



IGFRI Newsletter



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National Consultation on Forage Resource Development

National consultation on Forage Resource Development was held under the chairmanship of Dr S. Ayyapan, Secretary, DARE and Director General, ICAR visited IGFRI on 17 March 2010. Issues related to various aspects of feed and fodder resource development was deliberated. The delegation included Dr S.K. Dutta, Deputy Director General (Crop Sciences), Dr K.M.L. Pathak, DDG (Animal Sciences), Dr M.M. Pandey, DDG (Ag. Engg.), Dr H.P. Singh, DDG (Horticulture), Dr Arvind Kumar, DDG (Education), Dr K.D. Kokate, DDG (Ag. Extn.) and Dr C.S. Prasad, ADG (AN&P). Besides, Dr R.K. Sethi, Director CIRB, Hissar and Dr S.K. Dhyani, Director NRCAF also participated in the deliberations. In his overview, Hon'ble DG emphasised the need for the rapid development of livestock sector and to achieve this, augmentation of quality feed and fodder at affordable price is crucial. He said that wherever green fodder is available, livestock will be healthy. Since feeding based on green fodder is cost effective, therefore cultivation of green fodder should be encouraged. The Government of India is taking proactive measures in this regard. The major constraint in development of forage resource is the non availability of quality seeds of fodder crops and the lack of knowledge among farmers about the technologies related to fodder production. There is also the need to



highlight the economic viability of round the year fodder production as compared to conventional cropping system. To give an impetus to this activity the DG desired that specific action plan should be prepared to transfer fodder production technologies through KVKs across the country. The necessary technical support for this will be provided by IGFRI along with its regional stations and 21 AICRP centres on Forage crop. On this occasion, the Director IGFRI, Dr K.A. Singh presented a roadmap for Forage Resource Development and Utilization in the country for discussion. He highlighted the need for regular interface between ICAR and DAHDF for policy guidelines. He also talked about the IGFRI-Animal Science Institute-KVK interface and association in academic activities of NDRI, viz. M.Sc. programme in forage Production, and need for collaboration with Agricultural Engineering Institutes to disseminate technologies and develop machinery required in processing and of fodder. Deputy Director General (Crop Sciences) Dr S.K. Dutta said that fodder and forage crops are of great importance for which there is need to expand the research activities of IGFRI and to create awareness among the farmers. He also said that fortunately or unfortunately we have only one institution on fodder. This



(Contd on p. 3)

Report of the fodder sub-group of the advisory committee on animal husbandry and dairying of planning commission

Livestock is an important sub-sector of agriculture in India contributing between 25 to 30 percent of GDP of agriculture. It provides livelihood to millions of people in rural area as well as in peri urban areas. While, over the years growth in crop sector has decelerated, animal husbandry has shown relatively stable growth. The sector has been growing around 4–5 percent annually; with some deceleration in the recent years, principally due to inadequate public finance, lower investment by private sector, difficulty in credit availability, and inadequate safety net. In the X Five Year Plan, animal husbandry and dairying received only 8.4% of the total allocation for agriculture sector. Over two third of the rural people possess some form of livestock; over 80% of them are small and marginal farmers and agricultural labourers. The sector also provides safety net and coping mechanism in the event of crop failure to rural people. It is well known that in areas where livestock is integrated with crop, there are no suicides.

To give a fillip to the animal husbandry sector the Planning Commission of India constituted high powered committee to suggest state specific programmes. Three sub-groups were formed to study and suggest the strengths and weakness in the areas of Fodder, Livestock extension and Value addition. The Fodder Sub-group was constituted under the chairmanship of Director, IGFR. The committee observed that the forage crop possesses certain unique problems different from the food, grain, and horticultural crops. Besides multiplicity of the crop species and their nature, the forage crops are usually area and region specific. The preference for forages varies from season to season and locality to locality. Non-commercial nature of the crop does not encourage forage crop cultivation. In most of the cases the degraded and marginal lands are usually given for forage production with minimum inputs in term of fertilizers, water and operational energy input. To increase milk production from 101 mt at present to 160 mt by 2020, the fodder demand will be to the tune of 520, 850 and 90 mt in respect dry fodder, green fodder and concentrates, respectively. Feeding livestock on leguminous or a mixture of leguminous and non leguminous green fodder is considered more economical as compared to feeding them on concentrates or crop residues. Liberal feeding of greens or ensiled forage may cut down the costs on concentrates by 33%. Silage and hay provide feed particularly during lean periods—summer in plains and winter in hilly areas and balance the availability of forage round the year.

Increased demands for seeds of cultivated forages, range grasses and legumes are coming from many parts of the country where livestock rearing is seen as an enterprise and livelihood. Based on the area under cultivation (10.80

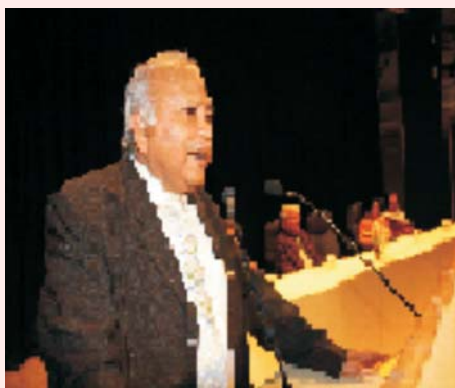
m ha), current demand for seeds of cultivated fodder is estimated at 355,000 tonnes/year and the estimated requirements in respect of major fodder crops, viz. maize, berseem, oat, lucerne, *sorghum* and *bajra* is 126,700 tonnes. But the availability of quality seed is only to the tune of 5–6%. Thus, there is considerable scope of improving seed production through CS-FS-BS chain. Also, the activities in the area of seed production of range grasses are not properly organized.



It was also observed that forage resource development receives only 2.88% of the total budgetary allocation of the Animal Husbandry and Dairying sector which need to be enhanced substantially. The organizational structure in the state animal husbandry departments need to be revamped with more trained manpower up to block/district level as in Punjab and Tripura. There is need for regular surveys by NSSO on aspects related to feed and fodder for proper planning and policy decisions. Diversion of edible crop residues towards non feed use should also be restricted and export of oil cakes be regulated. Bringing vast tract of unused lands along roadsides, railway lines and other wastelands under fodder production by giving them on lease to the people living in the vicinity may be quite fruitful. The Planning Commission has taken a proactive approach which is expected to revitalize the animal husbandry sector through various policy interventions so that the potential growth in livestock sector is realized and the livelihood opportunities of people dependant on this sector are improved.

(K.A. Singh)
Director

Dr H.P. Singh, Deputy Director General (Horticulture) visits IGfRI



Dr H.P. Singh, Deputy Director General (Horticulture) visited IGfRI from 6 to 7 February, 2010 to take a stock of the ongoing activities and guide the research activities in the field of horti-pasture and silvi-pasture. Dr Singh said that horticulture has emerged as the important activity which provides employment and income to a large number of farmers. He was happy to see the integration of horticulture component in the field of forage resource development. He appreciated the new initiatives stated at IGfRI farm taking up *Anola*, Guava, tamarind etc. on large-scale in the wastelands in association with the pasture which will give additional income. These demonstration plots would encourage farmers to take up hortipasture on their fields. Dr Singh also visited the laboratories of the Institutes and the outreach programmes on Farming System Research in the Tikamgarh district of Madhya Pradesh.

Prof. S.K. Dutta, Deputy Director General (Crop Sciences) visits RRS Avikanagar

Prof. S.K. Dutta, DDG (Crop Sciences) laid the foundation stone of Office-cum-Lab Building of Regional Research Station (IGfRI), Avikanagar on 31 January 2010. Prof. Dutta, also inaugurated the recently developed research farm and water harvesting structure on which has a capacity of 8,924 m³. On this occasion, Director IGfRI Dr K.A. Singh briefed the visiting dignitary about the role of the regional station in augmenting the feed and fodder resource development in the western region in view of the occurrence of frequent drought. Dr R.K. Jain, Officer-in-charge of the station apprised Prof. Dutta of the linkage developed between RRS Avikanagar and the Goshalas in Rajasthan. The team also visited the progressive Goshalas where IGfRI technologies and planting materials of newly released varieties of guinea grass and hybrid napier have been demonstrated on a large-scale. Prof. Dutta showed keen interest in the large-scale adoption of *bajra* variety AVKB-19 developed by this centre. He also suggested that the capacity building of the centre to develop the technologies suited for the semi-arid and arid region of the country.



(Contd from p. 1)

institute need to be strengthened to meet the national mandate and to develop forage technologies. Dr H.P. Singh, DDG (Horticulture) underlined the importance of IGfRI by saying that this Institute was established much before many of the ICAR institutes because of the importance of fodder. He also said that models for landless livestock keepers should be developed. He also said that no development can take place without seeds and hence seed chains should be established. Since milk cooperatives cater to the need of a large number of livestock farmers, effective collaboration need to be developed in producing and distributing fodder seeds through them. Dr M.M. Pandey, DDG (Ag. Engg.) said that Engineering Institutes will come forward to develop equipments and machinery necessary for processing of feed and fodder. Dr Arvind Kumar, DDG (Education) said that fodder production models should be developed for different agro-ecological zones for their wider adoption. He said that IGfRI activities resembles Farming System

models. IGfRI need to be associated with academic activities with concerned institutes and offered to organize winter and summer schools. Dr K.M.L. Pathak, DDG (Animal Science) exhorted to work in integrated and participatory mode and underlined the issues before the livestock sector in India. He agreed that IGfRI will be associated in the M.Sc. (Forage Production) programme of NDRI. Dr K.D. Kokate, DDG (Ag. Ext.) emphasized the need for upscaling the technologies through KVKs for which all support will be extended by the Council. The delegation also invited suggestions from the Scientists and technical staffs of IGfRI, NRCAF, KVK Bharari, and CSWCTRI, Datia to improve the adoption of fodder production technologies and expand area under fodder production for profitable livestock production. The delegation visited the research laboratories and farm of IGfRI. They appreciated the efforts in seed production, developing protocol for organic milk production, water management through water harvesting ponds and biotechnological breakthrough in apomixis research.

Crop Production Division

After the inception of IGFRI, the division of Soil Science and Agronomy was established in the year 1964, for development and standardization of sustainable forage production technologies by efficient management of inputs under irrigated and rainfed situations. This division was bifurcated into divisions of Agronomy and Soil Science in the year 1982. Further, in the year 1996, to promote the inter disciplinary approach in generation of agro techniques for enhancement of nutritious forage production through appropriate soil, water and nutrient management strategies, the division of Agronomy and Soil Science were merged to form the Division of Crop Production.

Mandate

- Development of suitable fodder production systems for irrigated and rainfed situations with an emphasis on efficient use of inputs, particularly nutrients and water.
- Development of forage based farming systems for efficient nutrient and water utilization
- Soil resource management and agro-meteorological studies relating to forage production systems.

Research projects

There are eleven major projects funded by the institute and three externally funded projects under different aspects going on in the division.

Research achievements

- Supply of N as 100% FYM led to 26.6 and 7.4% increase in berseem equivalent forage yield of guinea grass + cowpea – *berseem* rotation than sole fertilizer and combination of organic and inorganic sources, respectively.

- 60 kg P₂O₅ with 10 kg Zn gave higher yield of fodder sorghum (39.9 tonnes/ha) and fodder quality with increased crude protein (9.1%) and digestibility (58% IVDMD) and decrease in fibre content.
- It was an important finding that under rainfed conditions, deep summer ploughing + two harrowings in each season produced higher fodder yield of *bajra* + cowpea (44.5 tonnes green and 8.18 tonnes dry matter/ha).
- *Sorghum* + cowpea (F) – gram + linseed (G) cropping system gave best results by producing 33.8 tonnes green fodder of *sorghum* + cowpea (6.93 tonnes dry matter and 0.66 tonnes crude protein/ha) and 0.85 tonnes gram and 0.15 tonnes linseed grains/ha.
- Application of fly ash @ 50 tonnes/ha increased the forage yield of *sorghum* + cowpea by 15 and 18% in red and black soils, respectively and bulk density of black soil reduced (1.23 g/cc) and water holding capacity increased (5.63% at 15 bar and 17.64% at 1/3rd bar pressure) significantly over control.
- In crop-weather modeling the capability of CERES Model to simulate LAI (RMSE=0.34; MPE=23.3%), total dry biomass (MPE=38.3), grain yield (MPE=19.1%) and N Uptake (MPE 11.1%) of forage sorghum (PC-6, HC136 and MP Chari) under normal (5–15 July) and moderately late (25 July to 5 August) sowing as well as variable nitrogen levels was well identified.
- Trend analysis of 30 years of rainfall showed a decrease of 2.45 and 2.0 mm/year in annual and *kharif* season rainfall, respectively in Bundelkhand region,
- The water use efficiency and crop coefficient of sole guinea grass were 26.4, 36.1, 29.2, 25.1 and 16.6 kg dm/ha mm and 0.94, 1.12, 0.95, 0.97 and 0.94 from 1st to 5th cut, respectively.

- Under intercropping system of guinea grass + *berseem*, the water use efficiency and crop coefficient were 24.85, 39.52, 29.42 and 19.31 kg dm/ha mm and 1.32, 1.28, 1.20 and 1.36 from 1st to 4th cut, respectively.
- In the FSR project, introduction of vegetable cowpea was well received by the farmers as it gave higher yields and fetched better price in the market. During scarcity period the goats fed with stylo leaf meal @ 250 g/goat/day gained daily live weight of 35 g/goat when compared to general feeding (20–25 g/day). Similarly, the Hybrid Napier/Guinea has been successfully introduced on the filed bunds.



New initiatives

- Farming System Approach for livelihood security
- Resource conservation in fodder-food system through tillage rotation
- Nutrient management in fodder crops under problem soil
- Crop-weather modeling
- Hyperspectral studies in forage crops

Visits abroad

13 Scientist have visited 9 countries including USA, UK, Japan, Australia, etc. for advanced training and exposure in the field of forage crop production.

Technologies developed

- A cropping sequence of subabul + trispecific hybrid – sorghum (f) + pigeonpea (g) was proved to be the best suitable in terms of crop productivity and extending the fodder availability up to May, under semi-arid rainfed conditions
- Cropping system of *sorghum* + cowpea (F) – gram + linseed (G) was devised with its best performance under rainfed conditions
- For semi arid rainfed conditions, a system with *bajra* (F) – mustard (G) cropping system was found to be the best in producing green and dry matter yields.
- The tillage with two harrowing in each season + one deep summer ploughing produced maximum yields of green fodder and dry matter.
- In guinea grass + cowpea – berseem crop sequence application of 100% FYM produced higher forage yield. This also improved contents of organic carbon, available NPK and S in soil.



- Combination of organic (75%) and inorganic (25%) sources of nutrients was effective in reducing the volatilization loss and sustained release that gave higher green and dry matter yield of perennial grasses, annual forages and subabul.

A recommendation has emanated from the results where the split application of 80 kg S /ha (40 kg each in *kharif* and *rabi*) resulted in higher biomass, nutrient uptake and crude protein yield of N/B hybrid grass (NBH) + seasonal legumes (cowpea/*berseem*) intercropping.

The application of 40 kg S, 20 kg Zn and 10 kg Mn/ha along with NPK gave significantly higher yield and also improved fodder quality, *in vitro* digestibility and nutrients content.

The maximum water use efficiency of teosinte and lucerne was coincided with 2nd cut of the crop.

Recommendation of adoption of short duration and drought tolerant crop varieties was the out come of the trend analysis of rainfall for the past 30 years in the Bundelkhand region where a decrease of 2.45 and 2.0 mm rainfall/year in annual and *kharif* season rainfall, respectively was noticed.

Honours and awards

- National Productivity Award: For Dryland farming to *Kharaiya Nala lakheri nandi* watershed (1990–91).
- Sri Ram Award: By Fertilizer Association of India, New Delhi (1990–91).
- Best paper award: Watershed Management for Sustainable Rainfed Agriculture Development—An experience at Tejpura Watershed—International Symposium on Integrated Landuse and Management for Tropical Agriculture held at Brisbane, Queensland, Australia from 15 to 25 September, 1992.
- Best paper award: Soil and Water Conservation and Silviculture for Watershed and Barren Hill Improvement at Gaharawa Watershed—An Indian experience—International Symposium on Integrated Landuse and Management for Tropical Agriculture held at Brisbane, Queensland, Australia from 15 to 25 September, 1992.
- Best poster presentation award to Dr S.B. Tripathi, Dr R.B. Yadav and Dr A.K. Rai for the research article entitled "Impact of different land use systems on soil properties and runoff losses in the watershed". In: Conference on Food and Environmental Security through Resource Conservation in Central India: Challenges and Opportunities at CS&WCR&TI, Research Centre Agra, from 16 to 18 September, 2009.

Publications

A total of 394 research paper have been published in various peer reviewed national and international journal. Besides, 384 abstracts were published in various conferences/workshops, 95 book chapters, 327 popular articles and 16 technical bulletins were also published by the scientist of this division.

Zero till seed drill modified to enable sowing of fodder in mixed cropping system



Fig. 1: Compartmentalized seed hopper



Fig. 2: Mixed cropping enabled zero till drill

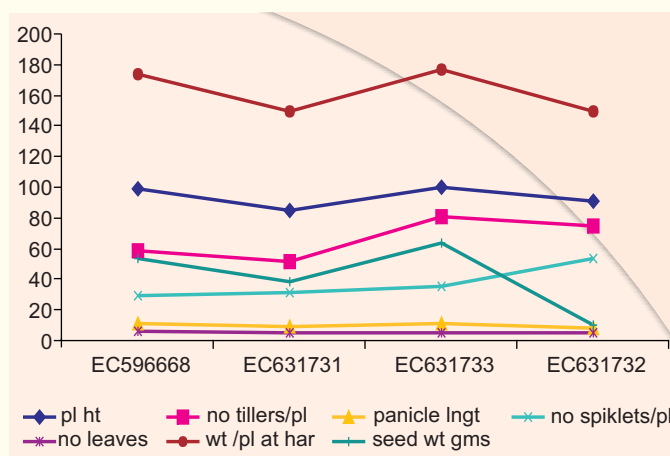
Zero till drill has proved to be a promising machine for sowing of rabi crops. Use of this seed drill saves diesel, tractor's working time, labour and most important it gives higher yield. A zero till seed drill operated by 35 hp tractor having 11 inverted T tines, adjustable fluted mechanism to regulate the flow of seeds, adjustable orifice gravity type fertilizer box with agitator was taken for modification such that it becomes able to sow fodder crop in mixed cropping pattern. The seed flow assembly was modified to sow the seed of different types with different seed metering unit. Different type of seed flow from different flutes was achieved by dividing the seed hopper in sections and filling the required seed in respective section. The sectioning was done such that it formed a complete open chamber for each seed metering unit and no mixing of seed took place between any two sections while in operation. Sectioning included fixing of two 240 × 24 × 3 mm flat on the seed hopper in such a way that it made a notch. The fixing was done on both the sides of the hopper such that a m.s. plate could be inserted in between two notches. The plate had trapezoidal dimension (140 × 255 × 220 × 295) mm and could be placed in any apartment as per the requirement. The partitioning sheets can be removed when a single crop like wheat is to be sown. With the partitioned chamber in the seed hopper, different types of seeds can be filled in different chambers and in a single run of operation, different seeds could be sown. This modified hopper (Fig. 1) seed drill was used to sow cowpea+sorghum in mixed cropping system to form paired rows of cowpea and sorghum in the field. Fig. 2 shows the full view of mixed cropping enabled seed drill. The seed rate of cowpea was kept at 60 kg/ha and the corresponding average seed rate achieved for sorghum was 44.2 kg/ha. Row to row distance was kept at 25 cm. There was 94–100% germination in cowpea and 94–98% in sorghum. With germination, sorghum crop needed thinning to the extent of 5–10%. The tractor was operated in IIIrd low gear at an operating speed of 4.0 km/h. The effective width of coverage achieved was 1.1 m and the effective field capacity was 0.25 ha/h giving 58% field efficiency using this seed drill.

—C.S. Sahay and P.K. Pathak

Evaluation of new barley accessions for yield potential

During Rabi 2008–09, four exotic barley accessions, viz. EC-596668, EC-631731, EC-631733 and EC-631732 received from NBPGR were evaluated for different morphological traits. The traits were plant height (cm), number of tillers/plant, panicle length (cm), number of spikelets/plant, number of leaves/plant, stem girth, L/S ratio (on DM basis), fodder weight (dry basis) and grain yield. All the accessions took 160–163 days to maturity and were of two rowed types. The seeds of EC-596668 were naked type whereas others had covered seed. Plant height ranged from 85 to 99 cm.

Accession EC-631733 had highest numbers of tillers (80), panicle length (11.3 cm), dry plant weight (176.6 g/plant) and grain yield (63.0 g/plant). Accession EC-631732 showed superiority for number of spikelets/plant (54) and stem girth (0.65 cm). The accession EC-596668 was best in terms of number of leaves/plant (5.6) and leaf/stem ratio (0.32 g) on DM basis. Accessions EC-631733, EC-596668 and EC-631732 can be further utilized in improvement of barley as fodder crop.



—S. Ahmed, A.K. Roy and U.P. Singh

Out crossing frequency of Cowpea at IGfRI Jhansi

Cowpea (*Vigna unguiculata*) is largely a self pollinating grain legume crop with multipurpose use. A hybridization programme was taken up to breed for higher biomass yield for fodder purposes. A total of 280 hand crosses were made between three cowpea varieties, namely, EC-4216, Bundel lobia-2 and UPC-5287 in the Net House during October 2009. A total of seven crosses materialized, i.e. two pods of EC-4216 (female parent) × Bundel lobia-2 (male parent), three pods of reciprocal cross Bundel lobia-2 (female parent) × EC-4216 and two pods of UPC-5287 (female parent) × Bundel lobia-2 (male parent). Also, fifty four F₁ hybrid seeds were obtained from 280 hand crosses. The results showed that out crossing occurred at a low frequency of 2.5% and seed set percentage was 19.2%. The chief pollinator insects of cowpea are mainly bumble bee and honey bees. The present report confirms the earlier reports by Ng and Hughes 1998 and Fatokun and Ng 2007, who have reported upto 1–2% out crossing in cowpea at International Institute of Tropical Agriculture, Nigeria.

—*Gitanjali sahay* and *Abhya Rashmi*

New Appointment

Dr R.V. Kumar joined as Principal Scientist (Plant Breeding) in AICRP (FC) on 30.01.2010. Earlier he had been working as Senior Scientist at NRCAF.



Dr M.M. Roy takes over as Director, Central Arid Zone Research Institute

Dr M.M. Roy has been selected as the Director of CAZRI, Jodhpur and joined there on 19 February 2010. Dr Roy joined IGfRI as Scientist in 1978 and served the Institute in various capacities. Dr Roy has wide experience in the field of forestry, agroforestry, MPTS resources, grassland and silvopasture management, ecology and biology. He has served 16 Advisory Committees constituted by Planning Commission, UGC, State Governments, ICFRE, DST and ICAR. He has over 200 publications to his credit. He has also worked as a Winrock Fellow at Yale University and University of Florida (USA) during 1990–91. The IGfRI family accords warm wishes to him and hopes that he will take CAZRI to new heights.



Dr K.K. Pandey, selected as Head of Plant Pathology Division, CPRI, Shimla

Dr K.K. Pandey, Principal Scientist at IGfRI has been selected as a Head of Plant Pathology Division at Central Potato Research Institute, Shimla



Outreach programmes of IGfRI

Farmer's training programme and vaccination camp at village Khargone, Kukshi, Dhar district MP—A

Farmer's training programme was conducted at village Khargone, Block Kukshi, district Dhar MP on 10th and 11th March, 2010 under NAIP project. A total of 52 selected farmers from three villages, viz. Khargone, Anjaniya



Malhar and Undali participated in the training programme. On this occasion vaccination camp for livestock was organised and the animals were treated for various ailments. Farmers were also provided with training kits, training manual, etc. and lectures were delivered on various topics related to fodder production and livestock feeding.

—*AK Roy, A K Shukla, P Sharma, Sunil Kumar, S N Ram* and *HV Singh*

Training programme on fodder production at Mahoba and Hamirpur districts of UP

As a part of NAIP project activity, Farmers' training programmes were conducted at Panwadi, district Mahoba and Rath, district Hamirpur on 13 and 14 February 2010, respectively. About 50 farmers participated in each of the two programmes. In both the programmes, farmers were provided with the training manual and kit on fodder production and utilization. The programmes consisted of interactive lectures on various aspects of fodder cultivation, conservation, utilization, hortipasture, silvopasture, livestock management, plant protection etc.

Sponsored Training programmes conducted by IGfRI

UP DASP II sponsored programme: "Livestock Management, Fodder Development and Utilization" from January 27 to 3 February 2010 for 17 veterinary officers of Directorate of Animal Husbandry, Government of Uttar Pradesh.

Tamil Nadu Forest Department: "Design, development and management of silvopastures on degraded dry lands" from 4 to 11 March 2010 for 10 Forest extension officers of Tamilnadu Forest Department.

ATMA sponsored programmes on "Fodder Production and Utilization" were conducted for 112 progressive farmers in batches of 20–25 farmers each. Five training programmes were conducted for the farmers from districts Bhilwara (Rajasthan), Banka, Begusarai and Buxor (Bihar) between January–March 2010.

Visit of international delegation from Bhutan

A delegation of 8 members from Ministry of Agriculture, Royal Government of Bhutan visited IGFR, Jhansi on 25 January 2010 to acquaint themselves about the recent developments in the field of forage production and explore the areas of cooperation in fodder resource development. The delegation held meeting the Director, IGFR along with the Head of Divisions. The important areas of mutual cooperation were identified efforts with ICAR and IGFR in particular. The technologies on fodder conservation, densification were well appreciated. The delegation visited the biotechnology laboratory and other central laboratories of the Institute. The delegation also visited the crop research farm of institute and they were impressed by the well laid experiments in the field.



Off-Campus training programme of IGFR Scientists

A specialized short course on "MDP on Quantitative Decision Making Techniques for Agricultural Management and Research for scientific personnel" was conducted for 10 scientists from IGFR, Jhansi at IIFM Bhopal from 22 to 27 February 2010 to acquaint them about the recent developments and techniques in decision making and management.

Exposure visits by farmer groups/officers

During January–March 2010, 423 farmers/officer trainees from 18 organisations from across the country came to IGFR for exposure visits and to learn various technologies related to fodder cultivation and feeding practices.

समाचार पत्रों से

चारा विकास की तकनीक खेतों में हस्तांतरित करें

झाँसी। भारत सरकार के उच्चस्तरीय दल ने बुधवार को भारतीय चरागाह एवं चारा अनुसंधान संस्थान का भ्रमण कर चारा उत्पादन की तकनीक देखा। उन्होंने देश की अलग-अलग जलवायु में चारा विकास की तकनीकों को खेतों में हस्तांतरित करने एवं चारा क्षेत्रफल बढ़ाने पर जोर दिया।

भारत सरकार के कृषि शिक्षा एवं अनुसंधान सचिव तथा महानिदेशक भारतीय कृषि अनुसंधान परिषद डा. एस आययन के नेतृत्व में उप महानिदेशक फसल विज्ञान डा. महानिदेशक उद्यान डा. कृषि

सी एस प्रसाद, निदेशक केंद्रीय भैस अनुसंधान संस्थान हिसार डा. आर के सेठी आदि ने ग्रासलैंड में विभिन्न विभागों की प्रयोगशालाओं में चारा विकास की तकनीकें भ्रमण के दौरान संस्थान सिंह ने किसानों विभिन्न तथा भैस पर चल रहे

उन्होंने उभालवाड़ा के कुपों का पांच दिवसीय प्रशिक्षण शुरू किया। उन्होंने चारा विकास की तकनीकें भ्रमण के दौरान संस्थान सिंह ने किसानों विभिन्न तथा भैस पर चल रहे

ग्रासलैंड में चल रहे प्रशिक्षण में भाग ले रहे हैं। उन्होंने चारा विकास की तकनीकें भ्रमण के दौरान संस्थान सिंह ने किसानों विभिन्न तथा भैस पर चल रहे

ग्रासलैंड में राजस्थान के कृषक प्रशिक्षण में भाग ले रहे हैं। उन्होंने चारा विकास की तकनीकें भ्रमण के दौरान संस्थान सिंह ने किसानों विभिन्न तथा भैस पर चल रहे

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सेवानिवृत्ति



श्री सुक्का
मजदूर
31 जनवरी 2010



श्री जाहर सिंह
टी-5
31 जनवरी 2010



श्री हंसराज शर्मा
सहा.वित्त.एवं लेखा अधिकारी
31 जनवरी 2010

संस्थान परिवार आपके सुखी एवं दिर्घायु जीवन की कामना करता है।

विक्रय हेतु उत्तम श्रेणी बीज

| चारा फसलें | प्रजनक (कि.ग्रा) | दर (रु./कि.) | टी.एफ.एल. (कि.ग्रा) | दर (रु./कि.) |
|--------------------------|---------------------|-----------------|------------------------|-----------------|
| बरसीम : | | | | |
| वरदान | 09 | 220 | 17.50 | 100 |
| जे.एच.बी.-146 | 900 | 220 | - | 100 |
| बी. बी.-3 | 139 | 220 | 74.50 | 100 |
| जई : | | | | |
| केंट | 260 | 35 | 700 | 15 |
| जे.एच.ओ.-822 | 300 | 35 | 1,160 | 15 |
| जे.एच.ओ.-851 | 447 | 35 | 338 | 15 |
| जई 99.2 | - | - | 31 | 15 |
| ग्वार : | | | | |
| ई.एल. 4216 | 840 | 49.50 | 96 | 25 |
| बी.एल.-1 | - | - | 30 | 25 |
| बी.एल.-2 | - | - | 330 | 25 |
| कोहिनूर | - | - | 140 | 25 |
| चरी : | | | | |
| पी.सी.-6 | - | - | 921 | 20 |
| एम.पी.चरी | 440 | 41.80 | 328 | 20 |
| घास : | | | | |
| गिन्नी | - | - | 11 | 325 |
| दीनानाथ | - | - | 1,100 | 120 |
| धामन घास | - | - | 5.5 | 110 |
| सूबबूल | - | - | 350 | 120 |
| घास की जड़ें : | | | | |
| (नेपियर/गिन्नी/त्रिसंकर) | 2000 नग | | | रु 0.75/स्लिप |

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