	2	560	740	+ 32.5
Use of basaline herbicide in Hy. cotton	2	285	345	+ 21.0
Alternate furrow irrigation to cotton × entire furrow irrigation	5	1310	1238	— 5.82
Recommended spacing (2' × 9") vs farmers method (3' × 9") in potato	4	2575	3350	+ 29.9
Recommended dose of fertilisers × farmers method in potato	2	60:60:30 3800	40:30:40 3400	— 11.7
Recommended package of practices of chrysanthamum × farmers method	1	5200	40:60:40 6800	+ 30.76
Leaf blight control in Hy. maize spray Dithane M-45 vs no spray	6	1731	1931	+ 11.46
Control of leaf blight of potato by spraying mancozeb	6	2916	3683	+ 25.96

**Extension Education Unit, Raichur**

*Rabi 1983-84*

**Popularising vegetable cowpea**

Bellary	5	—	1580
Siruguppa	1	—	2600
Sindhannur	1	—	2400
Yadgir	1	—	1842
Bidar	2	—	3075.5

1	2	3	4	5
Use of pianofix for better fruit set in chilli				
Bidar		7200	7600	+ 5.5
Control of aphids in safflower by Ragor				
Yadgir		126	230	+ 82.5
Popularising Keerti wheat				
Bidar		960	1100	+ 14.58
<i>Kharif 1984-85</i>				
Popularising gypsum application to groundnut				
Yadgir	4	125	189	+ 51.2
Fertiliser management in paddy				
Yadgir	10	760	1193	+ 56.9
Gangavathi	1			
Introduction of Mangala paddy in saline soils				
Raichur	1	820	1160	41.4
Popularising Mandya Vani paddy				
Yadgir	1	1575	1680	+ 6.7
Popularising vegetable cowpea				
Bellary	4	—	2980	—
Composite fish culture				
Gangavathi	12	—	1200	—
Manvi	2	—	1400	—
Raichur	1	—	1000	—
Fodder demonstrations				
Bellary	1(NB-21)	—	Contd.	
Reclamation of salt affected soils				
Sindhaur	5	—	Contd.	
Gangavathi	1			

#### Extension Education Unit, Mandya

*Rabi 1983-84*

Demonstration on cultivation of watermelon				
	2	37000 kg/ha	43125 kg/ha	+ 16.56
Demonstration on cultivation of cabbage				
	2	33000 „	34675 „	+ 5.0

1	2	3	4	5
<i>Summer 1983-84</i>				
Demonstration on cultivation of groundnut—use of correct seed rate and gypsum	2	670	795	+ 18.56
Demonstration of cultivation of paddy—use of weedicides and zinc sulphate	2	2250	2455	+ 9.11
Demonstration on cultivation of potato	2	21750 kg/ha	29750 kg/ha	+ 9.20
Demonstration on cultivation of cabbage	2	27950 ,,	29750 ,,	+ 6.44

Name	No.	Water spread area	Average yield of fish in kg	Remarks
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*Fisheries*

Composite fish culture in farm ponds

Mandya (Lokasere)	1	1 Acre	1500	Stock for first time
Maddur (K.P. Doddi)	1	5 Guntas	250	-do-
Maddur (Aloor Doddi)	1	10 Guntas	yet to be harvested	-do-

**Extension Education Unit, Mangalore**

1	2	3	4	5
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*Kharif 1984-85*

Comparing rock phosphate vs super phosphate in paddy	9	1556.00	1571.11	+0.97
Comparing hinosan vs bavistin to control blast disease of paddy	9	1482.66	1515.66	+2.23

**Assistant Professor of Extension  
Agricultural Research Station, Honnavile**

*Kharif 1984-85*

Fertiliser demonstration on sugarcane	1	87.5 tons/ac	140 tons/ac	+60.34
Fertiliser demonstration on coconut plants	1	60 nuts/plant	80 nuts/plant	- 33.33

**Assistant Professor of Extension**  
**Agricultural Research Station, Kathalgere**

*Summer 1983-84*

Advantages of maintaining optimum plant population in Jaya paddy (line planting at spacing of 20 × 10 cm)	1	1905	2400	+ 26.00
Advantages of growing improved redgram (Hyd. 3c) in rainfed areas (Check Local redgram)	1	190	330	+ 73.68

**Assistant Professor of Extension**  
**Agricultural Research Station, Dharwad**

*Kharif 1984-85*

Demonstration of package of practices vs local practices in cotton crop	3	625	735	+ 17.6
Demonstration of groundnut vs local practices	2	260	350	+ 34.61
Demonstration of recommended practices vs local practices in sunflower crop	1	85	115	+ 35.29

*f) Wholefarm Demonstrations:* One hundred and twenty one wholefarm demonstrations were carried out with 121 farmers during the year by different Extension Education Units. The details are given below :

Extension Education Unit	No. of Wholefarm demonstration running in				Total
	3rd year	2nd year	1st year	Started during the year	
Bangalore	—	—	—	30	30
Dharwad	23	2	10	—	35
Raichur	—	—	—	—	—
Mandya	—	—	—	26	26
Mangalore	—	—	—	14	14
Mudigere	—	—	—	16	16
Total	23	2	10	86	121



g) *Work with Youth Clubs* : Extension Education Units have implemented programmes with 37 Youth Clubs. Details are as follows :

Extension Education Unit	No. of Youth Clubs	Demonstrations	Lectures	Training sessions	Film shows
Bangalore	15	123	53	65	12
Dharwad	9	10	1	43	—
Raichur	5	4	6	—	—
Mandya	6	24	12	12	—
Mangalore	2	—	5	1	—
Total	37	161	77	121	12

h) *Working with High Schools* : The Extension Education Units have worked with 24 High Schools. 93 visits have been made to these schools and the students of these schools were educated through 82 lesson plans relating to agricultural technology.

Extension Education Unit	Working with No. of High schools	No. of visits made	No. of lesson plans provided
Bangalore	4	51	47
Dharwad	4	5	—
Raichur	6	18	18
Mandya	2	5	5
Mangalore	8	14	18
Total :	24	93	82

#### **National Demonstrations**

During the year, the three National Demonstration Units working in the Districts of Chitradurga, Bellary and Bijapur have laid out 68 demonstrations in the farmers field as per details presented below :

National Demonstration Units	No. of specialists working	No. of demonstrations conducted				Total No. of demonstration	No. of Soil Analysis made	Field day/ Field trips	No. of participants
		One crop	Two crop	Entire farming	Spl. Demonstration				
Hiriyur	2	4	15	5	1	25	12	13	201
Siruguppa	2	20	2	—	1	23	29	2	67
Bijapur	1	20	—	—	—	20	31	6	225
Total :	5	44	17	5	2	68	72	21	493

Important National Demonstrations conducted were as follows :

*National Demonstration Unit, Bellary District*

1. Demonstration on the use of improved variety S-206, application of gypsum, seed treatment with captan and use of recommended quantities of fertilisers in case of irrigated groundnut.
2. Demonstration on the use of improved variety BSH-1 and recommended quantities of fertilisers in case of hybrid sunflower
3. Demonstration on the use of improved variety A-1, recommended quantities of fertilisers (20 : 20 : 30) in case of safflower
4. Demonstration on the use of improved CSH-5, recommended quantities of fertilisers and plant protection against cutworms in case of hybrid jowar
5. Demonstration on the use of improved variety A-1 and recommended quantities of fertilisers in case of bengalgram

*National Demonstration Unit, Chitradurga District*

1. Demonstration on the use of Pushpa, Pragathi and IET-2254 and plant protection against stem borer, brown plant hopper and blast in case of paddy
2. Demonstration on the use of improved variety Indaf-5 and recommended quantities of fertilisers in case of irrigated ragi
3. Demonstration on the use of improved variety TMV-2, use of gypsum and plant protection against 'Tikka' disease in case of irrigated groundnut

*National Demonstration Unit, Bijapur*

1. Demonstration on the use of improved variety HD-2189 and Keerthi, and recommended quantities of fertilisers in case of irrigated wheat
2. Demonstration on the use of improved variety Morden and recommended quantities of fertilisers in case of dryland sunflower
3. Demonstration on the use of improved variety, M-34-1 and recommended quantities of fertilisers in case of *rabi* jowar
4. Demonstration on the use of improved variety A-1 and plant protection in case of safflower.

**Lab to Land Programme**

The III Phase of the Lab-to-Land programme, which was started from 1-6-1984 was continued during 1984-85. Under this programme, a total of 2887 families comprising of 799 small farmers, 1244 marginal farmers and 844 landless labourers have been enrolled by the Transfer of Technology Centres (TTCs) of the University. The centre-wise details of the number of families adopted according to land holding is given below. Details of the families adopted caste-wise is also provided below :

Sl. No.	Name of the TTC's	Total No. of families adopted	No of families according to land holdings			No. of families caste-wise			
			LL	MF	SF	CS	ST	BC	Others
1.	Director of Instruction (Agri) and Campus Officer, Hebbal, B'lore	50	2	40	8	35	3	8	4
2.	The Extension Leader Extension Edn. Unit, Directorate of Extn, Hebbal, Bangalore-24	700	120	426	154	243	70	347	40
3.	The Chief Instructor Farmers Training Institute, Hebbal, B'lore	50	14	14	22	6	16	28	-
4.	Plant Scientist (Ragi) AICRP on Millets and Improvement of Minor Millets on Mobilisation of Germplasm (ICAR), GKVK, Bagnalore	50	16	34	-	22	6	17	5
5.	Senior Sunflower Breeder, Elite Sunflower Seed Production Scheme, GKVK, B'lore	50	20	25	5	20	6	16	8
6.	Chief Scientist (Dry farming Scheme and Operational Research Project on Dry Farming) (ICAR) GKVK, B'lore	50	10	40	-	30	-	18	2
7.	The Senior Scientist (Pulses) AICRP on Pulses, GKVK, B'lore	50	25	10	15	21	2	27	-

1	2	3	4	5	6	7	8	9	10
8.	Director of Instruction (Vety), Vety. College, Hebbal, Bangalore.	50	14	31	5	24	—	18	8
9.	The Leader, National Demonstration Unit, Agril. Res. Station, Siruguppa, Bellary Dist.	50	50	—	—	8	—	36	6
10.	Associate Professor of Agronomy (NARP), Agril. Res. Station, Bidar.	50	23	6	21	7	1	23	19
11.	The Leader, National Demonstration Unit, Agril. Res. Station, Bijapur.	50	—	5	45	9	—	23	18
12.	Regional Associate Director (NARP), Agril. Res. Station, Bijapur.	48	10	11	27	9	3	4	32
13.	Regional Associate Director (NARP), Reg- ional Research Station, Mudigere, Chikama- galur Dist.	45	1	32	12	8	—	13	24
14.	The Extension Leader, Extension Education Unit, Regional Res. Station, Mudigere, Chikamagalur District.	200	83	94	23	113	24	26	37
15.	Leader, National Demon- stration Unit, Agril. Res. Station, Hiriur, Chitradurga District.	50	11	26	13	14	6	30	—
16.	Director of Instruction (Agri), College of Agril. Dharwad.	50	24	11	15	7	—	17	26
17.	The Extension Leader, Extension Education Unit, Agril. College, Dharwad.	200	65	48	87	25	23	66	86

1	2	3	4	5	6	7	8	9	10
18. Senior Physiologist. (Sorghum). Sorghum Res. Station, RRS, Dharwad.	44	25	8	11	15	-	-		29
19. Animal Geneticist (AICRP) on Buffalo (ICAR). Agricultural College, Dharwad.	50	10	28	12	13	-		17	20
20. Senior Scientist (Cotton) AICRP on Cotton, Agricultural Research Station, Hebli Farm, Dharwad.	50	20	14	16	19	-		18	13
21. Director of Instruction (Home Science) and Campus Head, Rural Home Science College, Dharwad.	50	20	12	18	7	-		11	32
22. Chief Scientist, Project on Water Management, College of Agriculture, Dharwad.	50	16	22	12	10	2		19	19
23. Chief Training Organ- iser, Krishi Vignana Kendra, Hanumana- matti, Dharwad Dist.	100	22	27	51	34	-		33	33
24. Senior Scientist (Pulses), AICRP on Pulses, ARS, Gulbarga.	50	1	7	32	20	2		14	14
25. Extension Leader, Ext- ension Education Unit, VC Farm, Mandya.	200	79	77	44	34	6		140	20
26. Regional Assoc. Direc- tor (NARP), RRS, V.C. Farm, Mandya.	50	10	14	26	5	-		40	5
27. The Rice Breeder, AICRP (Rice), RRS, Mandya.	50	25	3	22	2	6		33	9

1	2	3	4	5	6	7	8	9	10
28. The Extension Leader, Extension Education Unit, RRS, Raichur		100	37	20	43	37	8	50	5
29. Regional Assoc. Direc- tor (NARP), R R S. Raichur.		50	13	18	19	8	—	40	2
30. Regional Assoc. Direc- tor (NARP), Agril. Res. Stn., Navile, Shimoga.		50	23	21	6	2	—	47	1
31. Director of Instruction (F) and Campus Head, Fisheries College, Mangalore.		50	44	6	—	3	6	21	20
32. Regional Assoc. Direc- tor (NARP), Roman Catholic Church Bldg. Agril. Res. Stn., Brahma- var, South Canara Dist.		50	3	47	—	—	—	22	28
33. The Extension Leader. Extn. Edn. Unit, Fishe- ries College, Mangalore.		100	8	57	35	4	8	15	73
Total		2887	844	1244	799	814	198	1237	638

#### **Activities undertaken under the Lab to Land Programme**

A total of 1081 crop demonstrations were conducted under the programme.  
Important crops on which demonstrations conducted were :

<i>Crop</i>	<i>No. of demonstrations</i>
Paddy	169
Ragi	144
Cotton	55
Ragi and dolichos	261
Ragi + redgram	163
Groundnut + redgram	101

Other important programmes with the Lab to Land families included the following activities :

	<i>No. of families included</i>
1. Sericulture	28
2. Goat and sheep rearing	388
3. Piggery	42
4. Dairy	152
5. Fishery	2
6. Supply of Agricultural tools	51

#### ***Village adoption programme***

The University on suggestion made by the Government of Karnataka has taken up village adoption programme under the Government of India new 20-point programme. During the period under report education programmes in Dryland Agriculture, Pulses Production, Oil Seed Production and other aspects related to agriculture and allied fields have been organised in 47 villages under the village adoption programme of the University. Details are as follows :

Villages	Taluk
1	2

#### ***Extension Education Unit, Hebbal***

1. Neralur	Anekal
2. Agrahara	Bangalore North
3. Ganjurpalya	Bangalore South
4. Chikkadigenahalli	Chikkaballapur
5. Kodagurki	Devanahalli
6. Dodthumkur	Doddaballapur
7. Rampur	Gowribidanur
8. Padavanagere	Kanakapura
9. Vadaganahalli	Malur
10. Kerekathiganur	Nelamangala
11. Chamanahalli	Ramanagaram
12. Chikkaghatiganabbe	Hoskote
13. Matha	Magadi

#### ***Extension Education Unit, Dharwad***

14. Neeralakatti	Dharwad
15. Gobbaragumpi	Navalgund
16. Harthi	Gadag

1	2
17. Rainapur	Soundatti
18. Sherewad	Hubli
19. Hirehonnahalli	Kalagatagi
20. Kallihal	Haveri
21. Benakanakonda	Ranjibennur
22. Hangarki	Dharwad
23. Marihal	Belgaum
<i>Extension Education Unit, Raichur</i>	
24. Chikmadival	Gangavathi
25. Passpool	Yadgir
26. Gorebal	Sindhanur
27. Mallapur	Raichur
28. Betdur	Manvi
29. Honnalli	Bellary
30. Nandur	Gulbarga
31. Bhujanganagar	Sandur
32. Mariyammanapalya	Hospet
<i>Extension Education Unit, Mandya</i>	
33. Machalli	Mandya
34. Ailordoddi	Maddur
35. Kenchanahalli	Nagamangala
36. Malligere	Pandavapura
37. Lakshmipura	Mysore
38. Magadi	H. D. Kote
<i>Extension Education Unit, Mangalore</i>	
39. Kollya-pilar	Mangalore
40. Atradi	Udupi
41. Uppinekunduru	Kundapur
42. Peraje	Bantwal
43. Nalkur Guthigar	Sullya
44. B. Shettigere	Virajpet
<i>Agricultural Research Station, Honnavile</i>	
45. Bidar	Shimoga
<i>Agricultural Research Station, Kathalgere</i>	
46. Kumbalur	Honnali
47. Belalagere	Channagiri



The details of the number of farmers educated and the educational activities conducted with regard to promotion of technology in agriculture and allied fields is given below :

Extension Education Units/Res. Stations	No. of villages adopted	No. of farmers worked with in relation to different technology				Number of activities organised				
		Dryland Agri-culture	Pulse Produc-tion	Oilseeds Produc-tion	Others	Meet-ings	Film Shows	Trg. Pro-gram-mes	Field trials	Lec-tures
EEU, Hebbal	13	232	1080	129	170	252	4	106	60	115
EEU, Dharwad	10	607	885	656	125	84	2	47	11	—
EEU, Raichur	9	61	8	30	199	107	8	51	56	47
EEU, Mandya	6	21	3	18	50	86	1	7	—	3
EEU, Mangalore	6	—	—	—	810	48	—	6	—	—
Asst. Prof. Extn.										
ARS, Honnavile	1	—	—	—	—	12	—	6	157	—
Asst. Prof. Extn.										
ARS, Kathalagere	2	—	—	—	5	—	—	6	157	—
Total	47	921	1976	833	1359	589	15	229	441	165

#### Extension work carried out by College Departments

The Scientists of the College Departments in different colleges of the UAS assisted in the Extension work by way of activities like conducting trials and demonstrations, producing extension literature, delivering radio talks and participating in training programmes. The details of the activities implemented are given :

College Depts.	Trials/Demonstrations	Extension Literature	Radio Talks	Training Programme
1	2	3	4	5
<i>Agricultural College, Hebbal</i>				
Entomology	—	—	2	3
Microbiology	2	—	—	4
Horticulture	—	9	1	13
<i>Agricultural College, Dharwad</i>				
Seed Technology	—	—	1	6
Agronomy	—	2	7	17
<i>Fisheries College, Mangalore</i>				
Fishery Biology	—	7	1	2
Aquaculture	—	—	—	2

1	2	3	4	5
Fishery Oceanography	-	-	-	1
Fishery Economics	-	-	-	2
Fishery Processing Technology	-	-	1	2
Statistics Unit	-	-	-	1
Biochemistry	-	-	-	2
Fishery Engineering	2	1	-	1
<i>Veterinary College, Hebbal</i>				
Vety. Pharmacology	-	-	-	7
Vety. Pathalogy	-	-	1	3
Animal Genetics and Breeding	-	3	-	-
Animal Nutrition	-	1	-	6
Gynaecology and Obstetrics	-	-	-	1
Total	4	23	14	73

#### **Extension Programme on Bhagyalakshmi Biogas Plants**

The Directorate of Extension is closely involved in biogas programme under 20-point programme of Government of India.

The different items of work under this programme include.

(a) *Construction of biogas plants under the technical supervision of the Directorate of Extension :* During the year, different field units of the Directorate of Extension have provided technical assistance to farmers in constructing 32 Bhagyalakshmi Biogas Plants. The unit-wise details of the biogas plants constructed are provided below :

Name of the Unit	No of plants constructed by farmers with the technical assistance of staff of the Directorate of Extension
1. Extension Education Unit, Hebbal	19
2. Extension Education Unit, Mandya	3
3. Extension Education Unit, Mudigere	10
Total	32

(b) *Training programmes on operation, maintenance and rectification of biogas plants* : During the year the University organised 6 Training Programmes on operation, maintenance and rectification of Biogas plants for Gobargas Supervisors of the Blocks and Extension workers of the State Department of Agriculture as per details given below :

Name of the Training Centre	Date of Training	No. of persons trained
a) Krishi Vignan Kendra,	1) 28-5-84 to 2-6-84	10
Hanumanamatti	2) 2-7-84 to 7-7-84	16
	3) 8-11-84 to 13-11-84	29
b) Farmers Training Institute,	4) 28-5-84 to 2-6-84	19
Hebbal	5) 2-7-84 to 7-7-84	17
	6) 5-11-84 to 9-11-84	24
		Total 115

(c) *Users training courses on Biogas Technology* : 25 One-day users training courses for farm women were organised involving farm women as per details :

Institution	No. of Courses	No. of farm women trained
a) Kirshi Vignyan Kendra,	12	837
Hanumanamatti		
b) Farmers Training Centre,	13	650
Hebbal		
Total		1487

(d) *Rectification of non-functioning biogas plants* : At the request of the State Government, 23 experts of the University Directorate of Extension have helped farmers in rectifying non-functioning Bhagyalakshmi Biogas plants. During the year 119 plants have been rectified.

### **Bakery Training**

The Bakery Training Unit at Hebbal has organised 2 long-term training programmes of 20-weeks duration involving 30 participants and 4 short-term training programmes of 4-weeks duration involving 20 participants. The Bakery Training Units at Hebbal and Dharwad have organised 43 and 16 short-term courses of 3-days duration respectively.

<i>Type of course</i>	<i>No. of batches</i>	<i>No. of participants</i>
1. Long term training programme (20 weeks course) by Bakery Training Unit, Hebbal	2	38
2. Short term training programme (4 weeks course) by Bakery Training Unit, Hebbal	4	20
3. 3-day short courses for ladies		
a) Bakery Training Unit, Hebbal	43	1791
b) Bakery Training Unit, Dharwad	16	268

K. A. JALIHAL  
*Director of Extension*

## **PART V**

### **COMMUNICATION CENTRE**

The Communication Centre continued to serve the faculty, students and supporting departments through its publications, photography and printing works. The periodicals and publications brought out by the Communication Centre during the year are as detailed below :

#### ***Periodicals***

1. *Mysore Journal of Agricultural Sciences* : Six quarterly issues comprising of Vol. XVI issue Nos. 2, 3 and 4, as also Vol. XVII Nos. 1, 2 and 3 were printed and published. These issues covered 108 research papers and 233 theses abstracts relating to Plant Sciences, Animal Sciences, Fisheries Sciences and Social Sciences. Many Agricultural Scientists and the scientific institutions in India and abroad continued to be the subscribers for this Journal. Many International and National abstracting agencies have utilised this journal too, in their publications.

2. *Current Research* : Five combined issues viz., Vol. XI, No. 11-12 ; and Vol. XII, Nos. 1 to 12 (Quarterly) were printed and published. Six feature articles, 38 research news articles and 39 short research notes were covered in these issues. This Journal provides an insight into the latest research trends in agriculture, animal husbandry and allied subjects.

3. *Krishi Vignana* : Three issues comprising of Vol. IX, No. 4, and combined issues of Vol. X, Nos. 1-2 and 3-4 were published. This kannada publication has a wide circulation of 12,000 copies and it enjoys popularity among farmers of the State.

#### ***Other Publications***

*U. A. S. Diary* : Ten issues comprising of Vol. XIX, Nos. 3 to 12 covering the period of Dec. 1983 to Sept. 1984 were released. This Diary is meant for internal circulation and serves as an important reference material to the teaching and non-teaching staff of the University.

**U.A.S. Budget :** The Budget for 1985-86 and revised Budget for 1984-85 running to 529 pages was printed in two parts.

**Series Publications :** The following english publications were brought out during the year.

- i) Technical Series : Studies on Ecology of the Rice Brown Plant Hopper. No. 45; pp : 45.
- ii) Miscellaneous Series : Comments on Institution Building and Institution Management. No. 33 ; pp : 15.

**Books published under Government of India Text Book Project (Department of Kannada Studies)**

**ಭಾಷಾಂಶರ ಗ್ರಂಥಗಳು :**

1. ಆಧುನಿಕ ಆಹಾರ ಸೂಕ್ಷ್ಮಜೀವಿ ವಿಜ್ಞಾನ
2. ಮಂಗಳನ ಭೌತಿಕ ಗುಣಧರ್ಮಗಳು
3. ಇಪ್ಪತ್ತೊಂಬತ್ತನೆಯ ದಿನ

**ಮೂಲ ಗ್ರಂಥಗಳು :**

1. ತ್ರಿಕೋನ ಮಿತಿ
2. ಸಂಗಂಧ ದ್ರವ್ಯ ಸಸ್ಯಗಳು
3. ಜೀವಶಾಸ್ತ್ರ ಪಾರಿಭಾಷಿಕ ಶಬ್ದಕೋಶ
4. ಜೀವಗಣಿತ ಪರಿಚಯ ಭಾಗ-2
5. ಪ್ಲಾಂಟೇಷನ್ ಬೆಳೆಗಳಲ್ಲಿ ಕೀಟ ಹತೋಟಿ

**Wall Calendar :** A Calendar in Kannada for the year 1985 was printed and released for the use in UAS Offices.

**Convocation material :** The address of the Chief Guest, Welcome Address of the Vice-Chancellor in addition to Ceremonial sheets were printed in the UAS Press.

**UAS Printing Press**

The works undertaken in the press during the year under report include : six issues of 'Mysore' Journal of Agricultural Sciences' ; five combined issues of 'Current Research' ; ten issues of UAS Diary. an UAS Budget book, two series publications and three Kannada text books. In addition, the number of job works completed during the year were 280, the labour charges of which amounts to Rs. 1,02,857. The job works include the works entrusted mostly by the offices of the Comptroller, Registrar, Administrative Officer and Estate Officer.

**B.A.Ts Preferred**

During the period 266 BATs valued at Rs. 1,76,531-60 were preferred, out of which 149 BATs of the value of Rs. 88,718-30 were adjusted. In addition, 11 BATs claimed during 1983-84 were also adjusted during the year, contributing to an additional amount of Rs. 5,542-45.

**Photographic Unit**

The Unit continued to meet the photographic requirements of the teaching, research and extension staff as well as the students of this University. Two Laboratory Technicians were appointed to strengthen the staff position.

The progress achieved under this unit was as follows :

1. Photographs taken	:	1103
2. Films developed (roll)	:	39
3. Preparation of Slides (B&W)	:	646
4. Enlargements (assorted)	:	1411
5. Specimen photographs	:	23
6. Photo micrographs	:	98
7. Clinical photographs	:	30
8. Recopied photographs	:	442

Twenty six University programmes/functions were covered and 504 photos were taken for processing. In addition the following Video recording were made :

1. Rodent Control		
Dept. of Vertebrate Biology	—	2 hours duration
2. XIX Convocation	—	1 hour duration
3. Dry Land Agriculture	—	1 hour duration

**Exhibition**

A few charts and photographs were replaced and thus updated the information in the exhibition hall attached to Communication Centre.

The Editor and Associate Editor continued to be involved in teaching and guiding the P. G. students.

K. M. JAYARAMAIAH  
*Editor*  
*Communication Centre*

## **PART VI**

### **CAMPUS DEVELOPMENT**

#### ***GKVK Campus***

The building for the College of Agriculture which was initiated during the year 1983-84 from out of the grants from ICAR and the State Government, recorded substantial progress and an expenditure of Rs. 80.00 lakhs has been incurred during the year. The U.G. Hostel building taken up at a total cost of Rs. 42.00 lakhs inclusive of furniture and having an accommodation for 180 students has been completed. The construction of seed processing building, cold storage and administrative block and residential units etc., at a total cost of Rs. 16.22 lakhs which were taken up under II National Seeds Project, have been completed and have been handed over to the Users Department. Additional irrigational facilities were also provided under the Project, by drilling 4 bore wells, with a total yield of about 10,000 gallons per hr, including providing sprinkler irrigation system at a total cost of about Rs. 6 lakhs. Additional facilities were also provided to the schemes for the accommodation to their laboratories and offices by constructing a first floor to the existing buildings at a cost of Rs. 4 lakhs.

#### ***Hebbal Campus***

To provide laboratory facilities for the newly started Dairy Science College, a building for Dairy Technology was initiated for execution during 1983-84. The building recorded enough progress during the current year with an expenditure of Rs. 15.10 lakhs. In order to meet the increased demands from the girl students for hostel accommodation an extension to the existing Girls Hostel building was initiated during 1983-84 and the building has been completed in all respects during the current year incurring a total expenditure of Rs. 4 lakhs inclusive of furniture. In addition, the construction of Poultry buildings under the ICAR Scheme at a cost of Rs. 4 lakhs was completed during the year. A Postgraduate Laboratory building with Seminar Hall for Postgraduate Students in Poultry Science was initiated for construction during the current year at an estimated cost of Rs. 4 lakhs.

#### ***Dharwad Campus***

The U.G. Hostel building at a cost of Rs. 13.00 lakhs taken up for construction under ICAR grants recorded satisfactory progress and an expenditure of Rs. 10.00 lakhs has been incurred so far. This will accommodate 60



students and is likely to be completed during 1985-86. Additional accommodation for the Girls Hostel at a cost of Rs. 3.30 lakhs and construction of D type quarters at a cost of Rs. 3.00 lakhs which were taken up for construction from out of ICAR grants and the Hospital building at a cost of Rs. 1.00 lakh from out of State funds have been completed in all respects and handed over to the Users Department. The University also initiated construction of Laboratory building for the Microbiology Department during the current year and this building is expected to be completed during 1985-86.

Additional irrigational facilities by providing two new bore wells and construction of irrigational channels for the Horticulture Department were also provided during the year. The University was able to complete the formalities required for the acquisition of Kelegere Water tank with the Hubli-Dharwad Municipal Corporation and took over possession of the tank during February 1984.

#### ***Mangalore Campus***

The Postgraduate Hostel building initiated during 1983-84 at a cost of Rs. 3.20 lakhs from out of ICAR and State Government grants has been completed in all respects. In order to provide laboratory facilities for Fisheries By-products Departments, the University has initiated the construction of a By-Products Laboratory at the Technology Wing of the Fisheries College, Mangalore during the current year.

Under NARP Sub-Project sanctioned for Agricultural Research Station, Bramhavara, the University initiated construction of Laboratory building, Trainees Hostel and Staff Quarters at a total cost of Rs. 39.6 lakhs. An expenditure of Rs. 32.00 lakhs has been incurred during the current year and the works are likely to be completed in the early part of 1985-86. Necessary efforts are being made to provide farm facilities and irrigational facilities at this Research Station for the Research work under the Sub-Project.

The Laboratory building sanctioned under Multistate Cashew Research Project was also initiated during the year at Agricultural Research Station, Bramhavara.

Under the II National Seeds Project, one office building, 7 Units of Staff Quarters and one Implement Shed was constructed at Agricultural Research Station, Kandli in addition to providing irrigational facilities to lift about one cusec of water from the Yagachi river.

#### ***Raichur Campus***

In view of starting of the College of Agriculture at Regional Research Station, Raichur, the University took up preliminary planning works to revise

the Master Plan and also for the construction of College building and other subsidiary buildings. As an interim measure residential facilities for the students have been provided by making some temporary arrangements.

The University is planning to construct a Laboratory building at a cost of Rs. 6.00 lakhs for black cotton soil research with the financial assistance from CADA.

#### **Bidar**

In view of the decision to start a Veterinary College at Bidar, the University has initiated necessary action for acquisition of Government lands through revenue authorities. The University is also taking action to identify the facilities required to be built up at this Campus so as to prepare a Master Plan and to initiate the urgent works.

The University has initiated construction of Laboratory building and staff quarters at the Agricultural Research Station, Bidar under NARP Sub-Project at a total cost of Rs. 12.35 lakhs. The works have recorded a good progress. The buildings are likely to be completed during the early part of 1985-86.

The irrigational facilities at this Station were also augmented by digging an open well at the newly acquired land.

Under the NARP Sub-Project, the University initiated the construction of the Laboratory building, Staff Quarters, Trainees Hostel and an Overhead Tank at Agricultural Research Station, Bijapur. These works also recorded good progress and they are likely to be handed over during March, 1985. Additional farm facilities such as fencing the farm boundary, construction of a rat proof godown, which were also initiated at this Station have been completed.

Besides the above, the University has also initiated construction of Laboratory buildings, Trainees Hostels and Staff Quarters at Shimoga and Mudigere under the National Agricultural Research Sub-Projects, in addition to farm structures and other irrigational facilities. All the works have recorded a good progress and they are expected to be completed in the early part of 1985-86.

#### **Other Research Stations**

The University has initiated construction of Laboratory building at Agricultural Research Station, Gulbarga at a cost of Rs. 6 lakhs. During the current year an expenditure of Rs. 3 lakhs has been incurred and this building is expected to be completed during 1985-86.

Additional physical facilities like: (1) Construction of Threshing Yard at Honnavile and Gulbarga, (2) Rat Proof Godowns at Siruguppa, Nippani, (3) Cattle shed at Ullal, Kathalgere and Nippani, (4) Fencing at Siruguppa,

(5) Green Leaf tying yard at RTRS, Shimoga were completed during the year. The available irrigational facilities at different stations were augmented by (1) digging open wells at Raichur and Bidar (2) Drilling bore wells at Hebbal, GKVK, Chintamani, Kandli, Mudigere, Ullal, Hiriyur, Kathalgere, Dharwad and Arabhavi.

#### **Land Acquisition**

The University was able to acquire 130 acres of lands at Gulbaraga and about 11 acres of land at Mudigere. Government orders releasing government lands to the extent of 162 acres at Mudigere and 29 acres at GKVK have been received. The actual possession of the land is yet to be taken over, to provide additional land for irrigation and research work.

#### **Transport**

To meet the increased demands for the transport facilities at Hebbal, GKVK and Dharwad Campuses, the University added one bus at Hebbal Campus and one bus at Dharwad Campus to the existing fleet during the current year.

In order to provide transport facilities to the newly started Colleges, the University added one bus, one car and one van each to the Agricultural College at Raichur and Veterinary College at Bidar.

Two Jeeps and one van were added to the existing fleet of vehicles under NSP/II.

With the engagement of private security agency for watch and ward activities at the Main Campuses at GKVK and Dharwad, there was a marked improvement in the security arrangements, and the thefts and pilferages were kept under check during the year 1984.

The Estate Officer expresses his sincere thanks to all his colleagues, staff members of the Estate Branch for their co-operation extended to him during the year under report.

B. VENKATASWAMY  
*Estate Officer*

## **PART VII**

### **RESOURCES AND FINANCIAL ESTIMATES**

#### **1. Block Grants**

The non-lapsable lump sum Block Grant payable by the Government of Karnataka to the University under Section 35 of the UAS Act has been enhanced from Rs. 520.00 lakhs to Rs. 540.00 lakhs for the year 1984-85. The State Government have also released a sum of Rs. 40.00 lakhs due for the year 1983-84 during March 1985. There were several increases in D.A. (9 times) during the year 1984-85 and the State Government have been requested to enhance the Block Grants by Rs. 60.00 lakhs in this behalf. The State Government, however, have not provided additional grants required for the year 1984-85 and have indicated that the same would be considered after the audit of the accounts of the University is updated. The State Accounts Department have so far completed audit of accounts up to the end of 1981-82 and the audit for the remaining period is in progress. In view of limited grants, the University has to exercise restraint in filling up of vacant posts, as well as newly created posts besides economising the expenditure under office contingencies, maintenance of vehicles and other non-recurring charges including farm operations. However, this inevitable curtailment of expenditure has indirectly affected the quantum of internal resources as well as research work programmed in the University during the year. The State Government is again addressed to consider the request for enhancement of grants suitably.

#### **2. Development Grants**

##### **(a) State Government Sector**

A sum of Rs. 239.00 lakhs was released to the University during the year 1984-85 by the State Government, out of which Rs. 40.00 lakhs was towards Research being the 25 per cent share of the State Government for Co-ordinated Research Projects sanctioned by the ICAR on 75 : 25 per cent basis. The remaining amount of Rs. 199.00 lakhs was towards various development programmes undertaken by the University during the year 1984-85. Out of Rs. 199.00 lakhs, Rs. 39.00 lakhs was the special allocation made by the State Government towards the Establishment of two new Colleges viz., Agricultural College at Raichur and the Veterinary College at Bidar. The rest of the money viz., Rs. 160.00 lakhs was utilised broadly on the following items during the year 1984-85 :

- i) Creation of additional irrigation facilities at Hebbal, GKVK, Dharwad, Raichur Campuses and at other Research Stations, viz., Mudigere, Arabhavi, Arasikere, Ankola, Annigere, Bailhongal, Chintamani, Hagari, Hiriur, Honnaville, Ullal, Kathalgere, Sankeswar, Sirsi and Kandli.
- ii) Creation of additional physical facilities like construction of farm buildings at GKVK ; Rat Proof Godowns at Mudigere, Bijapur, Nippani and Siruguppa ; construction of Cart bridge at Dharwad ; threshing yard and field laboratory at Gulbarga ; fencing the farm at Siruguppa ; additional physical facilities for livestock maintenance at the Dairy Unit, Hebbal, Cattle shed at Mudigere, Hanumanamatti, Kathalgere, Ullal and Nippani.
- iii) Construction of II Units of Girls Hostel at Hebbal and P. G. Hostel at Mangalore.
- iv) Staff quarters at Honnaville, Chintamani, Kathalgere and Madenur.
- v) Extension to the Dispensary at Agricultural College, Dharwad.
- vi) Construction of D. Rajagopal Bhavan at Hebbal.
- vii) Asphalting the road leading to the Guest House at Dharwad.
- viii) Additional facilities to the existing Soil Science Laboratory at Raichur.
- ix) Other items of work where state funds was partly utilised are for the construction of Agricultural College building at GKVK, Postgraduate Laboratory at Poultry Farm at Habbal, Free-stall housing Heifer Paddock at Dairy, construction of first floor to Bio-gas Unit at Dharwad, Animal Science Unit at Dharwad, Fish Processing By-products Laboratory for the Technology Wing at Fisheries College, Mangalore.

**(b) ICAR Sector**

A sum of Rs. 40.81 lakhs was released by the ICAR during the year 1984-85. The total outlay provided by the ICAR during the VI Plan period towards developmental activities of the University is to the extent of Rs. 295.41 lakhs. The major items of works taken up during the year 1984-85 out of ICAR funds are :

- i) Construction of Agricultural College Building at GKVK (in progress).
- ii) Dairy Science College at Hebbal (in progress)
- iii) Construction of Undergraduate Hostel at GKVK.
- iv) Construction of Hostel at Dharwad (in progress)
- v) Staff quarters at Dharwad (completed)

Besides the above, funds were also provided for purchase of a Computer to the University at GKVK Campus.

Futher. equipments were purchased for the teaching institutions, books for the Library at GKVK, Dharwad and Mangalore Campus, out of ICAR funds.

### 3. *New ICAR Co-Ordinated Research Projects*

Following are the new Co-ordinated Research Projects sanctioned by the ICAR during the year 1984-85.

- i) Effect of termites and soil fertility, Hebbal.
- ii) AICRP on Agroforestry, Dharwad.
- iii) Adhoc Research Project on production of Agronomy and Management Systems of Subabul.
- iv) Interaction between nitrogen fixation bacteria.
- v) AICRP on Agro Meteorology, GKVK.
- vi) AICRP on dryland and phism of haemoglobin and transferring in normal and cattle affected in Theillieriosis, Hebbal.
- vii) Conjunctive use of groundwater and surface water.
- viii) Methodology for simultaneous determination of factor and product prices.
- ix) Adhoc Scheme on synergistic effects of VA Micorrhyza (VAM) with Rhizobion to improve nodulation and nitrogen fixation of legumes.
- x) Adhoc Scheme on 'Rhizobion strain improvement maintenance of Rhyzobium germplasm and improvement of carrier and inoculation techniques.
- xi) Operational Research Project for Research Development on Water Scheme basis.
- xii) Adhoc Scheme on evolving high yielding strains of plasta.

The number of All India Co-ordinated Research Projects assigned to this University during the year 1984-85 is 113 involving a sum of Rs. 266.47 lakhs as against 108 schemes that were in operation during the year 1983-84 amounting to Rs. 205.00 lakhs. Twenty five per cent of the expenditure in respect of 68 schemes sanctioned by the ICAR is met out of State Government Development grants provided under Agricultural Research.

#### 4. Schemes Sponsored by Other Agencies

The University also received funds from several other agencies *viz.*, ASPEE Research and Development Foundation Fund, Bombay, Mangalore Chemical & Fertilizers Ltd., Mangalore, Wheat Associates, Department of Atomic Energy, Government of India, Karnataka Dairy Development Corporation, World Bank assistance through the Department of Sericulture, Government of Karnataka, PL 480, Karnataka State Council for Science and Technology, International Atomic Energy Agency (IAEA) Vienna, Austria, Hindustan Liver Limited, Coffee Board, Karnataka Compost Development Corporation etc. In addition, funds have been provided also by the World Bank for the National Seed Project-II for production of foundation seeds at GKVK, Hassan and Kathalgere.

#### 5. Internal Resources

The receipts from internal resources of the University *viz.*, rent from buildings and hostels, fees, farm receipts, sale of publications and other miscellaneous receipts, is Rs. 162.38 lakhs for 1984-85 as against the sum of Rs. 172.23 lakhs received during 1983-84. There is a marginal decrease in farm receipts during the year.

#### 6. Accounts for 1983-84 and 1984-85

The expenditure for the year 1984-85 over the previous year is detailed below :

Particulars	Accounts for 1983-84	Accounts for 1984-85
(Rupees in lakhs)		
(A) Non-Plan		
Direction	201.292	217.790
Teaching	258.827	285.628
Research	190.786	208.146
Extension	31.253	36.429
State Govt. <i>w.e.f.</i>		
Sub-total (A)	682.158	747.993
(B) Schemes sponsored by other agencies	64.564	34.915
Total (A) & (B)	746.722	782.908

Particulars	Accounts for 1983-84	Accounts for 1984-85
<b>(C) Plan</b>		
<i>Five Year Plan schemes of the University</i>		
a) Development Expenditure	197.966	323.901
b) ICAR/IBRD/NARP Project	64.760	154.808
c) University Seed Production Programme	3.736	8.244
d) ICAR Co-ordinated Research Projects	205.194	257.244
e) Government of India Schemes	9.438	12.528
f) State Plan Schemes (Adhoc Schemes)	17.700	19.613
g) Second National Seed Project	45.172	63.409
Total	543.966	839.747
Grand Total (A) + (B) - (C)	1290.688	1622.655

#### 7. Budget for 1985-86 and revised estimate for 1984-85

The Statement showing the summary of Budget Estimates of Receipts and Expenditure for 1984-85 and 1985-86 is as follows :

	Revised Estimates for 1984-85	Budget Estimates for 1985-86
	1	2
	3	
(Rupees in lakhs)		
<i>Receipts</i>		
1. Grants from State Government	847.424	978.249
2. ICAR, Govt. of India and other Agencies	636.348	296.491
3. Income from Fees	7.824	7.869
4. Income from University Property, Farms, Rent and other Misc. receipts	151.680	171.180
5. Other Misc. income	19.100	21.480
Total Receipts	1662.376	1475.269



	1	2	3
<i>Expenditure</i>			
1. University Administration		221.273	278.129
2. Resident Teaching		300.317	367.474
3. Research		216.520	253.641
4. Extension		40.480	59.299
5. D.A. w.e.f. 1.8.84 and 1.11.84		6.500	12.000
Total Expenditure		785.090	970.543
Schemes sponsored by other Agencies		35.613	19.362
Total		820.703	989.905
<i>Five Year Plan Schemes</i>			
6. a) Development Schemes financed by ICAR and State Government		328.295	221.829
b) NARP Project financed by World Bank through ICAR and State Government		202.936	45.249
c) University Seed Production Programme		10.127	---
d) ICAR Coordinated Research Projects		266.465	254.896
e) Government of India Schemes		17.100	17.716
f) State Plan Schemes (Adhoc Schemes)		27.802	31.819
g) Second National Seed Project		70.954	55.486
Total Plan Schemes		923.679	626.986
Total		1744.382	1616.891
Anticipated Savings		(—)26.466	(—)53.014
Net Total		1717.916	1563.877

### 8. *Financial assistance for development schemes*

Assistance Received from the State Government, ICAR, KDDC and other Agencies towards Development Schemes during the year 1984-85 is furnished below :

	(Rupees in lakhs)
1. State Government (Development grant)	239.00
2. State Govt. Adhoc Schemes	9.88
3. Government of India	11.41
4. <i>Indian Council of Agricultural Research :</i>	
a) Co-ordinated Projects	141.66
b) NARP Projects	119.29
c) Second National Seed Project	5.27
<i>Grants from Other Sources</i>	
5. PL-480	3.73
6. Wheat Associates, USA	0.06
7. Aspee Research Foundation Fund, Bombay	1.65
8. Mangalore Chemicals and Fertilizers	1.11
9. Coffee Board	0.51
10. International Atomic Energy Agency, Vienna	0.25
11. Karnataka Compost Development Corporation	0.74
12. Science Research, Delhi	0.38
13. Central Coir Research Institute, Kerala	0.99
14. Department of Atomic Energy	0.55
15. Karnataka Dairy Development Project	20.95
16. United Nations Children Fund	0.05
17. ICRISAT, Hyderabad	0.36
18. DANIDA Project on Pressed Sardine, F.A.O.	0.60
Total	<u>558.44</u>

The University gratefully acknowledges the receipts of grants from these agencies.

H. M. NAGABHUSHANA  
Comptroller

## APPENDICES

## APPENDIX I

### LIST OF PERSONS APPOINTED DURING 1984-85

<i>Sl. No.</i>	<i>Name</i>	<i>Designation and Subject</i>	<i>with effect from</i>
1	2	3	4
<b>Teaching</b>			
PROFESSORS			
1.	M. P. M. Reddy	Fishery Oceanography	5-6-84
2.	Honne Gowda	Pharmacology	10-8-84
3.	Abdus Salam	Anatomy	10-8-84
4.	T. K. Das	Animal Nutrition	10-8-84
5.	Gururaj Hunsigi	Crop Production	22-10-84
6.	K. Shivashankar	-do-	11-1-85
ASSOCIATE PROFESSORS			
1.	Shakuntala Raju	Statistics	26-4-84
2.	M. R. Adwani	-do-	27-4-84
3.	M. N. Venkataram	-do-	27-4-84
4.	H. T. Gurusiddappa	-do-	9-5-84
5.	L. Siddappa	-do-	9-5-84
6.	Haridas G. Bhandari	Fisheries Byproducts	27-6-84
7.	K. M. Ponnappa	Plant Pathology	17-8-84
8.	K. T. Shivashankar	Horticulture	17-8-84
9.	K. Krishnappa	Nematology	22-8-84
10.	Gurumurthy	Statistics	17-9-84
11.	N. Vasuki	Ag. Chemistry and Soils	15-10-84
12.	B. S. Sathyan	Sericulture	18-10-84
13.	Srikant Kulkarni	Plant Pathology	31-10-84
14.	B. Shivaraj	Agronomy	22-11-84
15.	T. V. Muniyappa	-do-	23-11-84
16.	A. S. Kumaraswamy	-do-	5-12-84
17.	D. N. Raghunatha Reddy	Sericulture	17-1-85
18.	S. Thimme Gowda	Agronomy	8-2-85
19.	T. Venkatarayappa	Horticulture	11-2-85
20.	A. S. Shirwal	Central Instrumentation	11-2-85
21.	R. Venugopal	Agricultural Botany	13-2-85
22.	R. S. Kulkarni	-do-	18-2-85
ASSISTANT PROFESSORS			
1.	S. Narayana Swamy	Seed Technology	30-5-84
2.	K. S. Somanna	Physical Education	28-5-84
3.	H. N. Sathyanarayana Rao	Fishery Biology	4-6-84
4.	K. R. Dinesh	Crustacean Biology	4-6-84
5.	Ramesh M. Prabhu	Ham and Sausage	4-6-84
6.	E. Kempanna	Dairy Chemistry	6-6-84
7.	Girish	Dairy Microbiology	8-6-84
8.	R. Krishna	-do-	16-7-84

1	2	3	4
9.	M. Mohammed Nasser	Fishery Byproducts	6-8-84
10.	D. M. Gowda	Statistics	9-8-84
11.	Shantha D. Urs	Plant Pathology	28-8-84
12.	K. V. Keshavamurthy	-do-	28-8-84
13.	H. Chandrasekhar	Statistics	3-9-84
14.	M. N. Lakshmikantha Sastry	Plant Pathology	6-9-84
15.	A. K. Rokhade	Horticulture	12-9-84
16.	S. Jaganath	-do-	13-9-84
17.	Shailaja Hariraj Girwalkar	Home Science	28-9-84
18.	Kamala G. Nath	Food and Nutrition	26-10-84
19.	K. Mallikarjunaradhya	Agricultural Botany	29-10-84
20.	D. M. Mahishi	-do-	29-10-84
21.	G. N. Mohankumar	Horticulture	23-1-85
22.	S. T. Naik	Plant Pathology	31-1-85
23.	K. V. Jayaprasad	Horticulture	18-2-85
24.	C. N. Srinivasa Murthy	Ag. Chemistry and Soils	21-2-85
25.	K. R. Sreeramulu	Microbiology	28-2-85
26.	K. Somasekhara	Agronomy	28-2-85
27.	J. Vijayakumari	Food and Nutrition	22-5-85
28.	Gorur Sudarshan Ramaswamy	Assistant Instrument Engineer	22-10-84
INSTRUCTORS			
1.	C. K. Suresh	Agriculture	21-4-84
2.	T. S. Seshadri	Veterinary	30-4-84
3.	L. V. Saritha	Mathematics	4-5-84
4.	H. S. Veerappa Gowda	Fisheries	8-6-84
5.	Mohammed Naseer	-do-	8-6-84
6.	T. N. Prathapachandra	-do-	9-6-84
7.	B. V. Krishnamurthy	-do-	11-6-84
8.	B. Hanumanthappa	-do-	13-6-84
9.	A. N. Ravishanker	-do-	13-6-84
10.	B. S. Narayana Gowda	-do-	16-6-84
11.	H. R. Venkataswamy Reddy	-do-	18-6-84
12.	K. P. Lakshmikantham	-do-	2-7-84
13.	S. Krishnakumar	-do-	30-7-84
14.	N. Basavaraja	-do-	30-7-84
15.	G. N. Kulkarni	-do-	2-8-84
16.	J. Chandraprakash	Agriculture	20-8-84
17.	L. C. Veeresh	-do-	22-8-84
18.	L. H. Malligowda	-do-	23-8-84
19.	K. Narayana Gowda	-do-	23-8-84
20.	N. S. Parameshwar	Veterinary	23-8-84
21.	Srikant S. Patil	Agriculture	29-8-84
22.	B. M. Hirekurbar	-do-	1-9-84
23.	Gangadhara Gouda	Fisheries	1-9-84
24.	I. M. Mannikeri	Agriculture	4-9-84
25.	A. S. Thimmappa	-do-	5-9-84
26.	B. Basavaraju	-do-	10-9-84
27.	C. Parvathi	-do-	10-9-84
28.	N. Devakumar	-do-	10-9-84
29.	Sangama	-do-	10-9-84
30.	P. V. Kenchanagoudar	-do-	11-9-84

1	2	3	4
31.	M. Narayana Bhat	Veterinary	11-9-84
32.	Devendrappa Sangappa	Agriculture	12-9-84
33.	K. S. Ravi	-do-	12-9-84
34.	B. Nagaraju	-do-	13-9-84
35.	T. Veena	Veterinary	14-9-84
36.	H. M. Chidanandappa	Agriculture	14-9-84
37.	B. Sridhar	Veterinary	14-9-84
38.	Mallaiah	Agriculture	17-9-84
39.	A. N. Devaraju	Fisheries	1-9-84
40.	H. S. Nagesh	Veterinary	23-9-84
41.	R. S. Giraddi	Agriculture	5-10-84
42.	G. M. Varadaraju	-do-	8-10-84
43.	B. Nijalingappa	-do-	11-10-84
44.	M. V. Jagannath	Veterinary	12-10-84
45.	Shivamurthy Naik	Agriculture	12-10-84
46.	R. D. Durgaprasad	Veterinary	13-10-84
47.	R. S. Hegde	Agriculture	15-10-84
48.	F. M. Durgannavar	-do-	17-10-84
49.	Range Gowda	-do-	29-10-84
50.	R. Paramesh	-do-	31-10-84
51.	B. L. Rame Gowda	-do-	15-11-84
52.	K. H. Ramanjaneya	-do-	3-12-84
53.	Rosalind Michael	-do-	15-12-84
54.	Y. K. Kotikal	-do-	26-12-84
55.	A. N. Ganesha Murthy	-do-	8-1-85

### Research

#### PROFESSORS

1.	M. V. Nagaraja Shetty	Chief Scientist (Tobacco)	21-4-84
2.	K. T. Ramachandra	Chief Training Organiser, KVK	24-8-84
3.	B. G. Rajashekhar	Researcher, Kabbalanala Water shed Project, GKVK	12-10-84
4.	M. M. Hosmani	Sr. Agronomist	29-10-84
5.	G. D. Reddar	Chief Scientist (Dryland)	26-11-84
6.	C. J. Itnal	Researcher	17-1-85

#### ASSOCIATE PROFESSORS

1.	B. V. Patil	Entomologist	12-4-84
2.	I. G. Hiremath	Scientist-Entomology	19-4-84
3.	R. Vijayamma	Statistics, NARP	24-4-84
4.	M. K. Jagannath	Statistician	26-4-84
5.	B. N. Patil	Agrostologist	22-6-84
6.	S. Kumaraswamy	Pl. Protection Splst.	31-8-84
7.	Chikkadevaiah	Sugarcane Breeder	8-9-84
8.	S. Vijaykumar	Potato Breeder	10-9-84
9.	M. A. Narayana Reddy	Horticulture	14-9-84
10.	B. C. Uttaiiah	-do-	15-9-84
11.	D. Nanje Gowda	Nematologist	13-10-84
12.	B. Rabindra	Soil and Water Management	15-10-84
13.	V. S. Doddamani	Soil Physicist	18-10-84

1	2	3	4
14.	P. Venkataramaiah	Extension	7-11-84
15.	K. T. Krishne Gowda	Agronomist	23-11-84
16.	P. Ramana Gowda	-do-	22-11-84
17.	V. S. Veeranna	-do-	28-11-84
18.	T. K. Prabhakara Setty	-do-	23-11-84
19.	R. A. Setty	-do-	13-12-84
20.	M. V. Kulkarni	Sr. Farm Supdt.	20-12-84
21.	B. S. Gouda Reddy	Agronomy	29-12-84
22.	V. P. Badanur	Soil Physiologist	12-1-85
23.	A. N. Sudarshana Rao	Pl. Pathology	15-1-85
24.	P. C. Hiremath	-do-	17-1-85
25.	G. P. S. Rao	Fisheries Officer	21-1-85
26.	M. D. Kachapur	Agronomy., NARP	21-1-85
27.	B. Mallik	Entomology	28-1-85
28.	V. V. Sulladamath	Pl. Pathology	28-1-85
29.	K. Maharudrappa	Agronomy	25-2-85
30.	S. Rajasekharaiah	Maize Breeder	27-2-85
31.	K. Pandurangaiah	S. 2 Scientist, Soil Science	28-2-85
32.	Gavi Gowda	Entomology	10-1-85
33.	V. B. Nadagouda	Sr. Farm Supdt.,	30-3-85

## ASSISTANT PROFESSORS

1.	N. C. Narase Gowda	Farm Supdt.	14-5-84
2.	A. P. Nagaraju	-do-	14-5-84
3.	H. S. Vasudev	-do-	16-5-84
4.	N. A. Janardhana Gowda	-do-	17-5-84
5.	B. S. Lingappa	-do-	17-5-84
6.	N. S. Kambara	-do-	21-5-84
7.	H. L. Vasanthakumar	-do-	24-5-84
8.	C. M. Tippannavar	-do-	26-5-84
9.	S. L. Mohan	-do-	31-5-84
10.	B. A. Yandagoudar	-do-	1-6-84
11.	M. N. Venugopal	Fishery Microbiology	2-6-84
12.	P. Balakrishna	Farm Supdt.	6-6-84
13.	H. S. Siddamallaiiah	-do-	8-6-84
14.	M. N. Narasimha Reddy	-do-	8-6-84
15.	C. A. Chaco	Jr. Hatchery Scientist	23-6-84
16.	H. N. Narasimha Murthy	Jr. Poultry Geneticist	28-6-84
17.	M. P. Patil	Farm Supdt.	9-7-84
18.	B. M. Chittapur	Farm Manager	25-7-84
19.	S. N. Mageri	Asst. Prof.	9-8-84
20.	K. T. Pandurange Gowda	Asst. Pl. Pathologist	28-8-84
21.	Nagaraju	Jr. Pathologist	31-8-84
22.	N. M. Murali	Asst. Agronomist (DF)	31-8-84
23.	A. R. Suryanarayana Bhatta	Jr. Statistician	1-9-84
24.	A. L. Siddaramaiah	Jr. Pathologist	1-9-84
25.	B. M. Ramakrishna Reddy	Nematology	13-9-84
26.	S. I. Hanuma Setti	Scientist (S-I)	14-9-84
27.	H. B. Lingaiah	Horticulture	20-9-84
28.	A. N. Mokashi	Asst. Horticulturist	27-9-84
29.	H. S. Shivaleela	Jr. Scientist F & N	12-10-84

1	2	3	4
30.	J. Venkatesh	Asst. Pathologist	12-10-84
31.	V. Suryanarayana Reddy	Farm Manager	20-10-84
32.	P. R. Krishna Prasad	Jr. Pathologist (Sugarcane)	27-10-84
33.	M. Jayanna	Farm Supdt.	31-10-84
34.	I. F. Aftab Hussain	Crop Physiology, NARP	5-11-84
35.	H. S. Haralappa	Farm Supdt.	5-11-84
36.	Abdul Haseeb	-do-	5-11-84
37.	S. B. Devaranavadagi	-do-	17-12-84
38.	R. Krishna Manohar	Horticulture, NARP	31-1-85
39.	T. N. Krishnappa	Farm Supdt.	18-2-85
40.	V. P. Nagaliker	Asst. Agronomist	21-2-85
41.	V. Shakaranarayana	Technl. Asst.	21-2-85
42.	V. N. Shivanandam	Jr. Horticulturist	22-2-85
43.	P. Y. Kamannavar	Asst. Breeder (Seeds)	6-3-85
44.	V. Jagannath	Asst. Agronomist	8-3-85
45.	B. V. Jayakumar	-do-	11-3-85
46.	K. M. Devaraju	-do-	11-3-85
47.	B. Mallanna Gowda	-do-	11-3-85
48.	D. S. Raikar	Farm Supdt.	11-3-85

## RESEARCH ASSISTANTS

1.	H. B. Vankatashiva Reddy	Res. Assistant	6-4-84
2.	C. B. Kengar	-do-	12-4-84
3.	G. P. Puttaswamy	-do-	25-6-84
4.	Kasturiba, B.	-do-	2-7-84
5.	Azad Ismail Saheb	-do-	26-7-84
6.	M. V. Ramakumar	-do-	31-8-84
7.	C. Krishnappa	-do-	3-9-84
8.	K. Sripad	-do-	1-10-84
9.	D. L. Savithramma	-do-	9-11-84
10.	H. Ravindra	-do-	9-11-84
11.	S. Subramanya	-do-	9-11-84
12.	G. C. Kuberappa	-do-	9-11-84
13.	T. Narendrappa	-do-	10-11-84
14.	Srikantha Phadke	-do-	6-11-84
15.	S. Shashikumar	-do-	7-11-84
16.	Charles I Fernandes	-do-	12-11-84
17.	R. A. Balikai	-do-	12-11-84
18.	R. C. Gundappagol	-do-	13-11-84
19.	M. Asadulla	-do-	13-11-84
20.	N. Rajanna	-do-	14-11-84
21.	S. Chandra Naik	-do-	14-11-84
22.	B. O. Shanthanu	-do-	14-11-84
23.	S. G. Mantur	-do-	15-11-84
24.	B. M. Ramakrishna	-do-	15-11-84
25.	P. H. Ramanjani Gowda	-do-	15-11-84
26.	C. M. Kala	-do-	15-11-84
27.	R. A. Krishna Murthy	-do-	16-11-84
28.	Rajasekharappa V. Koti	-do-	17-11-84
29.	T. S. Vageesh	-do-	19-11-84
30.	K. Shama Rao	-do-	19-11-84



1	2	3	4
31.	Shivakumar	Res. Assistant	19-11-84
32.	Abusaleha	-do-	20-11-84
33.	B. T. Ningalur	-do-	20-11-84
34.	S. Rajendra Prasad	-do-	23-11-84
35.	H. Basavaraju	-do-	23-11-84
36.	K. S. Mohan	-do-	26-11-84
37.	H. Narayanaswamy	-do-	28-11-84
38.	S. Chandrashekhara S. Vaster	-do-	29-11-84
39.	Shankarappa K Meti	-do-	28-11-84
40.	V. N. Patel	-do-	28-11-84
41.	S. Lingaraju	-do-	29-11-84
42.	G. M. Patil	-do-	30-11-84
53.	K. Veenakumari	-do-	1-12-84
44.	Jayaram Gowda	-do-	3-12-84
45.	Ramesh Babu	-do-	5-12-84
46.	H. T. Nagaraju	-do-	5-12-84
47.	E. Gangappa	-do-	5-12-84
48.	T. R. Ugalavat	-do-	5-12-84
49.	M. D. Martur	-do-	10-12-84
50.	K. T. Puttarangaswamy	-do-	12-12-84
51.	T. N. Prakash	-do-	14-12-84
52.	M. Manjunatha	-do-	15-12-84
53.	K. H. Nagaraj	-do-	19-12-84
54.	V. V. Angadi	-do-	19-12-84
55.	B. S. Nandisha	-do-	5-1-85
56.	B. Jayaram Gowda	-do-	15-1-85
57.	S. P. Nataraju	-do-	16-1-85
58.	K. Srikantha Murthy	-do-	23-1-85
59.	G. S. Mahadevaiah	-do-	28-1-85
60.	B. L. Dinakar	-do-	1-2-85
61.	Govinda Naik, V.	-do-	1-2-85
62.	R. D. Savanur	-do-	5-2-85
63.	G. Satish	-do-	18-2-85
64.	A. C. Channaveeraswami	-do-	18-2-85
65.	S. M. Kaniyarnivar	-do-	20-2-85
66.	K. N. Kattimani	-do-	21-2-85
67.	S. P. Karadigudda	-do-	21-2-85
68.	P. G. Lovely	-do-	23-2-85
69.	S. Sathyanarayana Rao	-do-	28-2-85
70.	V. R. Ramakrishna Parama	-do-	28-2-85
71.	Suresh, S. Patil	-do-	1-3-85
72.	S. D. Nadiger	-do-	1-3-85
73.	B. N. Sreenivasa Murthy	-do-	9-3-85
74.	Narayanaprasad	-do-	11-3-85
75.	S. Nanjundaswamy	-do-	11-3-85
76.	K. Devaraju	-do-	25-3-85
77.	G. Gopinath	-do-	28-3-85

1	2	3	4
<b>Extension</b>			
<b>ASSISTANT PROFESSORS</b>			
1.	D. Seenappa	Aquaculture	18-6-84
2.	Y. Annaji Rao	Dairy-ANMPT	29-6-84
3.	Shivanandamurthy	Aquaculture	18-9-84
4.	T. Mune Gowda	Poultry Extn.	1-10-84
5.	K. Shivaramu	Crop Production	26-10-84
6.	Shanker	Dairy Extn.	5-11-84
7.	S. D. Kalaigi	-do-	31-12-84
<b>Extension Guides</b>			
1.	T. K. Beerappa	Extension Guide	22-6-84
2.	M. Modiletappa	-do-	25-6-84
3.	E. G. Jayaraj	-do-	28-6-84
4.	H. Hanumanthappa	-do-	28-6-84
5.	Iqbal Ahmed	-do-	4-7-84
6.	K. S. Ramesh	-do-	5-7-84
7.	S. Some Gowda	-do-	3-8-84
8.	J. Shivanna	-do-	20-8-84
9.	B. Neelakantan	-do-	22-8-84
10.	R. Shashikumar	-do-	29-8-84
11.	D. S. Janardhan	-do-	29-8-84
12.	P. Chandrasekhara Gowda	-do-	31-8-84
13.	B. N. Manjunatha	-do-	31-8-84
14.	J. Hanumantharaya	-do-	1-9-84
15.	Kantharaju	-do-	3-9-84
16.	T. G. Mahalakshmi	-do-	3-9-84
17.	D. Channa Naik	-do-	3-9-84
18.	C. K. Balachandran	-do-	3-9-84
19.	B. G. Nayananda	-do-	3-9-84
20.	S. Y. Srinivasa Reddy	-do-	6-9-84
21.	H. T. Nagaraju	-do-	14-9-84
22.	E. Narayanappa	-do-	14-9-84
23.	H. G. Sharanappa	-do-	17-9-84
24.	A. N. Bagali	-do-	24-9-84
25.	K. N. Chandre Gowda	-do-	29-10-84
26.	K. P. Chandrasekhar	-do-	31-10-84
27.	N. G. Lakshman Rao	-do-	5-11-84
28.	S. P. Halagalimath	-do-	15-11-84
29.	Surekha G. Kodamaggi	-do-	20-2-85
<b>Service Personnel</b>			
<b>Assistant Engineer (Civil)</b>			
1.	Ramesh D. Kattimani		
2.	Devaraju	-do-	
3.	K. Satish	-do-	
4.	Gopalakrishna	-do-	
5.	V. Nanja Reddy	-do-	
6.	S. Umesha	-do-	
7.	Chandrasekhar	-do-	
8.	C. Mohd. Ayubkhan	-do-	
9.	H. V. Subba Rao	-do-	
10.	H. Anjanappa	-do-	

1	2	3	4
11.	C. R. Ananda Rao	Superintendent (Accts)	
12.	D. Shivakumaraiah	-do-	
13.	Manju	-do-	
14.	Aziz Achan	Driver (LV)	
15.	S. Anjana	-do-	
16.	Chandrasekharappa Angadi	-do-	
17.	B. M. Munikrishnappa	Tractor Driver	
18.	A. Rangaswamy	-do-	
19.	Balaraja Naik	-do-	
20.	S. R. Mune Gowda	-do-	
21.	N. M. Dyamappa	-do-	
22.	P. Settaiah	-do-	
23.	C. N. Krishna Reddy	Lab. Assistant	
24.	M. D. Nanjundaraj Urs	-do-	
25.	C. Ramaiah	-do-	
26.	K. B. Hiremath	Pharmacist	
27.	H. Sukumar	Deck-hand	
28.	B. Narayana Salian	-do-	
29.	B. Jagadeesha	Life-guard	
30.	Ravindran Achari	Jr. Technician	
31.	B. Shivanna	-do-	
32.	V. Shivaraj	Lab. Technician	
33.	Venugopal	-do-	
34.	Bhasker Ullal	Driver-cum-Serang	
35.	H. Subba Rao	Store Helper	
36.	G. Manjula	-do-	
37.	Totagi	-do-	
38.	R. Hanumantharayappa	Bus Helper	
39.	Boraiah	-do-	
40.	Hanumantharao Salunke	-do-	
41.	M. C. Keshava	Guest House Cleaner	
42.	Jaya	-do-	
43.	Savithri	-do-	
44.	Krishna Settigar	Ward Boy	
45.	Kunhi Kannan	Cook	
46.	Govindappa	Workshop Helper	
47.	Nadak Jayantha Gowda	Farm man	
48.	Devadas Kava	Fisherman	
49.	Mallikarjunappa	Mali	
50.	T. Rathnamma	Messenger	
51.	Ravichandra	-do-	
52.	K. Padmappa Malgar	-do-	
53.	Sadashiva	-do-	
54.	Gangadhara	-do-	
55.	N. Sreedhara Bhandary	-do-	
56.	M. Krishna	-do-	
57.	Ramesh Moolya	-do-	
58.	Subha Naik	-do-	
59.	M. Narayana	-do-	
60.	M. Muniraju	-do-	
61.	S. M. Ganesha	-do-	

1	2	3	4
62.	Chikka	Watchman	
63.	Eswarappa	-do-	
64.	Sadananda Yedublogi	-do-	
65.	M. R. Nagara Halli	-do-	
66.	Bhaskara Poojari	-do-	
67.	T. C. Nanjeshi	-do-	
68.	K. Jayarama	Janitor	
69.	N. Narayana	-do-	
70.	John Alphose	-do-	
71.	Rajendra	-do-	
72.	B. Thimmappa	-do-	
73.	Thimmaiah	-do-	

## APPENDIX II

### LIST OF PUBLICATIONS BY THE STAFF OF THE UNIVERSITY

<i>Name of Author (s)</i>	<i>Title of the paper with the details of publication</i>
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#### AGRICULTURAL SCIENCE

##### Agricultural Botany

Ananda Rao, Gowda, A. N. S. and Satyan, B. A. (1984)	"Genotypic genus ' <i>Macrotyloma</i> '. <i>International Symposium on Genetic Manipulation in Crops</i> . Beijing, China. October 22-26.
Gowda, A. N. S. and Satyan, B. A. (1984)	" <i>In vitro</i> indication of calles and regeneration of whole plants from hypocotyle explants of cowpea ( <i>Vigna unguiculata</i> )". <i>Ibid</i> .
Jyothi, T. and Satyan, B. A. (1984)	"Isolation of high yielding and yellow mosaic virus resistant lines, in mungbean ( <i>Vigna radiata</i> L. Wilzeck) through induced mutagenesis". <i>National Seminar on New Dimensions in Pulse Research and Development</i> , JNKVV, Jabalpur, May 21-23.
Satyan, B. A., Paramesha, C. V, and Gopala Reddy, P. (1984)	"Isolation of some economic mutants in sesame ( <i>Sesamum indicum</i> )". <i>International Symposium on Genetic Manipulation in Crops</i> . October, 22-26, Beijing, China.
Satyan, B. A., Muniyappa, V. and Reddy, B. G. S. (1984)	"Resistance to horsegram yellow mosaic virus". <i>National seminar on New Dimensions in Pulse Research and Development</i> , JNKVV, Jabalpur, May 21-23, pp. 45-46.
Satyan, B.A. and Ranganatha, A.R.N. (1984)	"Problems and prospects and experimental approaches for pulse improvement in Karnataka". <i>Ibid</i> .
Satyan, B. A., Kallesh, H. G , Ananda Rao, Reddy, B. G. S. and Shiva-shankar, G. (1984)	"Incorporation of yellow mosaic virus resistance in horsegram ( <i>Macrotyloma uniflorum</i> ) through inter and interspecific hybridization". <i>Ibid</i> .

##### Agricultural Economics

Arunkumar, K. S., Chandrashekar, G. S. and Ramanna, R. (1985)	"Economics of sprinkler irrigation in Karnataka". <i>Water World</i> .
Bisaliah, S., Karamathullah, N. and Ramanna, R. (1984)	"Impact of new technology on agriculture in Karnataka". <i>Southern Economist</i> , 23.
Hanumanthajiah, C. V., Venkataram, J. V., Nagaraja, G. N. and Venkateswaralu, U. (1984)	"An optimum resource pattern for the beneficiaries of commercial bank financing of Prakasham Dt". <i>Land Bank J.</i> , 22.

<i>Name of Author (s)</i>	<i>Title of the paper with the details of publication</i>
Hanumanthiah, C. V., Venkataram, J. V. and Nagaraja, G. N. (1985)	"Performance of commercial banks in financing agriculture in Andhra Pradesh". <i>Indian Banking</i> , 10 : 14-18.
Rao, V. M. and Chandrakanth, M. G. (1984)	"Resources at the Margin : Tank Irrigation programme in Karnataka". <i>Economic and Political Weekly</i> , 19.
Sudhakar, H. R., Venkataram, J. V. and Nagaraja, G. N. (1984)	"An evaluation of performance of Regional Rural Bank in Mysore District, Karnataka". <i>Financing Agriculture</i> , 14.
Venkataram, J. V. (1985)	"Benefit cost analysis of investment in minor irrigation and land development". UAS Extension Series 14 : 45-54.
Venkatesh Reddy, K. G., Nagaraja, G. N. and Venkataram J. V. (1984)	"Economic of production of banana in Bangalore District, Karnataka". <i>Agriculture Banker</i> , 7.
Venkatesh Reddy, T., Venkataram, J. V. and Bojappa, K. M. (1985)	"Benefit cost analysis of selected horticultural enterprises". UAS Extension Series, 14 : 59-63.

### Agricultural Extension

Jayaramaiah, K. M. and Siddaramaiah, B. S. (1985)	"Youth programme". <i>Research in Extension Education</i> , ISEE (Karnataka Chapter) and KSDA, pp. 136-141.
Jayaramaiah, K. M., Sreenivasa Murthy, J. and Kusumakar, C. (1985)	"Training and visit system and other extension strategies". <i>Research in Extension Education</i> , ISEE (Karnataka Chapter) and KSDA, pp. 22-35.
Venkataramaiah, P. and Jayaramaiah, K. M. (1984)	"Unsuccessful youth club - A case study". <i>Youth Karnataka</i> , Directorate of Youth Services and Sports, 43 : 27-29.
Venkataramaiah, P. and Jayaramaiah, K. M. (1984)	"Farm youth frustration". <i>Youth Karnataka</i> , Directorate of Youth Services and Sports, 44 : 25-28.

### Agricultural Microbiology

Alagawadi, A. R. and Reddy, T. K. R. (1985)	"Effect of Trifluralin on Rhizobium and its nodulation on groundnut". <i>Pesticides</i> , 19 : 38-39.
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### Chemistry and Soils

Achar, H. P. and Vasuki, N. (1985)	"Soil testing and crop production - A challenge for 21st century". <i>National Seminar on Agrarian Structure and Strategies for the 21st Century</i> held at UAS, Bangalore.
Achar, H. P., Patil, V. S., Reddappa Reddy, M. and Ansari, M. R. (1984)	"Effect of moisture regimes and fertilizer levels on yield of onion". <i>Curr. Res.</i> , 13 : 29-30.

<i>Name of Author (s)</i>	<i>Title of the paper with the details of publication</i>
Badiger, M.K., Subba Reddy, Rosalind Michael and Shivaraj, B. (1985)	"Influence of fertilizer potassium, sulphur and calcium on the yield and quality attributes of groundnut". <i>J. Indian Soc. Soil. Sci.</i> <b>30</b> : 166-169.
Badiger, M. K., Rosalind Michael, Jayaram, N. and Shivaraj, B. (1985)	"Studies on some aspects of sulphur and response of crops to sulphur application". <i>J. Indian Soc. Soil Sci.</i> <b>33</b> .
Channal, H. T., Patil, S. J., Vasuki, N. and Srinath Reddy, N (1984)	"A comparative study of assessing the quality of underground irrigation water of Bilagi taluk, Bijapur district of Karnataka State by USDA and Agers methods". <i>Madras agric J.</i> , <b>71</b> : 610-613.
Shirwal, A. S. and Deshpande, P. B. (1984)	"Zinc adsorption isotherms of soils as related to soil properties". <i>J Indian Soc. Soil Sci.</i> , <b>32</b> : 255-261.

### Crop Physiology

Hiremath, S. M., Janardhan, K. V., Habib, A. F. and Panchal, Y. C. (1984)	"Varietal differences in leaf photosynthetic rate and its relationship with certain leaf characters and yield in groundnut ( <i>Arachis hypogaea</i> L.)". <i>J. Nucl. agric. Biol.</i> , <b>13</b> : 103-105.
Krishna Sastry, K. S., Devendra, R., Ramachandra, T. V., Narasimha, N. and Prasad, T. G. (1984)	"Competition of <i>Echinochloa</i> species on growth and productivity of transplanted rice". <i>Ninth Asian Pacific Weed Science Society Conference held at Netherlands</i> .
Malathi Chari, Prasad T. G. and Krishna Sastry, K. S. (1984)	"Diffusivity of proline and its significance". <i>Curr. Sci.</i> , <b>53</b> : 496-498.
Palled, Y.B., Patil, U. S. and Panchal, Y. C. (1984)	"Studies on chemical weed control in irrigated bidi tobacco ( <i>Nicotiana tabacum</i> L.) with special reference to Orobanche ( <i>Orobanche cernua</i> Loefi)" <i>Mysore J. agric. Sci.</i> , <b>18</b> : 197-202.
Patil, S. J., Panchal, Y. C. and Janardhan, K. V. (1984)	"Effect of short term moisture stress on free proline and relative water content in different plant parts of maize genotypes". <i>Indian J. Pl. Physiol.</i> , <b>27</b> : 322-327.
Prasad, T. G., Malathi Chari and Krishna Sastry, K. S. (1984)	"Effect of mannitol on stomatal behaviour". <i>Sci. Cult.</i> <b>50</b> : 120-122.

### Entomology

Chakravarthy, A. K. and Lingappa, S. (1984)	"Behavioural responses of <i>Adisura atkinsoni</i> Moore to the host plant, <i>Lablab niger</i> Medick, extract". <i>Insect Science and Application</i> , <b>6</b> : 79-81.
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Name of Author (s)	Title of the paper with the details of publication
Devaraj Urs, K. C. (1984)	"Prospects of insect pheromones in insect pest management programmes – A review". <i>Proc. III Oriental Ent. Symp. Kariavattom (Kerala)</i> .
Devaraj Urs, K. C. and Krishna Prasad, N. K. (1984)	"Plant products for protection of grains against the rice weevil and the pulse beetle in storage". <i>Proc. Natl. Sem. on Behavioural and Physiological Approaches in Management of Crop Pests</i> . June 21-23, Coimbatore (TNAU).
Devaraj Urs, K. C. and Subramanya, B. V. (1984)	"Effects of antibiotics on the growth, development and life cycle of <i>Spodoptera litura</i> ". <i>Proc. III Oriental Entomology Symposium, Kariavattom (Kerala)</i> .
Jayaramaiah, M. and Veeresh, G. K. (1984)	"Studies on the symptoms of infection of the fungus, <i>Beauveria brongniartii</i> (Sacc.) Petch to different stages of the white grub, <i>Holotrichia serrata</i> Fab. (Coleoptera : Scarabaeidae)". <i>J. Soil Biol. Ecol.</i> , <b>3</b> : 7-12.
Jayaramaiah, M. and Veeresh, G. K. (1984)	"Fungal pathogens of white grubs in Karnataka". <i>J. Soil Biol. Ecol.</i> , <b>3</b> : 83-87.
Jayaramaiah, M. and Veeresh, G. K. (1984)	"Influence of temperature and humidity on the survival of spores of the fungus <i>Beauveria brongniartii</i> (Sacc.) Petch". <i>J. Soil Biol. Ecol.</i> , <b>4</b> : 82-86.
Lingappa, S., Venkataraman Jois, Y. V. and Ramani, V. (1984)	"Antifeedant properties of certain plant extracts, against brinjal fruit and shoot borer, <i>L. orbonalis</i> ". <i>National Seminar on Behavioural and Physiological Approaches in the Management of Crop Pests, TNAU, Coimbatore</i> . June 21-23.
Muniyappa, N. and Veeresh, G. K. (1984)	"Plant virus diseases transmitted by white flies in Karnataka". <i>Proc. Indian Acad. Sci.</i> , <b>93</b> : 397-406.
Patil, S. P. and Veeresh, G. K. (1984)	"Description of the third stage larva of <i>Anomala ruficapilla</i> Burn (Rutelinae : Coleoptera)". <i>J. Maharashtra Agri. Univ.</i> , <b>9</b> : 56-58.
Patil, S. P. and Veeresh, G. K. (1984)	"External features of the larva of <i>Holotrichia netoiflana</i> Brenske, (Coleoptera : Scarabaeidae)". <i>J. Maharashtra Agri. Univ.</i> , <b>9</b> : 58-60.
Patil, S. P. and Veeresh, G. K. (1984)	"Description of larva of <i>Hybosorus orientalis</i> West Wood (Coleoptera : Scarabaeidae)". <i>J. Maharashtra Agri. Univ.</i> , <b>9</b> : 110-111.
Patil, S. P. and Veeresh, G. K. (1984)	"The larva of <i>Apogonia ronca</i> Fab. (Coleoptera : Scarabaeidae) <i>Melolonthinae</i> ". <i>J. Maharashtra Agri. Univ.</i> , <b>9</b> : 111-112.



<i>Name of Author (s)</i>	<i>Title of the paper with the details of publication</i>
Rajagopal, D. and Veeresh, G. K. (1984)	"Comparative efficacy of some sampling techniques in determining the population of fungus growing termite, <i>Odontotermes wallonensis</i> (Wasmann) (Isoptera : Termitidae)". <i>J. Soil Biol. Ecol.</i> , <b>4</b> 30-35.
Sampangiramegowda, K. and Veeresh, G. K. (1984)	"Assessment of crop loss in brinjal ( <i>Solanum melongena</i> L.) due to ash weevil <i>Myliocerus subfasciatus</i> Guerin (Curculionidae : Coleoptera)". <i>J. Soil Biol. Ecol.</i> , <b>4</b> : 41-52.
Sreedhar, P. and Devaraj Urs, K. C. (1984)	"Comparison of pheromone trap catches of <i>Spodoptera litura</i> with field populations in groundnut". <i>Proc. III Oriental Ento. Symp.</i> , Kariavattom, Kerala.
Srinivasan, S. and Lingappa, S. (1984)	"Colorimetric determination of methamidophos by cholin esterase inhibition". <i>Sci. Cult.</i> , <b>50</b> : 30-32.
Veeresh, G. K. (1984)	"Management of white grubs in sugarcane cropping system". <i>J. Soil Biol. Ecol.</i> , <b>4</b> : 124-131.
Veeresh, G. K. (1984)	"Importance of soil insect pests in relation to sorghum production". <i>International Sorghum Entomology Workshop held at Texas A &amp; M University College Station, Texas, USA. July</i> , 15-21.
Veeresh, G. K. (1984)	"White grub pests of national importance". <i>National Seminar on 'Concepts in Integrated Pest and Disease Management'</i> , TNAU, Coimbatore, Sept. 5-6.
Veeresh, G. K. (1984)	"Role of earthworm in food and protein production in India". <i>National Seminar on Organic Waste Utilisation and Vermicomposting, School of Life Science, Sambalpur, Orissa.</i> , Dec. 5-8.
Veeresh, G. K. (1984)	" <i>Bale kettagata niyantiaha - a monograph on crop pest control</i> " (in Kannada). IBH Prakashana, Gandhinagar, pp. 76.
Veeresh, G. K. and Belavadi, V. V. (1984)	"Termites and their influence on soil properties". <i>National Symposium on Soil Pest and Soil Organism, BHU, Varanasi.</i> Oct. 29-31.
Veeresh, G. K. and Gubbaiah (1984)	"A report on the 'Crazy Ant' ( <i>Anoplolepis longices</i> Jerdon) menace in Karnataka". <i>J. Soil Biol. Ecol.</i> , <b>4</b> : 65-73.
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## APPENDIX

Accounts for

RECEIPTS	
Head of Account	Accounts for 1984-85
I	2

(Rupees in lakhs)

## A. General Funds

I. (a) STATUTORY GRANTS FROM THE STATE GOVT.  
UNDER SECTION 35 OF THE ACT:

i) Block Grants	580.00
ii) Development Grants	239.00
iii) Adhoc Schemes	9.88

Total (a) 828.88

## (b) Grants from ICAR and Govt. of India :

i) I.C.A.R.	266.23
ii) Govt. of India	11.41

Total (b) 277.64

Total I 1106.52

II. GRANTS FROM OTHER SOURCES  
SECTION 30(iii) OF THE ACT :

1. PL. 480 U.S.A.	3.73
2. Wheat Associates, U.S.A.	0.06
3. Department of Atomic Energy	0.55
4. Karnataka Dairy Development Project	20.95
5. United Nations Children Fund	0.05
6. Science Research, Delhi	0.38
7. ASPEE Research Dept of Foundation Funds, Bombay	1.65
8. Mangalore Chemicals and Fertilisers	1.11
9. I.A.E.A., Vienna Austria	0.25
10. ICRISAT, Hyderabad	0.36
11. Coffee Board, Bangalore	0.51
12. Karnataka Compost Corporation	0.74
13. Central Coir Research Institute, Kerala	0.99
14. Danida Project on Pressed Sardine, FAO	0.60

Total II 31.93

## III

1984-85

EXPENDITURE	
Head of Account	Accounts for 1984-85
1	2
<b>A. General Funds</b>	(Rs. in lakhs)
<b>I. DIRECTION</b>	
1. University General Administration	97.07
2. University General Expenses	65.57
3. University Library	17.50
4. University Press and Publication	4.20
5. University Workshop, Hebbal Campus	2.80
6. University Examinations	0.75
7. University Works Expenditure	23.86
8. University Central Stores	3.35
9. Maintenance of University Dispensary at Hebbal	2.69
Total I	217.79
<b>II. RESIDENT TEACHING</b>	
1. Agricultural College, Hebbal	68.94
2. College of Agriculture, Dharwad	58.28
3. Veterinary College, Hebbal	67.77
4. College of Basic Sciences and Humanities	31.00
5. College of Fisheries, Mangalore	36.73
6. College of Rural Home Science, Dharwad	6.66
7. Agricultural Engineering Institute, Raichur	16.25
Total II	285.63

**APPENDIX**

RECEIPTS	
Head of Account	Accounts for 1984-85
1	2
III. INCOME FROM FEES ETC.	7.16
IV. INCOME FROM UNIVERSITY PROPERTY	137.78
V. OTHER MISCELLANEOUS INCOME	17.43
Total 'A' General Funds	1300.82
<b>B. Foundation Fund</b>	Total 'B' Foundation Fund 7.32
<b>C. Debt and Suspense Account</b>	
1. Advances	1.68
2. Loans	36.82
3. Deposits	84.80
4. Suspense	(—)1.24
5. Revolving Fund	0.47
6. Second National Seed Project	41.69
Total 'C' Debt and Suspense Account	164.22
TOTAL RECEIPTS (A + B + C)	1472.36
Add: Opening Balance	(—)58.69
Grand Total 1413.67	

III *Contd.*

EXPENDITURE	
Head of Account	Accounts for 1984-85
1	2
III. RESEARCH	
1. Direction	4.97
2. Regional Research Stations	114.30
3. Agricultural Research Stations	88.88
	<hr/>
Total III	208.15
	<hr/>
IV. (a) EXTENSION	36.43
	<hr/>
Total IV	36.43
	<hr/>
V. SCHEMES SPONSORED BY OTHER AGENCIES	34.91
VI. FIVE YEAR PLAN SCHEMES OF THE UNIVERSITY	839.75
	<hr/>
Total 'A' General Funds	1622.66
	<hr/>
B. Foundation Fund	Total 'B' Foundation Fund 5.69
C. Debt and Suspense Account	
1. Advances	2.79
2. Loans	27.03
3. Deposits	(-- )31.68
4. Revolving Fund Account	0.81
5. Purchase of Steel, Cement and other Building Materials	(-- )3.93
6. Purchase of Office and Lab. requirements	(-- )2.35
	<hr/>
Total 'C' Debt and Suspense	(-- )7.33
	<hr/>
TOTAL EXPENDITURE (A + B + C)	1621.02
Add: CLOSING BALANCE	(-- )207.35
	<hr/>
Grand total	1413.67

**APPENDIX****(b) Budget Estimates****Abstract Estimates of**

RECEIPTS	
Head of Account	Amount
(Rupees in lakhs)	
<b>A. General Funds</b>	
I. (a) STATUTORY GRANTS FROM THE STATE GOVERNMENT	
UNDER SECTION 35(2) OF THE ACT	
-Block Grant-Development Grant and	
Grants for Adhoc Schemes	978.25
Grants from I.C.A.R. and Govt. of India	277.13
Total I	1255.38
II. GRANTS FROM OTHER SOURCES	
a) PL-480	6.87
b) Wheat Associates, USA	1.74
c) Department of Atomic Energy	1.04
d) Karnataka State Council for Science and Technology	0.26
e) ASPEE Research Dept., Foundation Fund, Bombay	1.03
f) Mangalore Chemicals and Fertilisers	0.74
g) <i>Other Miscellaneous Grants :</i>	
1) Karnataka Silk Marketing Board	1.77
2) USDA—New Delhi	2.64
3) M/s Hindustan Lever Research Fund	1.59
4) Coffee Board, Bangalore	0.63
5) IAEA — Vienna Austria	0.02
6) Karnataka Compost Corporation	1.03
Total II	19.36



## IV

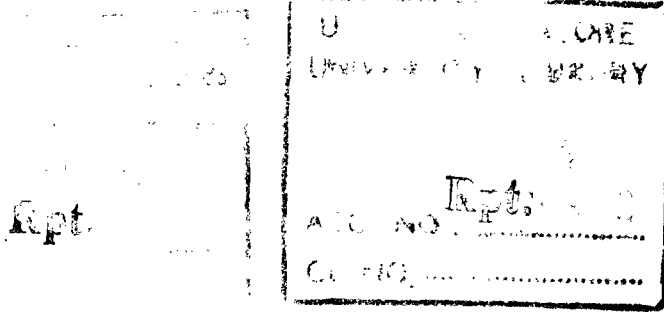
**for 1985-86**

### Receipts and Expenditure

EXPENDITURE	
Head of Account	Amount
(Rupees in lakhs)	
<b>A. General Funds</b>	
I. UNIVERSITY GENERAL ADMINISTRATION	278.13
II. RESIDENT TEACHING	367.47
III. RESEARCH	253.64
IV. EXTENSION	59.30
Additional D.A. sanctioned in G.O. No. FD 3 SRP 85 dated 28.1.85 w.e.f. 1.8.84 and 1.11.84	12.00
V. SCHEMES SPONSORED BY OTHER AGENCIES	19.36
IV. FIVE YEAR PLAN SCHEMES OF THE UNIVERSITY	626.99
Less : Anticipated savings due to Economy Measures	(—)53.01
<b>Total A</b>	<b>1563.88</b>

## APPENDIX

RECEIPTS	
Head of Account	Amount
III. INCOME FROM FEES ETC.	7.87
IV. INCOME FROM UNIVERSITY PROPERTY	171.18
V OTHER MISCELLANEOUS INCOME	21.48
Total III, IV & V	200.53
Total A	1475.27
B. Foundation Fund	1.00
C. Debt and Suspense Account	151.54
Total Receipts A + B + C	1627.81
Add: Opening Balance	—



Grand Total 1627.81

**IV Contd.**

EXPENDITURE	
Head of Account	Amount
<b>B. Foundation Fund</b>	1.00
<b>C. Debt and Suspense Accounts</b>	
a. Advances	2.50
b. Loans	70.40
c. Deposits	28.47
d. Revolving Fund Account	1.30
e. Purchase of steel, Cement and other Building materials	7.26
f. Purchase of Office and Laboratory requirements	3.00
	<hr/>
Total C	112.93
	<hr/>
Total Expenditure A + B + C	1677.81
Add: Closing Balance	(—)50.00
	<hr/>
Grand Total	1627.81

## APPENDIX V

*(Excerpts from the Addresses on the occasion of the XIX Convocation of the UAS, on March 29, 1985)*

### **Welcome Address by Dr. N. G. Perur, Vice-Chancellor, UAS**

We are most fortunate that our beloved Chancellor and His Excellency, the Governor of Karnataka has been able to find time to preside over the day's Convocation ceremony, in spite of his very busy and numerous engagements. His sustained keen interest in the well being of the University and his timely guidance have given us strength, inspiration and motivation for our better performance. I extend a very cordial and warm welcome to our Chancellor.

We feel greatly honoured by the presence of the Hon'ble State Minister for Agriculture, Government of Karnataka and the Pro-Chancellor of this University. In spite of the State Legislature being in session, he has been able to find time and participate in the convocation. I extend a very warm welcome to the Hon'ble Minister for Agriculture and the Pro-Chancellor.

We are equally most fortunate to have with us Mr. C. Subramaniam, Former Union Minister for Finance as the Chief Guest of the 19th Convocation. Mr. Subramaniam was also the Minister for Steel and Industries as well as for Food and Agriculture. He was the architect of the World Acclaimed "Green Revolution" in India and he laid the firm foundation for large scale adoption of modern scientific agriculture in India. Due to his bold steps and calculated risks taken, India could achieve self-sufficiency in food. Mr. Subramaniam rightly recognised the potentialities and importance of the Indian Agricultural Scientists and brought them on par with the other scientists of the Nation. He was also responsible for the re-organisation of agricultural research in the country and also for recognising the usefulness of the concept of inclusion of teaching, research and extension communication at the University level in Indian Agricultural Universities. In spite of several changes made by us in the Convocation date Mr. C. Subramaniam has kindly accepted our invitation to be with us today as the Chief Guest of the 19th Convocation of this University and to address our new graduates. I extend a very warm and cordial welcome to Mr. C. Subramaniam.

...Two New Colleges, one Agricultural College at Raichur and one Veterinary College at Bidar were established by the University during this year based on the recommendations of the State Level Committee constituted under the Chairmanship of Dr. G.V.K. Rao on 'Agricultural Education in Karnataka'.

Under UNDP/ICAR Centre of Tropical Horticulture, three University teachers were provided fellowships for training in the areas of citriculture, post-harvest technology and landscape gardening. Another teacher is undergoing special training in tissue culture as part of Advanced Centre activity. During this year, 37 Ph.D. students have secured ICAR Senior fellowships and 86 M.Sc. students secured Junior fellowships. A new Auditorium building was inaugurated by the Chancellor at Dharwad Campus on 17th December 1984 for the benefit of students and staff.

During this year the University has provided for payment of stipend at the rate of Rs. 300 per month per student to the students of various undergraduate degree programmes including the Diploma in Agricultural Engineering for the period of practical training. This facility was hitherto admissible only for the Veterinary students undergoing internship training. Provision has been made for payment of additional mess charges to the extent of Rs. 60 per month to SC/ST students. The University has also decided not to collect room rent from SC/ST students in the hostels. For the first time, provision for weightage for sportsmen was made in the admission of students at the undergraduate degree programme of this University.

During this academic year, one thousand and seventy eight (1078) students have been admitted to the various undergraduate and postgraduate degree programmes of the University including Diploma in Agricultural Engineering. A total of 689 students completed their degree or postgraduate degree programmes...

Two new Ph.D. courses one in Food and Nutrition, and another in Poultry Science were started from this academic year. A PG Diploma course in Sericulture has also been started from this academic year.

The University is pleased to report that a new animal husbandry research station in Bidarammanagudi, near Tiptur has been started. More than 800 acres of Amrithmahal Kaval land have been already handed over to the University by the State Department of Animal Husbandry. This would be the first livestock research station to be established under the University.

...For the first time the Regional Research Advisory Councils and Regional Research Formulation Committees meeting as part of NARP regional workshops discussed the revision of the recommendations of the package of practices at regional levels based on regional data and these were considered by the State Level meeting.

In the field of research in Rice in hilly areas, attention is being focussed on finding out blast resistant varieties. Trials conducted during 1984 *kharif*,

supported by the results of 1982 and 1983 have indicated that the two new varieties viz., IET-7191 and IR-13358-85-1-3 which are blast resistant might be substituted for Intan which is found to be susceptible to blast disease. Two cashew varieties have been released during this year as Ullal-1 and Ullal-2. These varieties give an average yield of 15 to 18 kg/tree/year with a shelling percentage of 30.

A new method of rejuvenation of old cashew trees by top working and *in situ* grafting have been tested in our Cashew Research Station at Ullal and these methods have been found to be useful. Beheading trees during December to February and grafting them from February to April have been found to be ideal from the point of success and establishment.

In Sunflower two new promising hybrids have been evolved which have performed better than the already released hybrid BSH-1. In Sweet Potato, variety C-43 has been found to be the best suited for the coastal region giving an average yield of 18 tons/ha.

A new wheat variety viz., DWR-39 has been released by the University for the general cultivation. It is suitable for peninsular zone and possesses a high degree of resistance to both black and brown rust disease compared to the ruling wheat variety, HD-2189. It has an yield potential of 32 q/ha. It matures in about 92 days...

A bunch type groundnut variety viz., Dh-8 has been released for general cultivation in the transitional track of Belgaum and Dharwad districts as an additional variety to Dh-3-30. It matures in 105 to 110 days and gives 15 per cent more yield over Dh-3-30. It has an yield potential of 3200 kg/ha...

A new Bidi Tobacco variety viz., "Spoorthy" (PL-5) has been released for the Bidi Tobacco growing areas of Nippani and Mysore. It takes 135 to 140 days from planting to harvest. It has better smoking qualities than A-2 Tobacco variety. It has an yield potential of 20 q. per hectare. A high-yielding cardamom clone viz., "Mudigere Cardamom Clone-1" has been released. This clone is suitable for high density planting. It yields up to 200 to 300 kg per hectare in normal density of 3000 plants per hectare and up to 1000 kg per hectare under intensive cultivation with high density of 9000 plants per hectare with trench system of planting.

Growing of soybean as a mixed crop with sugarcane was found to increase the yield of sugarcane by 17 per cent at the Regional Research Station, Dharwad. In coastal region, application of Urea super-granules or sulphur coated Urea for rice crop at 37.5 kg/ha has increased the yield significantly.

...Intercropping of tur and soybean has indicated that when one row of soybean was planted between two rows normally spaced tur, there was an increase of tur yield. Pre-emergence application of terbutryn weedicide at the rate of 0.50 kg/ha was found to control weeds effectively and economically in the mixed cropping system of maize-redgram, sorghum-redgram, bajra-redgram and setaria-redgram. In another weedicide experiment, it was found that pre-planting or pre-emergence application of weedicide alachlor at 2.5 kg/ha or weedicide fluchloralin at 2.0 kg/ha would control weeds satisfactorily in mixed cropping of chillies, onion and cotton.

Use of Pyrethroids like permethrin, cypermethrin, fenvalerate at 0.01 per cent and decamethrin at 0.001 per cent gave good control of insect pests on groundnut crop. Traps with fish meal and Nuvan have proved very effective in controlling shootfly in sorghum. The sorghum lines IS-14332, IS-3443 and IS-8283 have been found to possess multiple resistance for downy mildew, foliar diseases, charcoal rot and grain molds. A combination of BHC+Thiram+Apron seed treatment was found to be compatible with one another and effective in the control of downy mildew in sorghum.

In the Horti-Silvi experiment, intercropping fruit orchards with forest trees like Eucalyptus, Silver Oak and Subabul (K-8) have been found to be profitable as compared to growing fruit crops alone.

Glyricidia leaves when used as substrates in combination with 30 per cent cattle dung gave 38.165 litres of gas for 270 g glyricidia + 30 g cattle dung as compared to control (300 g of cattle dung) which gave 27.725 litres of gas. Thus there is a saving of 70 per cent cattle dung.

Under soil conservation, studies on evaluation of different soil and water conservation structures for both medium and deep black soils under low rainfall areas indicated the superiority of graded border strips over other treatments considering run-off, soil loss and crop yield.

Ridges and furrows laid out on 0.2 per cent slope proved to be a better inter-terrace land management treatment considering run-off, soil loss and crop yields. Contour border strips of 120 m length of zero per cent grade laid out at 30 cm vertical interval conserved maximum soil moisture and gave increased crop yields.

In a study on pathology of dermatitis in buffaloes, a detailed investigation into various skin disorders in buffaloes has been undertaken for the first time in the country, the knowledge of which would help for the control and treatment of the dermatological disorders in buffaloes. Package of practices have been developed to control gastro-intestinal parasites of cattle in the State.

Studies on imported and local born Jersey cattle have indicated that the imported cattle had lower age of calving and produced higher milk in the first lactation as compared to locally born ones

...In a survey on estuarine mullet fishery resources of Dakshina Kannada district, five important species were identified which contribute to mullet fishery along the Dakshina Kannada coast.

Studies on fish feeds indicated that poultry droppings based feed and subabul based feeds are more economical than conventional feed for carps reared in fish ponds. Studies on utilisation of paddy fields for fish culture have revealed that by rearing common carp fry in paddy fields it is possible to get additional net income of more than Rs. 800/ha in 120 days depending on the stocking rate and survival of fish fingerlings, besides the income from paddy.

In a study on the growth values of Tandoori naans, bread and rotis, the growth promoting value of Tandoori naans was better than either bread or rotis. In a study of bioavailability of iron, it was observed that the various ingredients used in the preparation influenced the total iron content of prepared foods. Similarly, cooking in cast-iron vessels increased the availability of iron. Research on standardisation and nutritive value of common recipes revealed that on an average one serving of common cereal preparations supply 8.5 g protein, 150 mg calcium and 7.5 mg iron, meeting  $\frac{1}{4}$ th,  $\frac{1}{3}$ rd and  $\frac{2}{3}$ th of the recommended daily allowances for protein, calcium and iron respectively.

Under the National Seed Project (NSP) financed by the World Bank, three breeder and foundation seed processing plants, air conditioned stores and dry-cum-threshing yard were set up at three research stations...

Dr. K. Krishnamurthy, Director of Research was awarded the Karnataka State Rajyotsava Award for his outstanding research work in the field of agriculture and Dr. N. L. Maurya, Principal and Head, Department of Agricultural Engineering was awarded Commendation Medal for his outstanding research work on Animal Energy, particularly cross-bred bullocks by the Indian Society of Agricultural Engineering.

... The highlights of this year's work in respect of the training unit was selection of this University as a National Centre for organising training programmes in the field of Agricultural Management. The University, in collaboration with the experts from Coverdale Organisation of U.K., under the financial assistance of the World Bank and Government of India, organised five special management training programmes during the year for Senior Officers of the Departments of Agriculture from all over India...



The World Bank has come forward to strengthen the Directorate of Extension of the University by sanctioning 8 posts of Coordinators (Extension) primarily to monitor the monthly workshops under the T and V system at different districts.

...The University is continuing the village adoption work under the Government of India's 20-point programme and during this year, this activity has been taken up in 44 villages located in 12 districts.

...During this year 22 Research Stations of the University have organised Field Days in which representative farmers from the area covered by each Research Station participated.

A new addition to the regular field days programme was the initiation of farmers' seminars at few research stations as an adjunct to these field days.

At the instance of the Government of Karnataka, an Inter-Collegiate Kannada essay writing competition for the undergraduate and postgraduate students of this University was conducted during March 1984 on the subject "Family Welfare". Mr. Y. S. Prabhakar, Final year B.Sc. (Agri. Mark) student was awarded the first prize while Mr. Azad Ismail Saheb of the Sr. M.F.Sc., class secured first prize in the competition for postgraduate students. In a National Essay competition organised by the Nehru Centre, Bombay, Mr. B. M. Maheshchandra Babu of this University bagged the second prize.

The Karnataka State Kho-Kho (Men) team captained by Mr. K. M. Renuka Prasad, a student of this University won the national championship, defeating Maharashtra State team who were the champions for 17 years in a row. In the South Zone Inter-University Hockey Tournament held in Mysore in January 1985, our University Hockey team entered the semi-finals. In a State Level essay writing competition conducted by the State Forest Department in September 1984 in connection with "Vanya Prani Sapthaha". Mr. B. D. Yogendra, M.Sc. (Agri) student secured second prize in the English essay writing competition while Mr. K. M. Manjunath, Sr. M.Sc. (Hort) student bagged the first prize in Kannada essay writing. Mr. M. B. Ganapathy, III year B.Sc. (Agri) student was selected as a member of the Karnataka State Hockey (Men) Team that won the South Zone National Hockey Championship held at Vishakhapatnam during November, 1984.

...The Department of Kannada Studies published 12 University level text books during this year.

In addition to, miscellaneous series publications entitled (1) "Comments on Institution Building and Institution Management and Excerpts on Agricultural

Development in India” and (2) “Development Programmes and Services with Excerpts on Seeds of Success”, three Kannada Books one each in technical series and farm bulletins were also published.

...It is hoped that the State Government will come forward with increased assistance to the University both under plan and non-plan allocations, as it has always done in the past.

**Address by Chief Guest — Shri C. Subramaniam**

I am happy to have the honour of addressing this Convocation of the University of Agricultural Sciences. At the outset I would like to thank the Chancellor and the Vice-Chancellor for having invited me to address the graduates of the year. This has given me an opportunity to spend a pleasant day in the midst of students and teachers in the academic atmosphere of a university dedicated to the development of agriculture. It has also enabled me to study the achievements of this University and I am very happy to find that, even within the short span of its existence, it has carved out an honourable place for itself in the field of agricultural science education and training. You have every right to be proud of your performance and contribution to the development of agriculture in our Country more particularly in the State of Karnataka. I have no doubt that with the liberal support of the State government and of the Indian Council for Agricultural Research and with the combined and dedicated efforts of the managements, staff and students the university will continue to grow in its stature in the years ahead.

This brings to my memory the days when I was called upon to switch from the ministry of Steel, Heavy Engineering and Mines to Food and Agriculture by Prime Minister Lal Bahadur in 1964, when he formed his cabinet after the death of Pandit Jawaharlal Nehru. The food situation in the country was grave notwithstanding a decade of planning.

...In a publication called “Famine 1975” the Paddock Brothers, it had been argued forcefully that India was doomed to starvation. The authors concluded “if other more deserving countries are to be saved (through food aid imports) India must be sacrificed”. In such a situation the task of the Food Minister was a difficult, unpleasant and thankless one, as he would be blamed for anything tragic happening anywhere in the country. If still I took up this challenging job it was not because of my faith in my own ability, but because of my faith in the Scientists primarily and in the people generally, particularly the farmers of India. Moreover the influence of my mentors Swami Chidbhavananda, Rajaji and Pandit Nehru had conditioned me to look upon challenges as opportunities and proceed to tackle them with a stout heart and faith in God. I had to undertake a pincer movement; on the one side to import sufficient food grains to

tide over the immediate situation of scarcity and on the other plan for the attainment of self-sufficiency in food grains. The ushering in of the Green Revolution was a land mark in the history of Indian Agriculture. I had to go on a crusade to achieve this break through ..

In bringing about a transformation in agriculture I mainly depended on the Agricultural Scientists...

A series of steps were taken to reorganise Agriculture Science and the establishment of Agricultural Universities was one of them.

I am proud of our agricultural scientific community who made it possible to bring about a transformation in Indian agriculture. Today there is a certain amount of self-confidence that we are in a position to solve our food problems. But taking into account the ever increasing population and the green revolution being confined only to particular areas and to limited crops we cannot afford to take a complacent attitude. It requires a clear picture of the future plans, policies and programmes to keep agricultural production to keep pace with the population. It is this aspect which I would like to deal with in my speech on this occasion, when I am addressing the outgoing graduates, who would be called upon to play a leading role in the development of agriculture.

In considering the problems relating to agriculture one should be clear about the goals to be achieved on a long term basis, say by the end of this century. The important questions to raise have to do, not so much with what production levels particular crops should reach but with what the more basic goals should be from which the more specific production and the targets can be derived...

The basic thrust and justification for the objectives are clear enough. Discussions with scientists lead one to believe that their technical feasibility is beyond doubt. It is a technical exercise to work out the matrix of inputs and outputs and the scheduling of various activities. At this point what is essential is for us to commit ourselves to a set of clear-cut goals that are nationally desirable and technically feasible. Simply stated, what is proposed here is that we should set our sights clearly from now on in ensuring that at least by 2,000 A. D. all the people of this country will have enough food and fibre for their basic needs. The self-sufficiency principle in such a context should be understood not in terms merely of meeting the needs of those with the private means to pay. Rather it should mean having enough supplies to enable even those lacking adequate incomes to have at least minimum levels of consumption, through a combination of assets, income and food transfers. This is a national responsibility that cannot be shirked

What are the policy initiatives that are required to achieve these objectives would be the subject matter of the rest of my address.

Before proceeding to the specifics, a general point needs to be stressed. It is that while the bulk of the suggestions are addressed to the Government, the initiatives that are called for will need a much broader base, particularly of voluntary agencies, local organizations and the farming community at large. This will be a crucial departure from our approach to agricultural development of the last two decades. In the mid-sixties producing additional food to stave off hunger was the over-riding priority. The high-yielding varieties programme, based on the research institutes coming up with improved seeds and Government supplying inputs and offering price support, helped to meet the immediate goals. The focus was on geographical areas and farming classes that had a ready production potential. But such selectivity will no longer be justified. Also while research, inputs and price support will continue to be important cornerstones of future policy, this combination will no longer be adequate. The farmers everywhere have to be involved, induced and enabled to make the best use of the available resources through co-operative action.

A special programme for consolidation of holdings, soil conservation and water management should be added to the existing ones relating to enforcement of ceilings and distribution of surplus ; and legislation undertaken to implement a comprehensive programme on the basis of technical criteria and of broad consensus in the villages. Every attempt should be made to have the programme put through within the next 10-15 years. A special fund should be set up by the Government of India to defray the cost of operation and to pay compensation where justified. The fund should also be replenished through levy of betterment charges based on the benefit derived by farmers from activities under the programme.

As part of the above reform, the Government of India in co-operation with the State Governments should immediately launch on a survey of land and water resources and complete it within 10 years. National and State level organisations should be identified or set up to have the work completed and to prepare village and water shed level maps which can serve as the basis for resource use and crop planning. The entire cost should be met and the technical expertise and equipment, where needed, made available by the Government of India. It is expected that even as the survey work proceeds, the resulting information will be of use in the consolidation and conservation programme referred to.

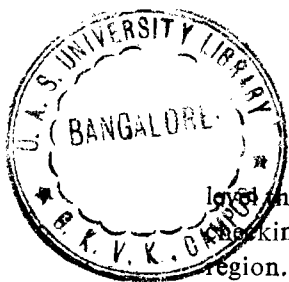
It is expected that work relating to consolidation of holdings, land re-shaping and soil conservation, scientific water management, *plus* off-farm activities in poultry, fisheries, dairying and building capital assets, when planned and executed systematically, will open up enormous new employment potential. The principle of guaranteed employment in rural areas should be accepted. The

Food for Work approach can be expanded many-fold under this system. The new principle advocated is that Government should undertake, before the turn of the Century, to supply food free through fair price shops to all those for whom the authorities and the local community are unable to find wage employment in any of the above activities.

Irrigation has received an added emphasis in the new 20-Point Programme announced by the Government of India. The plan to bring the benefits of irrigation to an additional 3 million hectares per year during the last 3 years of the Sixth Plan and at the same time to give priority to getting the optimum benefit from the area already provided with irrigation facilities, is most welcome. Equally commendable is the proposal to assist farmers to undertake effective methods of conserving and utilising water on a co-operative basis and to foster institutional devices such as 'Pani Panchayat' for stimulating co-operative endeavour on the part of each watershed community. Proper water resource mapping and planning would imply regulations on how farmers should use this valuable asset, both surface water and underground water. The present practice of enforcing standards of water exploitation only on farmers seeking loans from public financing institutions, while leaving the more affluent farmers free of any such restrictions is neither scientific nor equitable. This should change and water management should be guided by the long term requirements of the community as such.

...But concrete action to translate this dream into reality has been painfully slow. Survey and investigation work on the National Water Grid are said to be in progress but do not seem to be receiving enough priority. The Ganga-Cauvery link, the Brahmaputra-Ganga link, the link canal to Rajasthan from the Narmada are particularly important. The reported decision at the recent meeting of the National Development Council to set up a National Water Resources Council is timely.

...On research and development a major programme to decentralise not only adaptive, testing and demonstration work, but also in setting of research priorities and formulation of development schemes is essential. Interaction with farmers has to be more close and meaningful than has generally been the case so far. If interaction is improved, the question as to why a majority of farmers reap much lower yields than what research scientists claim are possible will cease to be mystery. The research stations will then be forced to grapple with the variety of physical and institutional problems that afflict small farmers and hopefully will then be in a better position to come up with possible solutions. The process of close feed-back would also serve to focus, more sharply and more urgently than now, attention of the researchers on the problems of getting higher yields and better economic returns from dry farming. At the organizational



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1975 there will be need for several research-cum-demonstration-cum-input quality checking stations in all States, one for each given agroclimatic district/sub-region. This diffusion should also be matched by necessary changes in the procedures for formulation of programmes and evaluation of results of all research stations to make them fully responsive to farmers' needs at the local level. The necessary changes should be put through within the next few years so that the results will be available to the farmers at least by the end of this decade.

**Agriculture as Energy Source :** By all projections, agriculture will continue to retain by 2000 A.D. its pre-eminent position in the national economy as producer of income and as provider of employment. ...Through a programme propagating the mobilization and use of bio-mass energy (along with solar energy) the dependence of the rural sector on outside sources can be minimised and a sizeable contribution to the energy needs of the urban sector made possible. Fuel plantation programmes assume a special importance in this context. The emphasis on social forestry and tree planting in the new programme should be sustained and developed in the coming decades into an ambitious drive for self-sufficiency in energy for the country as a whole. In focussing directly on problems of development of one particular sector equally important problems in connected sectors tend to be pushed to the background. There are a number of areas in which the policy objectives and programme-mix in the economy in general will affect, and be affected by, the approach to and the performance of the agricultural sector. Policies on population growth, education, industrialisation, pricing of inputs and outputs, imports and exports, and environmental safeguards are among the more obvious examples...

...Fortunately sophisticated modern scientific and technological tools are becoming available to plan, implement and evaluate various projects and programmes in the agricultural and other rural sector developmental activities. Satellite meteorology makes available accurate and longer term weather predictions. Remote sensing with the use of Satellites enables us to have a comprehensive knowledge of the soil and water resources, surface and underground. The same technology provides data to identify pests and diseases, which affect the standing crops, much more effectively and in time to take adequate preventive action. Irrigation management could be undertaken in a more rational and effective manner. Computers are available to store, retrieve, interpret and analyse multiple data to effectively plan agricultural activities. India has taken various steps with foresight to ensure these equipments and systems being available for future development. It should be realised that to remove backwardness, the most modern and sophisticated technologies are needed and they should be used in a discriminatory and rational manner. This throws up large scale opportunities to the educated young men and women of India.



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