

EMPOWERMENT OF FARMERS THROUGH FARMER FIELD SCHOOL IN ANDHRA PRADESH

BY

MIDDHE SREENIVASULU

M.Sc. (Ag.)

DOCTOR OF PHILOSOPHY

IN THE FACULTY OF AGRICULTURE



**EXTENSION EDUCATION INSTITUTE
COLLEGE OF AGRICULTURE, RAJENDRANAGAR
ACHARYA N.G. RANGA AGRICULTURAL UNIVERSITY
RAJENDRANAGAR, HYDERABAD-500030**

MARCH, 2011

EMPOWERMENT OF FARMERS THROUGH FARMER FIELD SCHOOL IN ANDHRA PRADESH

By

MIDDHE SREENIVASULU

M.Sc. (Ag.)

THESIS SUBMITTED TO THE
ACHARYA N.G.RANGA AGRICULTURAL UNIVERSITY
IN PARTIAL FULFILMENT OF THE REQUIREMENTS
FOR THE AWARD OF THE DEGREE OF
DOCTOR OF PHILOSOPHY
IN THE FACULTY OF AGRICULTURE
(EXTENSION EDUCATION)



**EXTENSION EDUCATION INSTITUTE
COLLEGE OF AGRICULTURE, RAJENDRANAGAR
ACHARYA N.G. RANGA AGRICULTURAL UNIVERSITY
RAJENDRANAGAR, HYDERABAD-500030**

MARCH, 2011

CERTIFICATE

This is to certify that **Middhe Sreenivasulu**, has satisfactorily prosecuted the course of research and that the thesis entitled “**EMPOWERMENT OF FARMERS THROUGH FARMER FIELD SCHOOL IN ANDHRA PRADESH**” submitted is the result of original research work and is of sufficiently high standard to warrant its presentation to the examination. I also certify that the thesis or part of the thesis has not been previously submitted by him for a degree of any university

Date:

(Dr R.RATNAKAR)
(Chairman of the Advisory committee)

CERTIFICATE

This is to certify that the thesis entitled “**EMPOWERMENT OF FARMERS THROUGH FARMER FIELD SCHOOL IN ANDHRA PRADESH**” submitted in partial fulfillment of the requirements for the award of degree of DOCTOR OF PHILOSOPHY IN AGRICULTURE in the major field of Extension Education of the Acharya N. G. Ranga Agricultural University, is a record of the bonafide research work carried out by **MIDDHE.SREENIVASULU** under my guidance and supervision. The subject of the thesis has been approved by the student’s Advisory committee.

No part of the thesis has been submitted by the student for any other degree or diploma. The published part has been fully acknowledged. All the assistance and help received during the course of the investigation have been duly acknowledged by the author of the thesis.

(Dr R.RATNAKAR)

Chairman of the Advisory committee

Thesis approved by the Student Advisory Committee

<i>Chairman</i>	(Dr R.RATNAKAR) Director Extension Education Institute Rajendranagar, Hyderabad	_____
<i>Member</i>	(Dr. V.SUDHA RANI) Associate Professor Extension Education Department College of agriculture Rajendranagar, Hyderabad	_____
<i>Member</i>	(Dr M.GANAESH) Dean of Students Affairs) ANGRAU, Rajendranagar, Hyderabad	_____
<i>Member</i>	(Dr. B.S. KULAKARNI) Professor & Head Dept. of Statistics & Mathematics College of agriculture Rajendranagar, Hyderabad.	_____

DECLARATION

I, MIDDHE SREENIVASULU, hereby declare that the thesis entitled **“EMPOWERMENT OF FARMERS THROUGH FARMER FIELD SCHOOL IN ANDHRA PRADESH”** submitted to the Acharya N G Ranga Agricultural University for the degree of **‘DOCTOR OF PHILOSOPHY IN AGRICULTURE IN THE MAJOR FIELD OF EXTENSION EDUCATION’** is the result of original research work done by me. I also declare that any material contained in the thesis has not been published earlier.

Date:

(M.SREENIVASULU)

Place :

LIST OF CONTENTS

Chapter	Title	Page.No
I	Introduction	
II	Review of literature	
III	Materials and methods	
IV	Results and Discussion	
V	Summary and Conclusions	
	Literature cited	
	Appendices	

LIST OF TABLES

Table No.	Title	Page No.
3.1	District wise ICDP Cotton FFS programmes conducted during 2006-2007	
3.2	Variables and their empirical measurement	
4.1	Distribution of FFS and Non FFS farmers based on their age	
4.2	Distribution of respondents according to their education	
4.3	Distribution of respondents according to their experience (In farming)	
4.4	Distribution of respondents according to their farm size	
4.5	Distribution of respondents according to their mass media exposure	
4.6	Distribution of FFS and Non FFS farmers based on their extension contact	
4.7	Distribution of FFS and Non FFS farmers based on their group orientation	
4.8	Distribution of FFS and Non FFS farmers based on their market intelligence	
4.9	Distribution of FFS and Non FFS farmers based on their risk orientation	
4.10	Distribution of FFS and Non FFS farmers based on their innovativeness	
4.11	Distribution of FFS and Non FFS farmers based on their management orientation	
4.12	Distribution of FFS and Non FFS farmers based on their Attitude towards FFS	
4.134	Difference in the attitude of FFS and Non FFS farmers towards FFS programme [District wise]	
4.14	Distribution of FFS and Non FFS farmers based on their Knowledge on ICM Cotton	
4.15	Response analysis of knowledge items	
4.16	Difference in the Knowledge of FFS and Non FFS farmers on ICM Cotton [District wise]	

Table No.	Title	Page No.
4.17	Distribution of FFS and Non FFS farmers based on their Skills learnt on ICM Cotton practices	
4.18	Response analysis of Skills learnt	
4.19	Difference in the Skill scores of FFS and Non FFS farmers in FFS on ICM Cotton [District wise]	
4.20	Distribution of FFS and Non FFS farmers based on their Adoption of ICM Cotton practices	
4.21	Response analysis of Extent of adoption	
4.22	Difference in the extent adoption scores of FFS and Non FFS farmers on ICM Cotton [District wise]	
4.23	Distribution of FFS and Non FFS farmers based on their Agro Ecosystem Management of ICM Cotton practices	
4.24	Response analysis of Agro ecosystem management	
4.25	Difference in the AEM scores of FFS and Non FFS farmers in FFS on ICM Cotton [District wise]	
4.26	Distribution of FFS and Non FFS farmers based on their Decision making ability ICM Cotton practices	
4.27	Response analysis of Decision making ability	
4.28	Difference in the Decision scores of FFS and Non FFS farmers in FFS on ICM Cotton [District wise]	
4.29	Correlation co-efficient between the Attitude and independent variables of FFS and non FFS farmers towards Cotton ICM practices	
4.30	Regression co-efficient of selected independent variables with Attitude on Cotton ICM practices (Warangal)	
4.31	Regression co-efficient of selected independent variables with Attitude on Cotton ICM practices (Kadapa)	
4.32	Regression co-efficient of selected independent variables with Attitude on Cotton ICM practices (Guntur)	
4.33	Correlation co-efficient between the knowledge level of Cotton ICM practices and independent variables of FFS and non FFS farmers	
4.34	Regression co-efficient of selected independent variables with	

Table No.	Title	Page No.
	Knowledge on Cotton ICM practices (Warangal)	
4.35	Regression co-efficient of selected independent variables with Knowledge on Cotton ICM practices (Kadapa)	
4.36	Regression co-efficient of selected independent variables with Knowledge on Cotton ICM practices (Guntur)	
4.37	Correlation coefficients between the independent variables and skill of FFS and non FFS farmers on ICM Cotton	
4.38	Regression co-efficient of selected independent variables with Skill on Cotton ICM practice (Warangal)	
4.39	Regression co-efficient of selected independent variables with Skill on Cotton ICM practice (Kadapa)	
4.40	Regression co-efficient of selected independent variables with Skill on Cotton ICM practice (Guntur)	
4.41	Correlation coefficients between the independent variables and Adoption of FFS and non FFS farmers on ICM Cotton	
4.42	Regression co-efficient of selected independent variables with Adoption on Cotton ICM practices (Warangal)	
4.43	Regression co-efficient of selected independent variables with Adoption on Cotton ICM practices (Kadapa)	
4.44	Regression co-efficient of selected independent variables with Adoption on Cotton ICM practices (Guntur)	
4.45	Correlation coefficients between the independent variables and AEM of FFS and non FFS farmers on ICM Cotton	
4.46	Regression co-efficient of selected independent variables with AEM on Cotton ICM practices (Warangal)	
4.47	Regression co-efficient of selected independent variables with AEM on Cotton ICM practices (Kadapa)	
4.48	Regression co-efficient of selected independent variables with AEM on Cotton ICM practices (Guntur)	
4.49	Correlation coefficients between the independent variables and Decision of FFS and non FFS farmers on ICM Cotton	
4.50	Regression co-efficient of selected independent variables with Decision on Cotton ICM practices (Warangal)	

Table No.	Title	Page No.
4.51	Regression co-efficient of selected independent variables with Decision on Cotton ICM practices (Kadapa)	
4.52	Regression co-efficient of selected independent variables with Decision on Cotton ICM practices (Guntur)	
4.53	Constraints expressed by FFS Farmers	
4.54	Suggestions given by farmers	
4.55	Constraints faced by officials	
4.56	Suggestions given by officials	

LIST OF ILLUSTRATIONS

Fig. No.	Title	Page No.
1	Conceptual model of the study	
2.	Distribution of FFS and Non FFS farmers based on their Attitude towards FFS	
3	Distribution of FFS and Non FFS farmers based on their Knowledge on ICM Cotton practices	
4	Distribution of FFS and Non FFS farmers based on their Skills learnt on ICM Cotton practices	
5	Distribution of FFS and Non FFS farmers based on their Adoption of ICM Cotton practices	
6	Distribution of FFS and Non FFS farmers based on their Agro-Ecosystem Management of ICM Cotton practices	
7	Distribution of FFS and Non FFS farmers based on their Decision making ability ICM Cotton practices	
8	Strategies to successful implementation of FFS and empowerment of farmers	
9	Empirical model of the study	

LIST OF APPENDICES

Appendix No.	Title	Page No.
I	Interview Schedule	
II	Development of Scale on attitude of farmers towards FFS	
III	Knowledge of farmers on Cotton ICM Technologies	

ACKNOWLEDGEMENTS

I earnestly revere the Lord Almighty for his boundless blessings which accompanied me in all endeavours.

*I take it as an extreme privilege to express my heartfelt thanks and sincere gratitude to my Major Advisor and Chairman of Advisory Committee, **Prof. R. Ratnakar** Director ,Extension Education Institute ,Rajendranagar, Hyderabad for his noble hearted help, guidance, cooperation and encouragement which have inculcated in me the spirit of confidence to successfully complete this research work. Without his personal involvement at every stage, it would have never been possible to see this work in the present shape.*

I deem it my privilege in expressing my deep sense of gratitude and respect to Dr.V.Sudha Rani, Associate Professor, Extension Education Department College of Agriculture, R,nagar and member of my Advisory Committee for her learned counsel, scholarly guidance, constant encouragement and constructive suggestions in the planning and execution of the research work. My sincere and heartfelt thanks to her for determined guidance and evincive criticism in the preparation and presentation of the study.

I with to extend my genuine thanks to Dr.M.Ganesh Dean of Student's Affair ANGRAU Hyderabad, and member of my Advisory Committee for sparing his precious time in giving me valuable guidance and timely suggestions during the preparation of the dissertation.

I am thankful to Dr. B.S.Kulakarni, Professor and University Head, Department of Statistics and Mathematics, College of Agriculture, Rajendranagar for his learned guidance and valuable suggestions during the course of my study.

I sincerely extend my gratitude to all the staff of Extension Education Institute Rajendranagar for their kind cooperation and valuable suggestions throughout the course of my work.

I always remember the help of staff of Department of Agriculture of Mahabubnagar, Warangal, Guntur and Kadapa districts for their help during the research work .I would like to express my sincere thanks to my friend DDA FTC MBNR and colleagues of DAATTC Mahabubnagar for their help rendered during the course of my research work.

I would like to express my earnest thanks to my father Sri. M.Narsimhulu , mother Smt. Ramakistamma , farther in-law Sri.S.Bhima Raju , Mother in-law Smt Mangayamma for their blessings .

Last but the not the least I am indebted my wife Smt. Lakshmi Rajyam and daughters Richy , Chintu for their moral backing during the course of my research work .

Date: March, 2011

(M.SREENIVASULU)

ABBREVIATIONS

AP	:	Andhra Pradesh
A.O	:	Agricultural Officer
AEO	:	Agricultural Extension Officer
ADA	:	Assistant Director Of Agriculture
FFS	:	Farmer Field School
ICM	:	Integrated Crop Management
IPM	:	Integrated Pest Management
FAO	:	Food and Agriculture Organisation
AEM	:	Agro Ecosystem Management
ITK	:	Indigenous Technical Knowledge
GO	:	Government organization
ICT	:	Information and communication technology
NSKE	:	Neem Seed Kernal Extract
n	:	Sample number
N	:	Total Sample Size
NGO	:	Non-Government Organisations

Name of the Author	: SREENIVASULU. M
Title of the thesis	: EMPOWERMENT OF FARMERS THROUGH FARMER FIELD SCHOOL IN ANDHRA PRADESH
Degree for which submitted	: DOCTOR OF PHILOSOPHY
Faculty	: AGRICULTURE
Major field of study	: EXTENSION EDUCATION
Major advisor	: Prof. R.RATNAKAR Director, EEI, Rajendranagar
University	: ACHARYA N G RANGA AGRICULTURAL UNIVERSITY
Year of submission	: 2011

ABSTRACT

The agriculture services in the country now in the process of reorientation of their development strategies towards supporting farmer empowerment. One method of empowering farmers and their capacity building is through Farmers Field School [FFS]. FFS is a participatory approach to adult education adopted by Indian government since 1990 towards the achievement of ecologically sound , profitable and socially sustainable small scale farming. Participatory extension approaches such as farmer to farmer extension and FFS encourage farmers to utilize their resources, own knowledge, skills while integrating new expertise, enhance farmers position as manager of their own land and resources.FFS empowered to build up their self- confidence and self- reliance. This implies the need to decentralize expertise to the field level by educating local people to analyze field situations and to make appropriate management decisions. Thus, the Field School was a school without walls that taught basic agro-ecology and management skills.From 2004 onwards,the state governments modified the existing extension approach from demonstration to FFS so as to enable farmers to evaluate technologies by themselves and have taken steps to institutionalize the IPM-FFS model for cotton and other crops in their main stream extension.

The study entitled “ Empowerment of Farmers Through Farmer Field School in A.P ” was mainly intended to find out the empowerment in terms of Attitude, Knowledge, Skills, Adoption, Agro ecosystem management and Decision making ability of cotton integrated crop management practices by farmers after FFS programme. An attempt is also made to study the agro ecosystem management and utilization of ITKs farmers while practicing cotton FFS. The findings of the study

would help for further refinement of FFS programme for reaching more number of farmers with adoptable low cost technologies in Cotton.

An ex-post-facto research design was adopted for the study. 180 FFS farmers (30 from one FFS) and 18 Extension officers (6 from each district) selected purposively and 180 Non FFS farmers (30 from each village) were selected randomly for the study. Thus, a total of 360 farmers (180 FFS farmers and 180 Non FFS farmers) and 18 Extension officers from three districts of A.P formed the sample of the study. A pre-tested interview schedule with measurement devices of all variables was used for collection of raw data. The data thus collected was coded and analysed with the help of appropriate statistical tests.

Majority of FFS farmers belonged to middle aged, high school education, had 3-13 years of experience in farming, small farmers, medium level of mass media exposure, medium extension contact, medium group orientation, medium market intelligence, medium level of risk orientation, medium innovativeness and medium level of management orientation. In case of Non FFS farmers, majority belonged to middle age, primary school education, had 3-13 years of experience in farming, small farmers, medium level of mass media exposure, medium extension contact, medium group orientation, medium market intelligence, medium level of risk orientation, medium innovativeness and medium level of management orientation.

Majority of the FFS respondents were having favourable attitude and opined that FFS is an innovative school of learning for farmers at field level and promote eco-friendly technologies. Majority of respondents had medium knowledge about Cotton ICM practices and they could diagnose nutritional deficiencies and sucking pest damage. Majority of respondents belonged to medium skills learnt category, Adoption, Agro ecosystem management and Decision making ability towards Cotton ICM practices. Further the Z-test results confirmed that the FFS farmers had significant improvement in Cotton ICM aspects over Non FFS farmers.

Correlation analysis revealed that Education, Mass media exposure, Market intelligence, Risk orientation, Innovativeness and management orientation were positively significant whereas Age and Experience in farming were found to be negatively significant with Attitude level of FFS farmers on Cotton ICM practices. All the 11 independent variables put together explained for about 76.66 percent variation in the attitude of FFS farmers and 48.33 percent in Non FFS farmers about Cotton FFS programme. In case of Knowledge of FFS farmers, Education, Mass media exposure and Innovativeness were positively significant whereas Age and Experience in farming were found to be negatively significant with Knowledge level of FFS farmers on Cotton ICM practices. Whereas in Non FFS farmers all the variables were non-significant. All the 11 independent variables put together explained for about 80.00 percent variation in the Knowledge of FFS farmers and 44.33 percent in Non FFS farmers about Cotton FFS programme.

Education, Mass media exposure and Innovativeness were significant with Skill of FFS farmers on Cotton ICM practices, whereas all the variables were found to be non-significant with skills of non FFS farmers. All the 11 independent variables put together explained for about 77.00 percent variation in the Skill of FFS farmers and 42.00 percent in Non FFS farmers about Cotton FFS programme.

Education, Mass media exposure and Innovativeness were positively significant whereas Age and Experience in farming were found to be negatively significant with Knowledge level of FFS farmers on Cotton ICM practices. Whereas in case of non FFS farmers age, education and experience were found to be positively significant relationship with Adoption of Cotton ICM practices. All the 11 independent variables put together explained for about 74.00 percent variation in the Adoption of FFS farmers and 46.66 percent in Non FFS farmers about Cotton FFS programme

Education, Mass media exposure and Innovativeness were positively significant whereas Age and Experience in farming were found to be negatively significant with agro ecosystem management of FFS farmers on Cotton ICM practices. Whereas in case of non FFS farmers all the variables were found to be non-significant relationship with agro ecosystem management of Cotton ICM practices. All the 11 independent variables put together explained for about 55.33 percent variation in the Agro ecosystem management of FFS farmers and 37.33 percent in Non FFS farmers about Cotton FFS programme.

Relationship between selected profile characteristics of the FFS and Non FFS farmers and their Decision towards Cotton FFS shows that Education, Innovativeness were positively significant whereas Age and Experience in farming were found to be negatively significant with decision of FFS farmers on Cotton ICM practices. Whereas in case of non FFS farmers, Education and management orientation were found to be positively significant relationship with decision of Cotton ICM practices. All the 11 independent variables put together explained for about 70.33 percent variation in the decision of FFS farmers and 43.00 percent in Non FFS farmers about Cotton FFS programme.

Except Neem based products no other ITKS were used in FFS programme. But in case of non FFS farmers, ITKs like Putting light in Pot acts as light trap in Cotton crop, Apply Ingava 30g/plant and then irrigate to reduce wilt incidence, Puttamannu 50g+ Cow urine 50ml+Cow dung 50g used for treatment [acts as anti-biotic and improves germination percentage]

Finally a hypothetical strategy was developed for successful implementation of FFS programme based on farmers and officials suggestions and results derived from the study. Based on the above findings, several implications for future research were drawn. The suggestions offered through the study, if followed, there would be a great benefit to farming community through FFS programme.

CHAPTER 1

INTRODUCTION

Empower farmers with Knowledge and Skill to make India hunger free

Dr. M.S.Swaminathan

Agriculture provides livelihood for majority of population in India. However, its intensification has reduced the economic capacity and sustainability of small farming system by inducing a significant increase in the inputs use in production. It is high time for paradigm shift in the agriculture extension approaches. The agriculture services in the country is in the process of reorientation of their development strategies towards supporting farmer empowerment. One method of empowering farmers and their capacity building is through Farmers Field School [FFS]. FFS is a participatory approach to adult education adopted by Indian government since 1990 towards the achievement of ecologically sound, profitable and socially sustainable small scale farming. FFS is based on the assumption that farming communities have a vast body of knowledge, skills and experience on which they can build their future. Participatory extension approaches such as farmer to farmer extension and FFS encourage farmers to utilize their resources, own knowledge, skills while integrating new expertise, enhance farmers position as manager of their own land and resources. FFS empowered to build up their self confidence and self reliance.

HISTORY OF FFS

WORLD

The term “Farmer Field Schools” came from the Indonesian expression *Sekolah Lapangan* meaning just *field school*. The first Field Schools were established in 1989 in Central Java during a pilot season by 50 plant protection officers to test and develop

field training methods as part of their IPM training of trainer's course. Two hundred Field Schools were established in that season with 5000 farmers participating. The following season in 1990 an additional 45,000 farmers joined Field Schools run by 450 crop protection officers. This work was undertaken by the FAO assisted Indonesian National IPM Programme.

The Farmer Field School (FFS) has one of the most impressive track records in participatory community approaches with 2–3 million farmers graduated on the agricultural subject of Integrated Pest Management (IPM) during the past 15 years, mainly in Asia, but more recently in Africa, the Middle East and Latin America also. A review of 25 impact studies indicated a range of positive outcomes of IPM Farmer Field Schools such as drastic reductions in agro-pesticide use, economic benefits and empowerment effects. The FFS approach evolved from the need to strengthen the ecological basis of Integrated Pest Management (IPM) to deal with the variability and complexity of agro-ecosystems through reducing reliance on pesticides. The ecology of opportunist insects (which include mosquitoes) is highly localized and dynamic, with populations fluctuating many fold both spatially and temporally. Accordingly, most tropical smallholder agro-ecosystems require management decisions that are tailored to local and contemporary conditions. This implies the need to decentralize expertise to the field level by educating local people to analyze field situations and to make appropriate management decisions. Thus, the Field School was a school without walls that taught basic agro-ecology and management skills.

INDIA

In India the FAO Inter country programme for rice started in 1994 followed by the FAO_EU IPM Programme for Cotton in Asia between 2000-2004 and since then

more than 8700 FFS were conducted in 28 states of India. From 2004 onwards, the state governments modified the existing extension approach from demonstration to FFS so as to enable farmers to evaluate technologies by themselves. In India realizing the effectiveness of FFS and economic and social benefits to resource poor farmers, the states of A.P, Karnataka and Maharastra have taken steps to institutionalize the IPM_FFS model for cotton and other crops in their main stream extension.

Andhra Pradesh

Agriculture education has moved from farmer training centres to villages by establishing a state wide net work of Polam badis [Farm Schools]. Polam badi offers practical demos and training on field for 14 weeks. The Department of Agriculture, Government of A.P has taken up promotion of FFS in large scale since Rabi-2004 to reduce cost of cultivation, increase the productivity, and reduce pesticide usage by adopting eco friendly alternatives to pesticides and also creating awareness among farmers about the pesticides hazards. It also ensures empowering the farmers to take up economical decisions in adopting practices of integrated crop management [ICM]. In A.P about 20,000 FFS s were conducted from 2001 to 2007 [Kharif] on Maize, Rice, Cotton, Oilseed crops.

Description of Farmer Field School [FFS]

Farmer field school consists of group of people with a common interest, who get together on a regular basis to study the “how and why” of a particular topic. The topic covered can vary considerably from ICM [INM+ IPM], Organic agriculture, Farm mechanization, Soil husbandry, Income generating activities such as bio-agents production. The vow of FFS would be to produce a healthy crop in a eco friendly approach duly considering the fundamentals of eco-system. FFS are comparable to

programmes such as study circles, religious studies at church, mosque or temple or specialized study programmes for any skill.

The basic principles of Farmer field school are

1. Grow healthy crop
2. Conserve natural enemies
3. Observe crops regularly
4. Farmers become experts through participation in FFS.

Why farmer field school ?

In developing countries, pesticides are often used under conditions which generate the hazards to health and environment .The success of green revolution in the prosperity of big farmers where natural resources are available in plenty i.e fertile soils, water, human resources. Advent to the green revolution farmers depend on high cost input based agriculture resulting in

- Increased cost of cultivation
- Less returns on their investment
- Poisonous chemical pesticide residues in the food stuff
- Human health hazards and
- Polluted environment

In the above scenario, it is felt that the farmers have to be educated on viable technology through a sustainable means.

How FFS is conducted?

FFS are conducted on the following basic concepts

1. **Adult /Non formal education :** The field schools are oriented to provide basic agro ecological knowledge and skills in a participatory manner so that farmers experience is integrated in the programme. The FFS offers the opportunities to farmers to learn

by sharing, by being involved in experimentation, discussion and decision making. This strengthens the sense of ownership of rural communities in technological package and evolving new knowledge on skills.

2. **Technology strong facilitator:** The field school is usually conducted by an extension officer / farmer. But in all cases, the facilitator must have skills at growing the crop concerned.
3. **Based on crop phenology and time limited :** The field school and season long training for trainers are based on the crops phenology. Seedling issues are studied during the seedling stage , fertilizers issues are discussed during high nutrient demand stages and so on. This method allows to use the crop as a teacher, and to ensure that farmers can immediately use and practice what is being learned.
4. **Group study:** Most field schools are organized for groups of about 25-30 persons with common interests can support each other, both with their individual experience and strength and to create a “critical mass”. As individuals, trying something new is often socially inappropriate (e.g. reducing sprays, cover crops), but with group support, trying something new becomes acceptable. The total participants are sub divided into groups of five persons so as to facilitate all members can better participate in field observations, analysis, discussions and take precautions.
5. **Field school site:** The field schools are always held in the community where farmers live so that they can easily attend weekly and maintain the field school studies. The extension officer [Facilitator] travels to the site on the day of field school. Total size of polambadi learning field is 2 acres, out of which ½ ac is for ICM ,1 acre is for field validation trials and ½ acre is for farmers practice.

Base line survey: The base line survey conducted to identify production gaps in polambadi village covering 10 farmers of poalambadi and non polambadi at random.

Polambadi curriculum: Based on base line survey 14 week curriculum is developed for carrying out polambadi activities. The duration of each polambadi session will be 4-5 hours [i.e 8 AM to 1-15 PM].

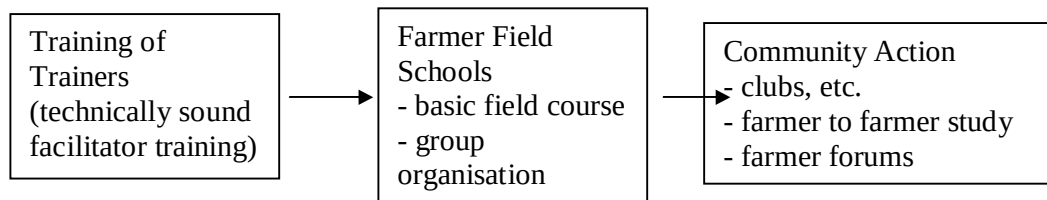
Polambadi day: The schedule day of polambadi for each village is finalized by the Facilitator [ADA.A.O, AEO and Farmer facilitator] in consultation with farmers of polambadi [Avoid market day].

Orientation training: Pre seasonal orientation training is conducted in each season at state /district/ mandal level.

Technical upgradation: Under technical upgradation, the farmers were trained in Seed testing, Soil testing, Seed treatment methodology, Bio fertilizers, Vermicompost, Green manuring, Zinc sulphate /Gypsum application. Precautions while purchasing agriculture inputs by farmers, Preparation of NSKE and Farm machinery.

Field day: At the end of season, field day was organized before harvest or at the time of harvest in which local community members and local policy makers are involved.

Activity flow in IPM programmes



Test and validate: The Field School method proposes that no technology will necessarily work in a new location, and therefore must be tested, validated, and adopted locally. Thus, IPM methods are always tested in comparison with conventional

practices. The end result is that beneficial aspects of IPM are incorporated into existing practices.

Hands-on learning activities: Besides season-long field studies, the Field School also uses other hands on learning activities to focus on specific concepts. “Zoos” in which insect life cycles can be observed more easily on potted plants. These methods also provide ways for farmers to continue studying after the Field School. Farmers are able to use the same methods to help other farmers to learn about IPM as well.

Evaluation and Certification: All Field Schools include field based pre- and post-tests for the participants. Farmers with high attendance rates and who master the field skill tests are awarded graduation certificates. For many farmers, the Field School is the first time that they have graduated from any school or received a certificate in recognition of their farming skills, a point of great pride to many families.

A process, not a goal: It must be remembered that Field Schools is a method to provide farmers with a learning environment so that they can achieve the goal of reducing inputs, and increasing yields and profits. In some programmes, the number of Field Schools, or expansion of programmes becomes the overwhelming target and success criteria, hence quality suffers and the initial goals are not met.

“Work self out of a job”: The facilitator in a Field School attempts to work him/herself out of a job but building the capacity of the group. Indeed, many Fields Schools take over the job of the extension facilitator by doing Farmer to Farmer training and other local activities to strengthen other members of the community.

Follow-up: All Field Schools normally have at least one follow-up season, the intensity of which will be determined by the motivation of the Field School participants, time constraints of participants and facilitator, and to some extent - funding. Follow-up has

been known to be a little as monthly support sessions for farmers to discuss their own problems in implementing IPM, to as much as farmers running a complete Field School for other farmers. Often farmers agree to repeat the Field School process for one more season to verify findings, or to repeat the process of the Field School on a new crop to learn IPM for the next crop. Some groups begin to form associations, people's organisations, and clubs that are officially or un-officially organised and carry on studying as a group. The facilitator usually becomes less central in the process if he/she has done a good job, more often providing some technical backstopping and stimulation for the group.

Local funding goal: Some of the Field School activities focus on future planning and funding raising. There is an explicit goal for groups to become independent and seek support from various agencies. Writing a proposal and receiving a funding grant from government or NGO sources. In national agriculture policy it is desirable to have funds available directly to farmer groups that request support for their local activities.

FFS AND FARMERS EMPOWERMENT

The empowerment term was originally used by FAO experts from 1995 onwards. The FFS is effective in promoting empowerment of farmers due to the following reasons:

- It addresses a felt need and quickly produces an obvious benefit

- It demands critical thinking and develops problem solving skills

- It promotes collective action among farmers

- It provides an opportunity for experimentation and further innovation

FFS empowerment can be at three levels

Individual empowerment: Farmers who have participated in FFS carry out careful observation and analysis to decide what practices to apply in their own fields

Group empowerment: FFS members collectively plan and conduct experiments to learn about agro-ecology and test or adapt new practices

Community empowerment: The FFS group organizes activities that benefit other members of the community, including farmer to farmer training.

1.1 NEED AND IMPORTANCE OF STUDY

Farmer Field School [FFS] go beyond a reduction in pesticide use and increase in yield. The curriculum emphasizes the development of critical analytic and communication skills. This has triggered further development of field experiments by farmers, collective action, leadership, planning and organization. It is enviable and worth to study the empowerment of farmers through FFS as it gives clear picture of attitude of the farmers towards FFS programme, but also give proper direction and the vision to trainers and policy makers.

This study was mainly intended to find out the empowerment in terms of Knowledge, Skills, and Decision making ability, Adoption of cotton integrated crop management practices by farmers after FFS programme. An attempt is made to study the agro ecosystem management and utilization of ITKs farmers while practicing cotton FFS. The findings of the study would help for further refinement of FFS programme for reaching more number of farmers with adoptable low cost technologies in Cotton. Keeping in view the importance of farmer to farmer extension as means of empowerment the present study is designed to study the empowerment, of farmers through Farmer Field school in Andhra Pradesh with the following objectives.

1.2 OBJECTIVES OF THE STUDY

General objective

To assess the empowerment of farmers on ICM Cotton through Farmer Field School [FFS] in Andhra Pradesh.

Specific objectives

1. To study the personal, socio-economic, psychological characteristics of FFS farmers and non FFS farmers.
2. To measure the attitude of FFS Farmers and non FFS farmers towards FFS.
3. To study the extent of knowledge and adoption of FFS practices by FFS farmers and non FFS farmers.
4. To study the Agro-ecosystem management by FFS farmers, groups and communities.
5. To document the ITKs used by FFS farmers and Non FFS farmers.
6. To study the relationship between the selected personal, socio-economic, psychological characteristics and empowerment in terms of Attitude ,Knowledge, Extent of adoption, Decision making and Agro ecosystem management.
7. To elicit the constraints and suggestions from FFS farmers and Extension officials to formulate appropriate strategies for effective functioning.

1.3 LIMITATIONS OF THE STUDY

The present investigation suffered from the limitation of time, funds and other research facilities commonly faced by the student researcher. However, considerable efforts were made by the researcher to make the investigation more meaningful.

1.4 LAYOUT OF THE THESIS

The thesis is presented in six chapters .It begins with introduction which include history of FFS, need and importance, objectives, limitations of the study. The second chapter deals with review of literature pertaining to variables of study. The third chapter consists of methodology adopted for research. The results and discussion of study are presented in the fourth chapter. Lastly the fifth chapter includes the summary of the research study, implications of the findings and suggestions for future implementation. Literature cited and appendices of the study presented at the end.

CHAPTER II

REVIEW OF LITERATURE

A comprehensive review of literature is an essential part of investigation, as it is not only gives an idea on the work done in the past and helps in delineating of problem area but also provides basis for interpretation and discussion of results.

The past studies pave the way for future research endeavors. An acquaintance with earlier pertinent studies has been felt necessary to develop good understanding of the present study. Therefore, an attempt was made in this chapter to review the literature which has meaningful relation to the present study. The literature related to the variables selected in the study which have meaningful relation to the various objectives of study was reviewed and furnished under the following heads.

- 2.1 Selected profile characteristics of FFS and Non FFS farmers
- 2.2 Attitude of FFS and non FFS farmers
- 2.3 Knowledge of FFS and Non FFS farmers
- 2.4 Skill of FFS and non FFS Farmers
- 2.5 Extent of Adoption of FFS and non FFS farmers
- 2.6 Agro ecosystem management by FFS and non FFS farmers
- 2.7 Exploration of ITKS by FFS and Non FFS farmers
- 2.8 Decision making ability of FFS and Non FFS farmers
- 2.9 Relationship between profile characteristics and dependent variables.
- 2.10 Constraints and suggestions of FFS farmers and Extension officials
- 2.11 Conceptual model of the study and derivation of hypothesis
- 2.12 Definition and operationalization of the terms used in the study.

2.1 SELECTED PROFILE CHARACTERISTICS OF FFS AND NON FFS FARMERS

2.1.1 Age

Ramakrishna (1999) indicated that a large number of (65.83 %) trainees were under middle age group followed by young (19.17 %) and old age (15 .00 %) groups in his study on the impact of TANWA.

Murthy (2000) identified that majority (55.83%) of beneficiaries of Janmabhoomi programme were middle aged.

Madhavalatha (2002) reported that (36%) of FTC trained farmers belonged to middle age followed by equal percentage (31.6%) of young and old age in case of trained farmers. Among untrained farmers (43.33%) belonged to middle age followed by old (30%) and young (26.67%) age farmers respectively.

Ravichandra Prasad (2002) reported that majority of the beneficiaries (60.71%) were middle aged followed by young age (35.71%) and old age (3.58%) categories respectively.

Obaiah (2004) revealed that more than half 52.14 per cent were middle aged while per cent were young aged and 21.43 per cent were old aged in FFS.

Ravishanker (2005) concluded that majority of respondents were old with respect to weather forecasting.

2.1.2 Education

Veerendranath (2000) revealed that majority of castor growers (30 per cent) were illiterate, 18.89 per cent of them belonged to can read only category,17.22 per cent of them had primary level of education, 16.11 per cent of them belonged to can read and

write category, 9.44 per cent were under middle school of education ,6.67 per cent were under intermediate category and the rest 1.67 per cent belonged to graduates and post graduates.

Madhavalatha (2002) reported that (35.0%) FTC trained farmers were educated up to high school level followed by middle school (28.33%) college and above (25%) and primary school (6.67%).

Ravichandra prasad (2002) reported that (35.12%) of beneficiaries were educated up to primary level followed by middle school (16.07%), high school (12.50%), functionally literate (12.5%), illiterate (12.5%) and college level (10.71%)

Sivasubramanyam (2003) indicated that majority of respondents (35.0%) had primary school education followed by middle school (18.33%), higher secondary school (15.00%), secondary school (12.5%), can read and write (10.00%) and can read only (9.17%)

Obaiah (2004) indicated that among trained farmers , (37.86 %) had education up to primary school level, followed by high school (20.17 %), middle school (17.14 %) , illiterates (14.29 %), functionally literate (7.14 %) and college education (2.86%). Comparatively one third (31.43 %) of the un trained farmers had education up to primary school level followed by high school level (27.14 %), middle school education (17.14 %), illiterate (14.29 %) ,functionally illiterate (8.57 %) and college education (1.43 %).

Natarajan (2004) revealed that majority of FFS farmers belonged to middle school (34.44%) followed by high school(28.89%), higher secondary school (18.89%) ,primary school(16.67%) and illiterate (1.11%), where as in case of Non FFS majority

were primary educated (30.00%) followed by functionally literate (26.67%), high school (18.88%), middle school (17.785) and illiterate (5.56%)

2.1.3 Experience

Khan (1999) revealed that majority (70%) of the respondents fell under medium category followed by low (16.66 %) and high (13.34 %) experience in Rice cultivation.

Chatterjee (2000) observed that (66.67 %) of the respondents had medium level of farming experience followed by low (18 %) and high (15%) levels of farming experience.

Sridhar (2001) concluded that majority (52.5 %) had medium experience in rose cultivation followed by low (32.5 %) and high experience (15 %).

Reddy (2003) found that majority of the rice growing farmers (71%) fall under the category of medium farming experience followed by high (19%) and low (9.4 %) categories.

Sarada (2004) revealed that (37.5 %) of the farmers had high farming experience followed by low (33.3%) and medium (29.17%) farming experience.

Obaiah (2004) observed that majority of FFS farmers had medium farming experience (61.43%) followed by high (26.43 %) and low (12.14 %) experience in farming .

2.1.4 Farm size

Nagadeve (1999) revealed that majority of respondents have fallen in semi medium category ,26.00 per cent of respondents had medium land holding while 26.67 per cent possessed small land holding and marginal of 12.00 per cent, only meager number 2.00 per cent had large land holding.

Nadre (2000) stated that 50.00 per cent of respondents had land up to 4.0 ha followed by 4.1 to 10.0 ha category with (32.7 %) and (11.5 %) respondents were found in the category of above 10.00 ha .

Baswarajaiah (2001) observed that 43.33 percent of respondents were small farmers followed by with a little variation of marginal (30.0 %) and medium farmers (25.83 %) ,while negligible percent (0.84%) of big farmers.

Gattu (2001) reported that half of (50.0%) of the respondents were found to be medium farmers followed by small farmers (35.99%) and large farmers (15.0%).

Sivanandan (2002) stated that majority of the respondents (56.0%) were small farmers followed by marginal (26.0%) and big (18 %) farmers.

Reddy (2003) revealed that majority of rice growers were in the medium category (53.06%) followed by small (29.79%) and big farmers (17.14%)

Obaiah (2004) indicated that half 48.57 per cent of the trained farmers belongs to medium land holding category and followed by 20.0 per cent with large holdings ,16.43 per cent small holdings and 15 .0 per cent had marginal holdings. Whereas 44.29 per cent untrained farmers had marginal land holdings followed by large, small and medium land holdings with 21.43 per cent, 18.57 per cent and 15.71 per cent respectively.

Natarajan (2004) revealed that majority of FFS farmers belonged to small (63.33%) followed by big (21.11 %) and marginal (15.56%), where as in case of Non FFS, majority were marginal (53.33%) followed by small (38.89%) and big (7.78%)

2.1.5 Mass media exposure

Chatterjee (2000) revealed that 51.67 per cent of the beneficiaries fell under medium level of mass media exposure followed by low (28.83%) and high (20.00%) level mass media exposure.

Veerendranath (2000) observed that majority of them (52.78%) had medium mass media exposure and rest of them 25.00 per cent and 22.22 per cent had low and high mass media exposure.

Gattu (2001) revealed that majority (75.83%) of the respondents had medium mass media exposure followed by low (14.17%) and high (10.00%) mass media exposure.

Madavilatha (2002) reported that 40.00 percent of respondents had high level of mass media exposure followed by equal percentage of medium (30%) and low (30%) levels incase of trained farmers , where as 38.33 per cent of respondents had low level of mass media exposure followed by medium (35.00%) and high (26.67%) levels incase of untrained farmers respectively.

Ravichandra Prasad(2002) indicated that 73.22 per cent of the beneficiaries had medium mass media exposure followed by high (16.07%) and low (10.07%) mass media exposure respectively. Where as the non beneficiaries 53.33 per cent of them had low mass media exposure followed by medium (35.73%) and high mass media exposure.

Obaiah (2004) reported that 58.57 per cent of respondents had medium level of mass media exposure followed by equal percentage of medium (20.71%) and low (20.72%) levels in case of trained farmers, where as 55.72 per cent of respondents had

medium level of mass media exposure followed by low (35.71%) and high (8.57%) levels in case of untrained farmers respectively.

2.1.6 Extension contact

Murthy (2000) identified that majority (64.17%) of beneficiaries of Janmabhoomi programme had medium extension contact.

Ravisankar (2000) revealed that 46.67 per cent of respondents had high level of extension contact followed by medium (30.00%) and low (23.33%) levels.

Madhavalatha (2002) reported that 43.33% per cent of respondents had high extension contact followed by low (30.00%) and medium (26.67%) levels in case of trained farmers, whereas 45.00 per cent had medium level of extension contact followed by high (30.00%) and low (25.00%) levels in case of untrained farmers.

Ravichandra Prasad (2002) indicated that majority of the beneficiaries (80.36%) had medium extension contact followed by high (14.28%) and low (5.36%) extension contact, whereas non beneficiaries less than half of them 48.21 percent had low extension contact followed by (41.07%) and (10.72%) with medium and high extension contact respectively.

Sivasubramanyam (2003) reported that majority of the respondents (60.84%) had medium level of extension agency contact followed by low level of contact with extension agency (30.83%), only 8.33 per cent of the respondents had high extension agency contact.

Obaiah (2004) indicated that 55.72 per cent of the trained farmers had medium extension contact followed by 22.14 per cent each had low and high extension contact.

Whereas 62.86 percent untrained farmers had medium extension contact followed by 21.43 per cent high and 15.71 per cent low extension contact respectively.

2.1.7 Group orientation

Srinivasan (1996) while reporting about the working of two NGOs assisted women groups of IFAD project, noticed that the belonging to group gave the women a lot of confidence. These women were able to take charge of their lives and solve their problems only through united action.

Bagyalakshimi (2002) Observed that the self help group members had medium group orientation (46.25%) followed by high (39.58%) and low (22.08%)

2.1.8 Market intelligence

Balappa Shivaraya and Hugar (2002) revealed a strong integration among all the selected markets in Karnataka (India) both in onion and potato, except in Bijapur in onion. Therefore, to continue the present system of market integration, there is a need to establish cells for vegetables to generate market intelligence which would provide a better platform for guiding the farmers in marketing their produce.

Prameela Sharma (2004) indicated that efficient marketing structures optimized the supply chain from farmer to consumer by adding significant value and mitigating risk to ensure that the consumer obtains the produce in the desired time, place and form.

Sundar and Raju (2005) revealed that higher profitability of superba compared to competing crops is an important reason for the cultivation of this crop in the study area. The study recommends, among others, the strengthening of market intelligence to address the problem concerning price fluctuations of G. superba seeds. The strengthening of research and extension is also recommended to address production and marketing constraints.

Singh (2005) in his study indicated that Market intelligence of total international demand and present levels of wild and domesticated supplies along with prices of planting stock and different grades of produce need to be made available to prospective farmers to prevent trade cycles.

2.1.9 Risk orientation

Singh et al (1999) indicated that majority of farmers had low (63%) risk preference followed by medium (22%) and low (15%) risk preference towards dry farming technologies.

Veerendranath (2000) reported that majority of small farmers had low risk orientation, medium farmers had medium and large farmers had high risk orientation respectively

Subramanyam (2002) inferred that 75.00 per cent of the trained farmers had medium risk preference while 13.34 per cent had low and 11.66 per cent had high levels of risk preference.

Madavilatha (2002) reported that 45.00 per cent of respondents had medium level of risk orientation followed by low (31.67%) and high (23.33%) levels in case of trained farmers ,where as 48.33 per cent had low level of risk orientation followed by high (28.33%) and medium (23.33%) levels in untrained farmers.

Siva Subramanayam (2003) concluded that majority (60.84%) of the coconut farmers had medium level of risk orientation while 24.17 per cent had low and 15 per cent had high levels of risk orientation.

Ravishankar (2005) reported that majority of respondents were high market orientation with respect to weather forecasting .

2.1.10 Innovativeness

Veerendranath (2000) revealed that majority of the respondents (39.44%) had medium innovativeness and the rest of them (30.66%) and (30.00%) had low and high innovativeness respectively,

Madavilatha (2002) reported that 45.00 per cent of respondents had medium innovativeness followed by high (30.00%) and low (25.00%) levels in case of trained farmers, where as 41.67 per cent had medium level of innovativeness followed by high (33.33%) and low (25.0%) levels in untrained farmers.

Ravichandra Prasad (2002) reported that 67.86 per cent of the beneficiaries had medium innovativeness followed by high (17.86%) and low (14.28%) levels. Non beneficiaries 51.78 per cent of them had low innovativeness followed by medium (37.50%) and high (10.72%) innovativeness respectively.

Reddy (2003) reported that majority (70.2 %) of the rice growers had medium innovativeness followed by high (15.1%) and low 14.7%) innovativeness.

Purnima (2004) found that majority of the respondents in her study had high innovativeness towards jute diversification programme.

Obaiah (2004) indicated that 56.43 per cent of respondents had medium level of innovativeness followed by high (31.00%) and low (30.00%) levels in case of trained farmers, where as 65.71 per cent had medium level of innovativeness followed by high (22.86%) and low (11.43%) levels in un trained farmers.

Ravishanker (2005) stated that majority of respondents had medium level of innovativeness with respect to weather forecasting.

2.1.11 Management orientation

Dayanidhi (1997) stated that majority of small farmers (38.7%) and medium farmers (42.02%) were under medium management orientation category where as majority of large farmers (52.63%) were having high management orientation.

Vijayachandra (1998) reported that trained farm women were distributed only among two categories, namely medium management orientation (62.50%) and high management orientation (37.50%) and none of them fell under low management orientation category.

Obaiah (2004) indicated that 50.71 per cent of respondents had medium level of management orientation followed by high (25.71%) and low (23.58%) levels in case of trained farmers. Majority of (68.57%) untrained farmers had low management followed by high (21.43%) and medium (10.00%) management orientation.

Ramprasad (2004) concluded that majority of farmers had medium management orientation (78.4%) followed by low (14.4 %) and high (7.2%)

DEPENDENT VARIABLES

2.2 ATTITUDE

Meti and Sundaraswamy (1998) stated that majority of the farmers had favourable attitude towards improved farm implements.

Kumar et al. (1999) inferred that majority of the farmers were neutral or undecided in their attitude towards the agro-forestry programme.

Nagadev (1999) revealed that majority of respondents (68.67%) had moderately favourable attitude, while 16.66 per cent had more favourable attitude and 14.67 per cent respondents had less favourable attitude.

Prasad and Sundaraswamy (2000) found that 36.67 per cent of the respondents belonged to less favourable attitude category followed by 34.33 per cent belonged to more favourable category. A significant percentage (29.00%) of respondents belonged to favourable category.

Ramamurthy (2000) indicated that 72.50 per cent of beneficiaries had favourable attitude, followed by 11.67 per cent with more favourable and 15.83 per cent with less favourable attitude towards Janmabhoomi programme.

Kapala (2002) observed that majority of the farmers (52.00 %) had favourable attitude towards sustainable agriculture, followed by more favourable attitude (27.50 %) and less favourable attitude (20.50 %)

Reddy et al. (2001) indicated that most of the farmers (37.50%) had negative attitude followed by positive (31.63%) and neutral (30.83%) attitude towards dry land agricultural technology.

Lakshmana (2003) concluded that majority of respondents (65.66%) had favourable attitude and 3.33 per cent had highly unfavourable attitude towards ITKs and their blending with modern technologies.

Obaiah (2004) observed that majority of the trained farmers had moderately favourable attitude (55.72%) followed by 31 per cent each less and more favourable attitude. Where as in case un trained farmers they had less favourable attitude (55.71%) followed by moderately (32.86%) and more favourable attitude (11.43%) towards IPM in rice.

Krishnamurthy et.al, (2005) revealed that 43 per cent farmers had more favourable attitude followed by less favourable attitude (29%) and favourable attitude (28%) towards IPM practices in Rice.

Patel et. al. (2007) indicated that majority (55.00%) of the farmers had medium favourable attitude towards IPM strategy followed by 30 per cent low and 15 per cent high favourable attitude towards IPM strategy.

2.3 Knowledge

Bhairamkar et al. (1998) revealed that more than half (53.33%) of the beneficiaries had high knowledge while 26.67 per cent had no knowledge about the IPM programme. On the other hand ,43.33 per cent of non-beneficiaries had medium knowledge, while 36.67 per cent had no knowledge about IPM programme. The knowledge scores of the beneficiaries, non-beneficiaries and total sample were 12.46, 6.65 and 9.51 per cent respectively.

Bhople and Lakhdive (1998) indicated that more than 50.00 per cent of the farmers know about IPM practices.

Murthy and Veerabhadraiah (1999) in their study on Impact of IPM farmer field school training programme on knowledge level of rice farmers revealed a highly significant difference between trained and untrained farmers with respect to mean knowledge index.

Lipi Das et al. (2005) observed that there was remarkable change in knowledge level of farmers in all three ICM technologies after exposure to on farm trials .The pre exposure mean knowledge level increased from 27 to 86 % indicating a change of (59 %) in over all knowledge level of farmers.

Krishnamurthy et.al. (2005) observed that 53 per cent trained farmers had high knowledge followed by low knowledge (27.00%) and medium knowledge (20.00%) regarding IPM practices in Rice. Whereas 45 percent untrained farmers had low knowledge followed by high (32.00 %) and medium (23.00%) knowledge in respect of IPM practices in Rice.

Jaswinder Singh and Kuldip Kumar (2006) observed that majority (60.67 %) of the farmers had medium knowledge level with score between 13-17 in soil and water management practices. .

Waman et al, (2006) revealed that nearly half the cotton growers had high knowledge level on IPM practices in cotton.

Jeyalakshmi and Santhagovind (2008) revealed that over all knowledge level of farm women on sustainable plant protection technologies was found to be low in paddy.

Maraddi et.al, (2007) observed that more than half of the respondents belonged to medium knowledge level category (53.33 %) followed by low (32.77 %) and high (13.89 %) in respect of sugarcane cultivation practices.

2.4 SKILL

Kumar (1996) revealed that majority (58%) of trainees had medium level of skill followed by high (31%) and low (11 %) level of skill after training by K.V.Ks.

Chandravathi (1997) reported that all the women farmers expressed that the training programme was highly advantageous for improving skills in seed treatment, seed selection, gypsum application and preparation of spray fluid etc.

Vijayachandrika (1998) found that majority (77.50 %) of the trained farm women belonged to medium category of skills acquisition followed by 20.00 percent belonging to high category of skills acquisition with regard to rice crop.

Raju (1999) revealed that majority (70.83%) of the trainees had medium level of operational skills acquired followed by low operational skills acquired (17.50%) and high operational skills acquired (11.67%) in ANTWA training programme.

Obaiah (2004) More than half (54.29%) of the trained farmers belonged to medium skills learnt category followed by high (25%) and low (20.91%) categories of skills learnt .In case of untrained farmers majority (63.57%) of them belonged to low skills learnt group followed by medium (20%) and high (1.43%) categories of skills learnt in Rice IPM.

2.5 ADOPTION

Thyagarajan and Vasanthakumar J (2000) found that majority of the farmers were in low category of adoption (48.33%) of recommended rice technologies followed by high (28.675) and medium (23.0%) adoption.

Vijyalan (2001) in his study on eco friendly agricultural practices in Rice revealed that rice growers were found to have low (41.66 %) adoption level followed by medium (32.5 %) and high (25.84 %) levels.

Subramanyam (2002) found that 58.33 per cent of respondents had medium adoption followed by high (25 %) and low (16.67 %) level of adoption in case of AMC trained farmers ,where as 63.34 per cent of respondents had low adoption followed by medium (21.66 %) and high (15.00 %) levels of adoption in case of untrained farmers.

Madhavalatha (2002) reported that 35.00 percent of respondents had high extent of adoption followed by low (33.33 %) and medium (31.67 %) extent in case trained

farmers ,where as 40.00 percent had low extent of adoption followed by high (31.67 %) and medium (28.33 %) extent of adoption in untrained farmers.

Wasnik (2003) stated that 46.40 percent of farmers had high adoption followed by medium (38.60 %) and low (15 %) after introduction of watershed development programme.

Natarajan (2004) revealed that majority of FFS farmers belonged to medium(36.66%) adoption category followed by high (35.66 %) and low(27.78%), where as in case of Non FFS majority were medium (36.67%) followed by low (33.33%) and high (30.00%)

Waman et al. (2006) revealed that majority of the farmers had low to medium level of adoption of recommended IPM practices in Cotton.

2.6 AGRO ECOSYSTEM MANAGEMENT

Pest defender management

Ooi and Kenmore (2005) concluded that educating farmers about biological control result in farmers using less chemical insecticides and becoming more efficient in their production activities.

Mancini (2006) stated that those farmers who had learned more about pest and predator ecology attained the highest reductions in pesticide usage.

Input management

Mancini (2006) observed that adoption of IPM reduced pesticide use by 78 per cent without affecting crop productivity, suggesting that a large part of the current use of pesticides is unnecessary

Nisha Aravind (2006) found that the non-IPM fields received an imbalance dosage of nutrient treatment as well as chemical pesticide sprays, while the IPM fields were applied with a balanced fertilizer treatment (NPK), planted at lower densities with wider spacing and need-based botanical and biological pesticides application. Benefit cost ratio was higher for IPM farmers (1:2.01) compared to that of non-IPM farmers.

Arun Balamatti and Rajendra Hegde (2007) found that FFS training has strengthened women's knowledge and skills on soil and water conservation, soil fertility management and better practices of crop production and protection. The availability of food crops for home consumption has improved.

Biodiversity conservation

Singh et al (2006) stated that farmers possess an immense knowledge of their environment based on the years of informal wisdom and close observation of the nature. By living in rich and variety of complex ecosystems, they have developed an understanding of ecosystem, food web, and techniques for their effective management. People knowledge and perception towards environment are important elements cultural identity and biodiversity conservation.

Ooi and Kenmore (2005) indicated that the species diversity was higher in IPM plots compared with plots regularly treated with insecticides. In India, the number of species was 48 in IPM plots and 31 in non-IPM plots, with an increase in biological control knowledge (FFS farmers scoring 16.9 points for recognizing natural enemies compared to 2.3 for non-IPM), there is a concomitant reduction in use of insecticides (43% for IPM farmers versus 34% for non-IPM)

2.7 Use of ITKs

Singh and Rao (1993) documented several traditional conservation farming practices followed by farmers in rainfed farming systems under different groups such as tillage and moisture conservation practices, land management ,water harvesting and crop management practices.

Mane and Sutaria (1993) documented different traditional practices followed by tribal farmers in different crops in Gujarath state.

Rambabu (1997) found that majority of farmers were medium adopters in Cotton (63.34%) cropping system followed by low and high adoption.

Atchuta Raju (2002) concluded that majority of respondents (57.50 %) had medium level of adoption of eco-friendly farming practices followed by 22.50 percent low level of adoption and remaining 20.00 percent with high level of adoption.

Lakshmana (2003) indicated that majority of ITKs found rational (85.71 %) and remaining ITKs (14.29%) were found not rational.

Karthekeyan et al.(2006) described about five indigenous technologies involving cow based products used by farmers for various purposes and an analysis on its impact in Tamil Nadu.

2.8 DECISION MAKING

Neelarani (1999) in her study found that in majority of tribal families ,husband alone took majority of decisions regarding agricultutal activities.

Chatterjee (2000) inferred that majority (68.33%) of the respondents had medium level of decision making ability followed by low (18.33%) and high (13.33 %) levels of decision making ability.

Devi (2000) found that majority of respondents had medium level (49.28%) decision making ability followed by high (28.26%) and low (22.46%)

Obaiah (2004) reported that majority (57.14%) of the FFS trained farmers were having medium decision making ability followed by high and low decision making ability with equal percentage (i.e 21.43% each). In case of untrained farmers, 42.86 per cent were found to be under low decision making ability category followed by medium (41.43%) and high (15.71%) decision making ability categories.

Nisha Aravind (2006) in her study on effectiveness of Farmer field school (FFS) approach in rice ecosystem for IPM observed that farmer regained the competence to make rational decisions concerning the management of crops.

2.9 Association of profile Characters with that of Attitude, Knowledge, Skill, Extent of adoption, Agro ecosystem management and Decision making

1. ATTITUDE

Attitude Vs Age

Ramprasad (2004) concluded that age had positively significant relationship with attitude level of farmers.

Attitude Vs Education

Singh et al. (1999) concluded that there was positive and significant relationship between education and attitude of farmers towards dry farming technologies .

Chandra et al.(2000) inferred that there was no significant association between education and attitude of farmers towards watershed development practices.

Prasad and Sundaraswamy (2000) indicated that there was positively significant association between education and attitude of farmers towards dryland agricultural technologies.

Ramamurthy (2000) reported that there was a negative significant relationship between education and attitude of farmers

Obaiah (2004) reported that there was positive and significant relationship between education and attitude of FFS and non farmers towards IPM in rice.

Attitude Vs Farming experience

Srinu (1997) reported that there was positively significant relationship between farming experience and attitude of farmers.

Prasad and Sundaraswamy (2000) indicated that there was positive non-significant association between farming experience and attitude of farmers towards dryland agricultural technologies.

Atchuta Raju (2002) concluded that farming experience had positively significant relationship with attitude of farmers towards sustainable agriculture..

Obaiah (2004) reported that there was positive and significant relationship between farming experience and attitude of FFS and non farmers towards IPM in rice.

Ramprasad (2004) stated that farming experience had positively significant relationship with attitude of farmers.

Attitude Vs Farm size

Singh et al. (1999) stated that there was positive non-significant association between land holding and attitude of farmers towards dry farming technologies .

Chandra et al.(2000) reported that there was negatively significant association between farm size and attitude of farmers towards water shed development

Ramamurthy (2000) reported that there was a positive significant relationship between farm size and attitude of farmers

Atchuta Raju (2002) concluded that farm size had positively significant relationship with attitude level of farmers towards sustainable agriculture.

Ramprasad (2004) stated that farm size had positively significant relationship with attitude of farmers .

Attitude Vs Mass media exposure

Singh et al. (1999) stated that there was positively significant association between mass media exposure and attitude of farmers towards dry farming technologies.

Chandra et al. (2000) inferred that there was positive and non significant relationship between mass media exposure and attitude of farmers towards water shed development

Ramamurthy (2000) reported that there was a positive significant relationship between mass media exposure and attitude of farmers

Prasad and Sundaraswamy (2000) indicated that there was positively significant association between mass media exposure and attitude of farmers towards dryland agricultural technologies.

Obaiah (2004) reported that there was non significant relationship between mass media exposure and attitude of farmers

Attitude Vs Extension contact

Meti and Sundaraswamy (1998) indicated that there was non significant relationship between extension participation and attitude of farmers

Chandra et al.(2000) indicated that there was positively significant association between extension participation and attitude of farmers towards watershed development practices.

Prasad and Sundaraswamy (2000) stated that there was a positive significant relationship between extension participation and attitude of farmers towards dryland agricultural technologies.

Ramamurthy (2000) stated that there was a negatively significant relationship between extension participation and attitude of farmers.

Obaiah (2004) reported that there was a non significant relationship between extension contact and attitude of farmers

Attitude Vs Risk orientation

Chandra et al. (2000) indicated that risk orientation had positively significant relationship with attitude level of farmers towards sustainable agriculture.

Prasad and Sundaraswamy (2000) reported that there was a positively significant relationship between attitude and risk orientation of farmers.

Atchuta Raju (2002) concluded that risk orientation had positively significant relationship with attitude level of farmers towards sustainable agriculture.

Attitude Vs Innovativeness

Ramakrishna (1999) stated that there was positive relationship between innovativeproneness and attitude of farmers.

Atchuta Raju (2002) concluded that innovativeness had positively significant relationship with attitude level of farmers towards sustainable agriculture.

Obaiah (2004) reported that there was positive and significant relationship between innovativeness and attitude of FFS and non farmers towards IPM in rice.

Attitude Vs Management orientation

Obaiah (2004) reported that there was positive and significant relationship between management orientation and attitude of FFS and non farmers towards IPM in rice.

Ramprasad (2004) concluded that management orientation had positively significant relationship with attitude level of farmers.

2.Knowledge.

Knowledge Vs Age

Veeraiah et al (1998) revealed that age had negative and significant relationship with the level of knowledge of trained farmers about recommended critical skills in rainfed groundnut cultivation.

Ramakrishnan (1999) concluded that age had a negative and significant relationship with knowledge gained trainees.

Hemanth Kumar (2002) reported that there was no significant relationship between age and knowledge level of the oriental tobacco farmers.

Madhavalatha (2002) reported that there was no significant relationship between age and knowledge level of the trained farmers.

Saritha Vaish et al. (2003) concluded that age had highly significant relationship with knowledge level of rural women on rice production technology.

Satpal Singh et al.(2003) revealed that age had negative significant relationship with knowledge level of farmers on sunflower production technology.

Obaiah (2004) indicated that age had positively significant relationship with knowledge of FFS and non FFS farmers on IPM in rice.

Knowledge Vs Education

Balasubramani et al. (2000) reported that there was positive and significant relationship between education and knowledge level of Rubber growers

Borkar et al. (2000) found that there was a positively significant relationship between education of the farmers with their knowledge level of biofertilizers .

Veerendranath (2000) indicated that there was a positive and significant relationship between education and knowledge of rainfed castor growing farmers.

Hemanth Kumar (2002) inferred that there was a positive and significant relationship between education and knowledge level of the respondents about oriental tobacco practices.

Madhavalatha (2002) reported that there was a positive significant relationship between education and knowledge level of the trained farmers.

Satpal Singh et al.(2003) revealed that education had positively significant relationship with knowledge level of farmers on sunflower production technology.

Obaiah (2004) stated that education had positively significant relationship with knowledge of FFS and non FFS farmers on IPM in rice.

Knowledge Vs Farming experience

Sindhe et al. (1999) indicated that there was a negatively significant correlation between farming experience and knowledge about improved practices of Rabi Jowar

Balasubramani et al. (2000) indicated that there was positive and non significant relationship between farming experience and knowledge level of Rubber farmers

Chatterjee (2000) inferred that there was a positively significant relationship between farming experience and knowledge level about the recommended technologies of NWDPRA.

Veerendranath (2000) reported that there was non-significant relationship between experience and knowledge of rainfed castor growing farmers.

Obaiah (2004) indicated that farming experience had positively significant relationship with knowledge of FFS and non FFS farmers on IPM in rice.

Knowledge Vs Farm size

Sindhe *et al* (1999) indicated that there was a positive and significant association between land holding and knowledge about improved practices of Rabi Jowar

Singh *et al* (1999) observed that there was a positive and non significant relationship between land holding and knowledge level of dry farming technologies.

Borkar *et al* (2000) indicated that there was a positive and significant association between land holding and knowledge level of bio fertilizers.

Madhavalatha (2002) reported that there was a positive significant relationship between farm size and knowledge level of the trained farmers.

Obaiah (2004) indicated that farm size had positively significant relationship with knowledge of FFS and non FFS farmers on IPM in rice.

Knowledge Vs Mass media exposure

Singh *et al* (1999) observed that there was a positively significant relationship between mass media exposure and knowledge level of dry farming technologies.

Borkar *et al* (2000) indicated that there was a positively significant association between mass media exposure and knowledge level of bio fertilizers.

Chatterjee (2000) stated that there was a positive and significant relationship between mass media exposure and knowledge level about the recommended technologies of NWDPPRA.

Gattu (2001) stated that there was a positive and significant relationship between mass media exposure and knowledge level.

Satpal Singh et al. (2003) revealed that mass media exposure had positively significant relationship with knowledge level of farmers on sunflower production technology.

Obaiah (2004) indicated that mass media exposure had positively significant relationship with knowledge of FFS and non FFS farmers on IPM in rice.

Knowledge Vs Extension contact

Prasad and Sundaraswamy (1999) concluded that there was positive and significant relationship between extension participation and knowledge level about dry land technologies.

Ramamurthy (2000) observed that there was a positive and significant association between extension participation and knowledge level

Borkar *et al.* (2000) indicated that there was a positive and significant association between extension participation and knowledge level of bio fertilizers.

Ravichandra Prasad (2002) reported that there was a positive and significant relationship between extension participation and knowledge level of beneficiaries about package of practices of rice OFEDs.

Satpal Singh et al.(2003) revealed that extension contact had positively significant relationship with knowledge level of farmers on sunflower production technology.

Obaiah (2004) indicated that extension contact had positively significant relationship with knowledge of FFS and non FFS farmers on IPM in rice.

Knowledge Vs Market intelligence

Chander (1991) reported that in case of medium and large farmers ,market orientation had positive significant relationship with knowledge on the recommended technologies of watershed development project.

Reddy (1998) revealed that there was a positive and significant relationship between market orientation and knowledge of the farmers of KVV.

Knowledge Vs Risk orientation

Gattu (2001) reported that risk orientation had positively significant relationship with knowledge level of respondents.

Atchuta Raju (2002) concluded that risk orientation had positively significant relationship with knowledge level of farmers on ecofriendly farming practices.

Satpal Singh et al. (2003) revealed that risk orientation had positively significant relationship with knowledge level of farmers on sunflower production technology.

Natarajan (2004) indicated that risk orientation had positively significant relationship with knowledge level of farmers on recommended IPM practices.

Knowledge Vs Innovativeness

Devi and Manoharan (1999) reported that there was positively significant relationship between innovativeness and knowledge level.

Ramakrishnan (1999) reported that there was positively significant relationship between innovation proneness and knowledge level

Veerendranath (2000) concluded that there was a positive and significant relationship between innovativeness and knowledge level of rainfed castor growing farmers.

Kalaskar et al. (2001) reported that there was positively significant relationship between innovation proneness and knowledge level of coconut growers.

Madhavalatha (2002) reported that there was a positive significant relationship between innovativeness and knowledge level of the trained farmers.

Obaiah (2004) indicated that innovativeness had positively significant relationship with knowledge of FFS and non FFS farmers on IPM in rice.

Knowledge Vs Management orientation

Obaiah (2004) indicated that management orientation had positively significant relationship with knowledge of FFS and non FFS farmers on IPM in rice.

3. Skills

Skills Vs Age

Ramakrishnan (1999) concluded that age had a negative and significant relationship with operational skills acquired by the trainees.

Skills Vs Education

Ramakrishnan (1999) inferred that there was a positive and significant relationship between education and operational skills acquired by the trainees.

Obaiah (2004) reported that there was positive and significant relationship between education and skills of FFS and non farmers towards IPM in rice.

Skills Vs Farming experience

Subbarao (1996) observed that there was a negative and significant relationship between farming experience and skills

Obaiah (2004) reported that there was positive and significant relationship between farming experience and skills of FFS and non farmers towards IPM in rice

Skills Vs Extension contact

Ramakrishnan (1999) inferred that there was a positive and significant relationship between extension contact and operational skills acquired by the trainees.

Obaiah (2004) reported that there was positive and significant relationship between extension contact and skills of FFS and non farmers towards IPM in rice

Skills Vs Mass media exposure

Ramakrishnan (1999) inferred that there was a positive and significant relationship between mass media exposure and operational skills acquired by the trainees.

Obaiah (2004) reported that there was a non significant relationship between mass media exposure and skills of farmers

Skills Vs Innovativeness

Obaiah (2004) reported that there was positive and significant relationship between innovativeness and skills of FFS and non farmers towards IPM in rice

Skills Vs Management orientation

Obaiah (2004) reported that there was positive and significant relationship between management orientation and skills of FFS and non farmers towards IPM in rice

4. Extent of adoption

Adoption Vs Age

Raju (1999) revealed that age had negative significant relationship with adoption of different agricultural practices taught in the training programmes under ANTWA of trained farm women.

Veerendranath (2000) reported that age had negative significant relationship with adoption of rainfed castor growing farmers.

Ravichandra Prasad (2002) stated that there was no significant relationship between age and adoption level of beneficiaries about package of rice OFEDs.

Hemanth Kumkar (2002) reported that there was no significant relationship between age and adoption level of oriental tobacco farmers.

Avinash Kumar Singh et al. (2003) concluded that age had significant relationship with adoption of improved chick pea technology.

Adoption Vs Education

Manjunatha (1999) stated that education had positively significant relationship with adoption.

Veerendranath (2000) reported that education had positive and significant relationship with adoption of rainfed castor growing farmers.

Baswarajaiah (2001) revealed that education had positively significant relationship with adoption of respondents.

Madhavilatha (2002) reported that there was a positive significant relationship between education and adoption level of trained farmers.

Avinash Kumar Singh et al. (2003) concluded that education had significant relationship with adoption of improved chick pea technology.

Satish (2003) reported a positive and significant relationship between education and adoption risk management practices by the papaya growers.

Adoption Vs Farming experience

Chandra (2000) inferred that there was a positive and significant relationship between farming experience and adoption of respondents.

Baswarajaiah (2001) revealed that farming experience had negative non significant relationship with adoption of respondents.

Atchuta Raju (2002) concluded that farming experience had positively significant relationship with adoption level of eco friendly farming practices.

Ravichandra Prasad (2002) concluded that there was a negative and significant relationship between farming experience and adoption level of the beneficiaries about the package of practices of rice OFEDs.

Natarajan (2004) revealed that farming experience had no significant relationship with adoption of farmers on IPM practices.

Adoption Vs Farm size

Chandra et al. (2000) inferred that there was a positive and significant relationship between farm size and adoption of respondents.

Madhavalatha (2002) reported that there was a positive significant relationship between farm size and adoption level of trained farmers.

Avinash Kumar Singh et al. (2003) concluded that farm size had significant relationship with adoption of improved chick pea technology.

Satish (2003) revealed that there was non significant relationship between farm size and adoption risk management practices by the papaya growers.

Ravishankar (2005) indicated that there was positive significant relationship between farm size and decision making ability of farmers of weather forecasting

Adoption Vs Mass media exposure

Chandra (2000) inferred that there was a positive and significant relationship between mass media exposure and adoption of respondents.

Gattu (2001) stated a positively significant relationship between mass media exposure and adoption level

Madhavalatha (2002) reported that there was a positive significant relationship between mass media exposure and adoption level of trained farmers.

Satish (2003) reported a positive and significant relationship between mass media exposure and adoption risk management practices by the papaya growers.

Avinash Kumar Singh et al. (2003) concluded that mass media exposure had significant relationship with adoption of improved chick pea technology.

Adoption Vs Extension contact

Raju (1999) revealed that extension contact had positive and significant relationship between extension contact and adoption of practices taught under ANTWA for trained farm women.

Chandra (2000) inferred that there was a positive and significant relationship between extension contact and adoption of respondents.

Subramanyam (2002) concluded that there was a positive and significant relationship between extension contact and adoption of latest agricultural technology by trained farmers of AMCc.

Avinash Kumar Singh et al. (2003) concluded that extension contact had significant relationship with adoption of improved chick pea technology.

Motamed and Baldeo Singh (2003) reported that there was a positive and significant relationship between extension contact and adoption level of the improved sericulture practices.

Adoption Vs Risk orientation

Veerendranath (2000) reported that a positive and significant relationship between risk orientation and adoption of rain fed castor farmers.

Gattu (2001) indicated positive significant relationship between risk orientation and adoption level of trained farmers.

Madhavalatha (2002) reported that there was a positive significant relationship between risk orientation and adoption level of trained farmers.

Subramanyam (2002) concluded that there was a positive and significant relationship between risk orientation and adoption of latest agricultural technology by trained farmers of AMCs.

Ravishankar (2005) indicated that there was a positive and significant relationship between risk orientation and adoption of weather forecasting.

Adoption Vs Innovativeness

Manjunatha (1999) stated that there was positive significant relationship between innovativeness and adoption level

Madhavalatha (2002) reported that there was a positive significant relationship between innovativeness and adoption level of trained farmers.

Subramanyam (2002) concluded that there was a positive and significant relationship between innovativeness and adoption of latest agricultural technology by trained farmers of AMCs.

Satish (2003) reported a positive and significant relationship between innovativeness and adoption risk management practices by the papaya growers.

Ravishankar (2005) indicated that there was a positive and significant relationship between innovativeness and adoption of weather forecasting.

5. Decision making

Decision making Vs Age

Rani (1999) observed that positive but non significant relationship between age and decision making ability of farm women.

Mahitha Kiran (2000) found that there was no significant relationship between age and decision making ability of farm women in agriculture.

Kumar (2001) found that age had not shown any significant relationship with farm decision making of floriculture farmers.

Radha Krishna et.al. (2008) revealed that there was positive and significant relationship between age and decision making level of members of SHG.

Decision making Vs Education

Rani (1999) observed that education was significantly related with decision making ability of farm women.

Mahitha Kiran (2000) found that there was no significant relationship between education and decision making ability of farm women in agriculture.

Kumar (2001) found that education was positively significant with farm decision making of floriculture farmers

Obaiah (2004) found that there was no significant relationship between education and decision making ability of FFS farmers.

Radha Krishna et.al. (2008) revealed that there was non significant relationship between education and decision making level of members of SHG.

Decision making Vs Farming experience

Vijayalakshmi (1995) concluded that there was positive and non-significant relationship between farming experience and decision making on farm women.

Sumana (1996) observed that there was non-significant relationship between farming experience and decision making pattern of farm women.

Obaiah (2004) reported that there was positive and significant relationship between farming experience and decision making of FFS and non FFS farmers.

Decision making Vs Farm size

Vijayalakshmi (1995) observed that land holding status of family was found to be non-significant with decision making ability of farm women.

Kumar (2001) found that farm size was positively significant with farm decision making of floriculture farmers

Mahitha Kiran (2000) found that there was no significant relationship between farm size and decision making ability of farm women in agriculture.

Radha Krishna et.al. (2008) revealed that there was positive and significant relationship between farm size and decision making level of members of SHG.

Decision making Vs Extension contact

Rani (1999) observed that Positive and significant relationship between extension contact and decision making ability of farm women.

Mahitha Kiran (2000) found that there was positive significant relationship between extension contact and decision making ability of farm women in agriculture.

Obaiah (2004) reported that there was positive and significant relationship between farming experience and decision making of FFS and non FFS farmers.

Radha Krishna et.al. (2008) revealed that there was positive and significant relationship between extension contact and decision making level of members of SHG.

Decision making Vs Mass media exposure

Vijayalakshmi (1995) observed that there was positive and non-significant relationship between mass media exposure and decision making ability of farm women.

Mahitha Kiran (2000) found that there was positive significant relationship between mass media exposure and decision making ability of farm women in agriculture.

Obaiah (2004) reported that there was positive and significant relationship between mass media exposure and decision making of FFS and non FFS farmers.

Decision making Vs Risk orientation

Rani (1999) observed that Positive and non significant relationship between risk orientation and decision making ability of farm women.

Mahitha Kiran (2000) found that there was positive significant relationship between risk orientation and decision making ability of farm women in agriculture.

Ravishankar (2005) stated that there was positive significant relationship between risk orientation and decision making ability of respondents of weather forecasting.

Radha Krishna et.al. (2008) revealed that there was positive and significant relationship between risk orientation and decision making level of members of SHG.

Decision making Vs Innovativeness

Mahitha Kiran (2000) found that there was positive significant relationship between innovativeness and decision making ability of farm women in agriculture.

Obaiah (2004) reported that there was positive and significant relationship between innovativeness and decision making of FFS and non FFS farmers.

Ravishankar (2005) stated that there was positive significant relationship between innovativeness and decision making ability of respondents of weather forecasting.

Decision making Vs Management orientation

Rani (1999) observed that there was a positive and non significant relationship between management orientation and decision making ability of farm women.

Obaiah (2004) reported that there was positive and significant relationship between management orientation and decision making of FFS and non FFS farmers.

2.10 CONSTRAINTS

Jain and Bhattacharya (2000) indicated that five types of constraints which includes social, financial, situational, technological and operational .A majority of respondents (685%) reported that non awareness about bio-fertilisers product. Other constraints were lack of practical oriented training (64%),lack of relevant literature (60%) ,lack of handling skills (56%) lethargy due to cumbersome technique (54%), lack of confidence on bio fertilizers input (52%) and poor quality of bio fertilizer (50%) .Few (44%) reported lack of bio fertilizer supply were centre in village and lack of storage facility.

Baswarajaih (2001) concluded that the problems expressed by the farmers were lack of resources, follow up action by implementing officials, technical guidance by scientists ,efforts on the part of implementing agency to educate and convince the farmers about the programme, illiteracy and the farmers were habituated to subsidies, low level of motivation and less availability of suitable technology for resource poor situations ,credit facility, timely supply of inputs.

Madhavalatha (2002) reported that problems as perceived by the FTC trained farmers were high cost of input (75%), lack of awareness on advanced IPM practices(61.67%), difficulty in implementing biological methods(43.33%), lack of methods for easy detection of the ETIL (36.66%) ,non availability of inputs in time

(31.67%), inability to contact extension agencies at the time of need (26.67%), difficulty in calculating pesticide doses (20.00%), high cost of labour (16.67%), lack of simple monitoring methods (11.67%) high cost of sprayers (8.33%), difficulty in remembering scouting methods (3.33%).

Obaiah (2004) indicated that problems expressed by FFS farmers were Farmer field school timings are not convenient for majority of farmers (93.57%) was an important problem followed by poor mobility facilities to the extension staff (90.71%), non-availability of inputs in time (88.57%), lack of literature on proven IPM technologies (84.42%), non availability of trained facilitators for the FFS (81.42%), shortage of funds and infrastructure facilities (77.14%), lack of proper monitoring (72.85%), inadequate training to the field staff (69.28%), lack of proper training material (64.28%) and poor coordination between plant protection services, research institutes and extension functionaries (61.42%)

Natarajan (2004) stated that high cost of inputs, high labour cost, difficulty in remembering ETL and scouting methods, labour scarcity during peak period of the season were the major problems encountered by the beneficiaries of rice IPM FFS.

2.10.1 Suggestions

Rambabu (1997) revealed that the important suggestions made by the farmers to overcome the constraints were: improvement of sound research on ecological farming practices, make available the bio-fertilisers and neem products on subsidy rates by government, establishment of bio-gas plants for getting more organic manure and strengthening the extension system to immediate dissemination of proven indigenous technologies.

Nagadeve (1999) revealed that the important suggestions made by the IPM trained farmers to overcome the constraints were timely supply of inputs at reasonable cost (74%), regular farm visit of extension worker (70%), arranging more credit facilities (64%), less rate of interest on loan (58%), providing the subsidy on inputs (42%) should be found out. Timely technical guidance (38%), organising more number of training programmes and involving the other farmers of village in training programme (32%) and follow up training programme (28%) for successful implementation of IPM programmes and thereby improve the plant protection status of farmers.

Baswarajaiah (2001) concluded that the suggestions offered by the farmers for improving participation, making proper follow up action, leadership abilities, encouraged to develop capacity to analyse the problems and interests of people to be provoked to intensify extension activities, timely supply of inputs with subsidized rates, provision of timely technical guidance by scientists, provided adequate training for timely execution of soil and moisture conservation works.

Vasantha (2002) in her study on IPM technologies in cotton revealed that lack of organizational or cooperative efforts by farmers as the major problem for which it was suggested that formation of farmers clubs and cooperative societies for effective group actions as the need of hour.

Obaiah (2004) indicated that the suggestions made by FFS farmers were conduct FFS programme at 9 AM (92.14%), separate and exclusive transport facilities may be arranged to the facilitators to attend the FFS in time (91.42%), supply of critical inputs in time (88.57%), publications may be published in vernacular language regarding proven IPM technologies and may be supplied (87.57%), officials must be trained in key components of programme (81.42%) adequate funds to be allotted to

meet the basic requirements and to incur the expenditure on contingencies (78.57%) ,proper monitoring of the programme at every stage by the superior officer (72.85%) ,providing training material for smooth conduct of FFS(64.28%) ,maintenance of proper coordination between plant protection services ,research institutes and extension functionaries.

Natarajan (2004) stated that reduction in high cost of inputs, simple procedures to remember ETL and scouting methods as important suggestions in the adoption of IPM practices in rice.

2.11. Conceptual model of the study and derivation of hypothesis

2.11.1 Conceptual model of the study

In the light of inferences derived from recorded evidences in the literature , conceptual model has been developed for the study (Empowerment of Farmers through Farmer Field School in Andhra Pradesh) has been assessed on level of attitude, knowledge, skills learnt, adoption , agro-ecosystem management and decision making by FFS and non FFS farmers. The independent variables representing the personal,Socio-economic and psychological characteristics were selected ,based on the review of literature and in consultation with experts in the field of extension to examine nature and extent of relationship with attitude, knowledge, skills learnt, adoption , agro-ecosystem management and decision making by FFS and non FFS farmers

This model was positively perceived with a view to give Empowerment of farmers in comparison of selected behavioral dimensions of FFS and non FFS framers like attitude, knowledge, skills learnt, adoption , agro-ecosystem management and decision making

and independent variables affecting them and the relationship was diagrammatically presented in Fig.1 which will help to derive hypothesis for empirical testing.

2.11.2 Derivation of hypothesis

Based on the review of literature and conceptual frame work for the study ,the following hypothesis were found to examine the dependent variables and its selected dimensions and to test their relationship with independent variables.

General Hypothesis -1

There will be relationship between the independent variables of FFS and Non FFS farmers with their Attitude

General Hypothesis -2

There will be relationship between the independent variables of FFS and Non FFS farmers with their Knowledge.

General Hypothesis -3

There will be relationship between the independent variables of FFS and Non FFS farmers with their Skill learnt.

General Hypothesis -4

There will be relationship between the independent variables of FFS and Non FFS farmers with their Adoption of Cotton FFS practices.

General Hypothesis -5

There will be relationship between the independent variables of FFS and Non FFS farmers with their Agro-ecosystem management.

General Hypothesis -6

There will be relationship between the independent variables of FFS and Non FFS farmers with their Decision making.

2.12 Definition and operationalization of the terms used in the study

Empowerment:

Empowerment is operationalized as a process that enables farmers to increase their knowledge and build skills in identifying and analyzing problems encountered and take appropriate decisions and actions to prevent and reduce risks and to solve problems.

Knowledge

Knowledge was operationalized as the number of eco-friendly farming practices known to farmers in order to protect the natural resources in the farmers field school area.

Attitude

Attitude was operationalized as the mental disposition of the respondent about various aspects of ICM either positively or negatively.

Skill

An ability and capacity acquired through deliberate, systematic, and sustained effort to smoothly and adaptively carryout complex activities.

Decision making ability

Decision making ability was operationalized as the degree to which an individual justifies his selection of most efficient means/ ways from among the available alternatives on the basis of scientific criteria.

Agro ecosystem management

Agro ecosystem management was defined as tool that provide integration and synthesis of soil test results, management priorities, and environmental concerns.

Adoption

Adoption was operationalized as practicing the ICM technologies in cotton by FFS farmers as per recommendations of Department of Agriculture.

Age

Age of the respondent was operationalized as the number of completed years at the time of enquiry.

Education

Education of the respondent was operationalized as the formal education attained by the respondent

Farm size

Land holding was operationalized as the total extent of land an individual farmer possessed and cultivated.

Farming experience

Farming experience was operationalized as the number of completed years of experience in farming by the respondent.

Extension contact

Extension contact was operationalized as the frequency of contact of respondent with extension personnel i.e AEO,A.O,ADA,FFS facilitator, Adarsha rythu and ANGRAU Scientist

Group orientation

Group orientation was operationalized as the degree to which the farmer is oriented towards group for achieving common goal and in adopting new ideas in FFS.

Market intelligence

Market intelligence is operationalized as the process of acquiring and analyzing information in order to understand the market to determine the current and future needs and preferences, attitude and behaviour of the market and to assess the changes in business environment that may affect the size and nature of the market in the future.

Mass media exposure

Mass media exposure was operationalized as the frequency with which the respondent reads news paper and agric. Journals, listens radio and watches television, C.Ds for farm information.

Innovativeness

It was operationalized as the degree to which an individual adopts new ideas and new information related to FFS practices.

Risk orientation

Risk orientation was operationalized as the degree to which the farmer was oriented towards risk and uncertainty in adopting new ideas in FFS.

Management orientation

Management orientation was operationalized as the degree to which a farmer is oriented towards scientific farm management comprising of planning, production and marketing functions of his farm enterprise.

CHAPTER III

MATERIALS AND METHODS

The present chapter deals with methodology adopted for the present study. It includes the research design, locale of the study, sampling procedure, empirical measurement of the variables, procedures followed in development of Attitude of farmer, Knowledge test, Skill, Extent of adoption, Agro-ecosystem management and Decision making towards Farmers Field Schools. The methods followed have been described under the following sub heads.

- 3.1 Research design
- 3.2 Locale of the study
- 3.3 Sampling procedure
- 3.4 Empirical measurement of the variables
- 3.5 Constraints and suggestions for effective implementation of Farmers Field Schools in Cotton
- 3.6 Tools for data collection
- 3.7 Statistical tests used to analyze the data

3.1 RESEARCH DESIGN

Ex-post-facto research was followed for carrying out the study. Expost facto research design is systematical empirical enquiry in which the dependent variables have not been directly manipulated because they have already occurred or they are inherently not manipulable. With respect to the type of variables under consideration, size of respondents and phenomenon to be studied, the ex-post-facto design was chosen as an appropriate research design.

3.2 LOCALE OF THE STUDY

The state of Andhra Pradesh was purposively selected for the study as the investigator is familiar with the local language, which helps to develop rapport and also

enable in depth study combined with personal observation. Moreover, the investigator is working in ANGRAU, the only Agricultural University in Andhra Pradesh.

3.3 SAMPLING PROCEDURE

3.3.1 Selection of Districts

Three districts one each from Telangana, Rayalaseema and Andhra region i.e., Warangal, Kadapa and Guntur were selected purposively based on highest number of FFSs on Cotton crop during 2006-2007. (Table 3.1)

3.3.2 Selection of Mandals

Two mandals from each district were selected purposively based on highest number of Cotton Farmers Field schools organized during 2006-2007. The list of mandals are given below :

S.No	District	Mandal
1	Warangal	Hasanparthy
		Nekkonda
2	Kadapa	Porumamilla
		Kalasapadu
3	Guntur	Tadikonda
		Amaravathi

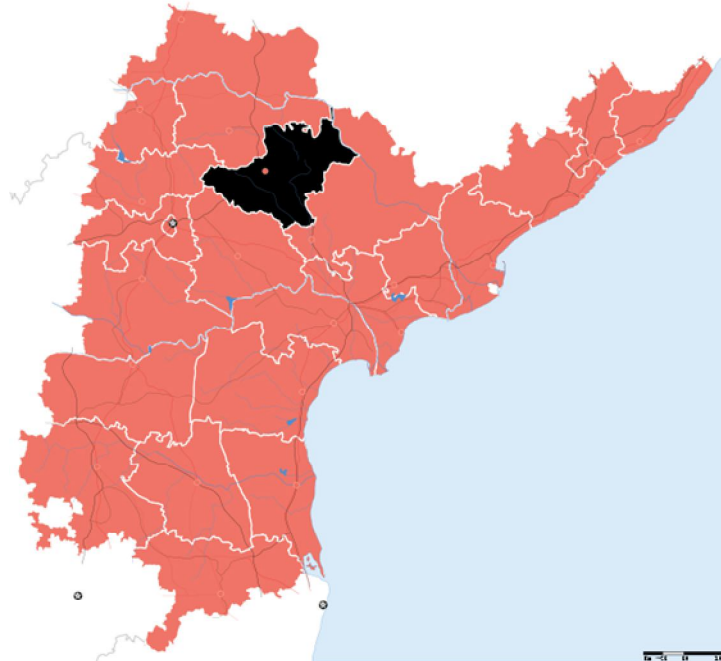
3.3.2 Selection of Farmer Field Schools

One Farmer Field School was selected from each mandal, thus six FFSs were selected for the study. The villages selected are presented given below:

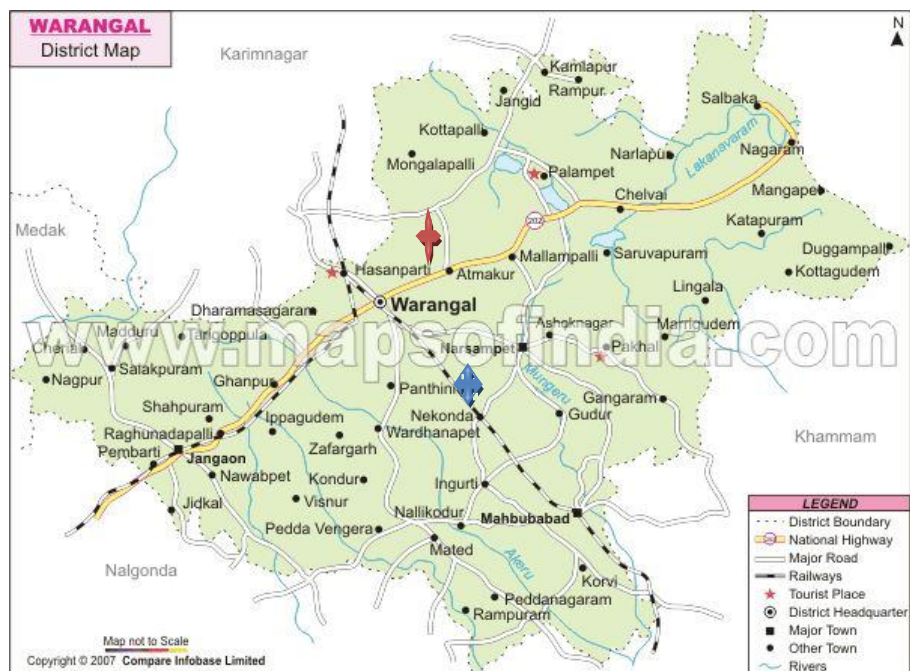
S.No	Mandal	Village
1	Hasanparthy	Seethampeta
	Nekkonda	Deekshakunta
2	Porumamilla	Rajasahebpetta
	Kalasapadu	Rajupalem
3	Tadikonda	Ponnekallu
	Amaravathi	Daranikota



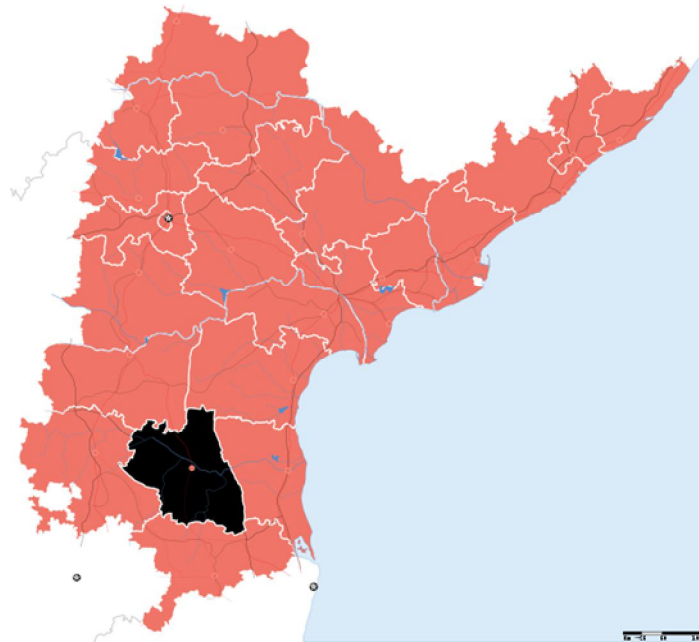
Location of selected districts in Andhra Pradesh State



Location of Warangal District in A.P



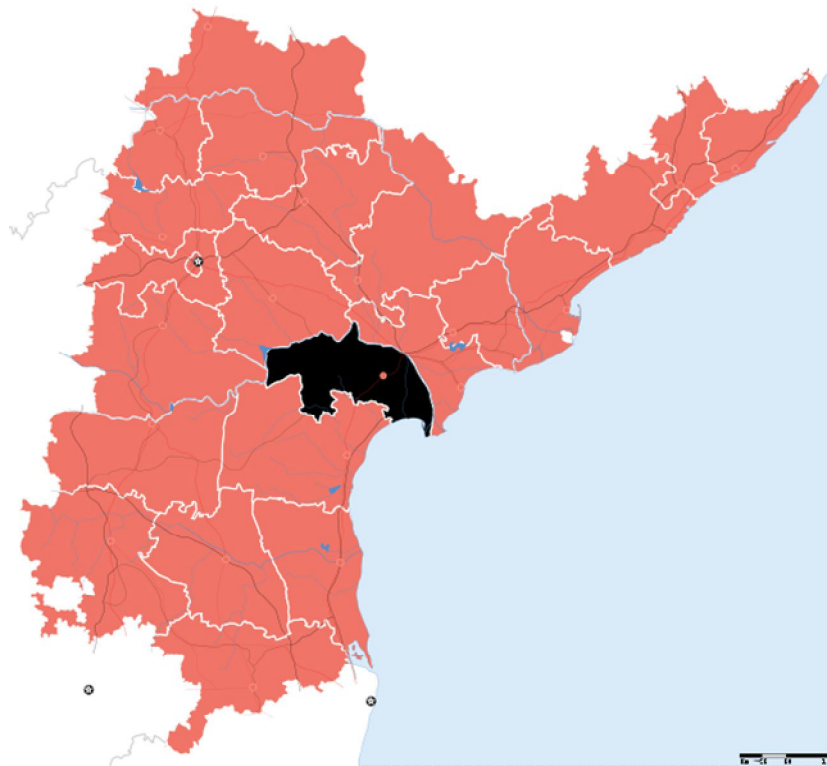
Location of selected mandals in Warangal District



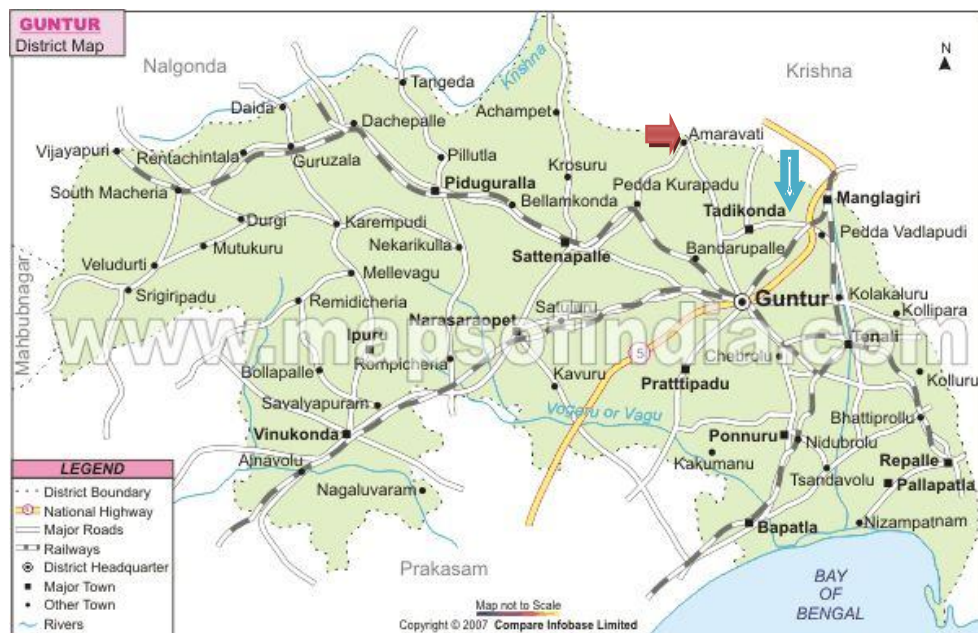
Location of Kadapa District in A.P.



Location of selected mandals in Kadapa District



Location of Guntur district in A.P



Location of selected mandals in Guntur District

3.3.3 Selection of respondents

180 FFS farmers (30 from one FFS) and 18 Extension officers (6 from each district) selected purposively and 180 Non FFS farmers (30 from each village) were selected by proportionate random sampling method for the study. Thus, a total of 360 farmers (180 FFS farmers and 180 Non FFS farmers) and 18 Extension officers from three districts of A.P formed the sample of the study.

S.No	Mandal	Village	No. of FFS Farmers	No. of Non FFS farmers	No. of Extension Officials
1	Hasanparthy	Seethampeta	30	30	3
2	Nekkonda	Deekshakunta	30	30	3
3	Porumamilla	Rajasahebpetta	30	30	3
4	Kalasapadu	Rajupalem	30	30	3
5	Tadikonda	Ponnekallu	30	30	3
6	Amaravathi	Daranikota	30	30	3

3.4 EMPIRICAL MEASUREMENT OF THE VARIABLES

Variables for this study were selected based on review of literature, in consultation with the experts in the field and advisory committee members. The variables which were found to have relevance to the present research, were included in the study. Eleven independent variables were selected for this study for understanding the characteristics of respondents, their relationship and extent of influence on the six dependent variables namely, Attitude, Knowledge, Skills, Extent of adoption, Agro ecosystem management and Decision making ability. The methods used for measuring the variables are presented in the following Table 3.2

Table 3.2 : Variables and their empirical measurement

S. NO.	VARIABLES	EMPIRICAL MEASUREMENT
I. Independent Variables		
Personal variables		
1	Age	In completed years
2	Education	Scale developed by Venkatramaiah (1983) revised in (1990) with modifications
3	Experience in FFS and farming	In completed years
Socio-Economic variables		
4	Farm size	As per land reforms act.
5	Mass Media exposure	Schedule developed for the study
6	Extension contact	Scale developed by Byra Reddy (1971)
Psychological variables		
7	Group orientation	Schedule developed for the study
8	Market intelligence	Schedule developed for the study
9	Risk orientation	Scale developed by Supe [1969] with suitable modifications
10	Innovativeness	Scale developed by Feaston (1968) with suitable modifications
11	Management orientation	Scale developed by Samantha (1977) with suitable modifications
II. Dependent Variables		
1	Attitude	Scale developed for the study
2	Knowledge	Test developed for the study
3	Skill	Schedule developed for the study
4	Adoption	Index developed for the study
5	Agro ecosystem management	Index developed for the study
6	Decision making ability	Index developed for the study

3.4.1 Independent Variables

3.4.1.1 Age

Age of the respondents was operationalized as the number of completed years at the time of enquiry. A Score of one was given to each completed year to obtain the age of a respondent.

The respondents were later grouped as:

Young	-	below 35 years
Middle	-	35 - 58 years
Old	-	above 58 years

These categories were expressed in terms of Frequencies and percentages at the time of presentation of results.

3.4.1.2 Education

In the present study education was operationalised as formal education an individual received. The educational status was noted against the category, composed of the following.

<u>Categories</u>	<u>Score</u>
Illiterate	1
Primary school	2
High School	3
Intermediate	4
Graduate	5
Post graduate	6

3.4.1.3 Experience in FFS and Farming

Farming experience refers to number of completed years of the respondent's involvement in FFS and agriculture production and scores were assigned as given below.

S.No.	Category	Score
a.	Up to 1 year experience	1
b.	1-2 years experience	2
c.	More than 2 years	3

After obtaining the scores, the respondents were arranged in three categories based on mean and S.D.

S.No.	Category	Score
1.	Low farming experience	Below Mean – S.D
2.	Medium farming experience	Between Mean $\pm$ S.D
3.	High farming experience	Above mean + S.D

3.4.1.4 Farm size

This variable was operationalized as the number of standard hectares possessed by respondents at the time of enquiry.

The respondents individual scores were noted for calculation and based on the scores obtained from land holdings, the respondents were classified into three groups as follows.

Categories	Score
1. Small farmers	up to 1 ha [2.5 acres]
2. Medium farmers	1-2 ha[2.5 to 5.0 acres]
3. Large farmers	Above 2 ha[5 acres]

As per section 8, sub-section (a) B of the Andhra Pradesh reforms (Ceiling on Agricultural holdings) Act No. 1 of 1973; the section 8 (1) B reads as follows:

_____ and for the purpose of computing the specified limit in case where holdings of any person both wet and dry land one Hectare of wet land shall be deemed to be equal to 2.5 acres of dry land.

3.4.1.5 Mass media exposure

Mass media exposure was operationalised as the extent of exposure to radio, television, Newspaper, Agril. Magazines, C.D./D.V.Ds and Internet by respondents.

To measure the degree of exposure to mass media sources, each respondent was asked to indicate on a six point continuum as to how often he/she got information about improved farm practices from each of the sources. The scoring for the responses was daily (5), weekly (4), fortnightly (3), once in a month (2), rarely (1) and never 0 were given. The score for an individual respondent was obtained by adding the scores over different sources.

The respondents were grouped into 3 categories based on mean and standard deviation as follows:

S.No.	Category	Score range
1.	Low Mass media exposure	Below Mean – S D
2.	Medium Mass media exposure	Between Mean $\pm$ S D
3.	High Mass media exposure	Above Mean +S D

3.4.1.6 Extension contact

Extension contact was operationlaised as the degree to which respondent maintain contact with formal extension oraganisations like State department of Agriculture, University scientists, N.G.Os, Polam badi master trainers, Adarshs ryhus and Input dealers. The Scale developed by Byra Reddy (1971) was used with suitable modifications for the study. The respondents were asked to check each agency they meet during last six months .

Scoring Frequency	Score
Weekly	4
Fortnightly	3
Once in month	2
Rarely	1
Never	0

Based on the total score of the respondents, they were grouped as follows:

S.No.	Category	Score range
1.	Low extension Contact	Below Mean – S D
2.	Medium extension Contact	Between Mean $\pm$ S D
3.	High extension Contact	Above Mean + S D

3.4.1.7 Group orientation

Group orientation was operationalized as the degree to which the farmer was oriented towards group for achieving common goal and in adopting new ideas in FFS. The schedule was developed for quantifying the variable. The schedule consists of eight statements, of which 1,2,4,5 were negative and rest were positive. These items were quantified on three point responsive categories i.e. True, Somewhat true and Not true

Response			
Score	True	Somewhat true	Not true
Positive	3	2	1
Negative	1	2	3

Based on the total score of the respondents, they were grouped as follows:

S.No.	Category	Score range
1.	Low group orientation	Below Mean – S D
2.	Medium group orientation	Between Mean $\pm$ S D
3.	High group orientation	Above Mean + S D

3.4.1.8 Market intelligence

Market intelligence is operationalized as the process of acquiring and analyzing information in order to understand the market to determine the current and future needs

and preferences, attitude and behaviour of the market and to assess the changes in business environment that may effect the size and nature of the market in the future.

The schedule was developed for quantifying the variable. The schedule consists of eight statements, of which 2,4,5,6,7,8 were positive and 1,3 were negative. These items were quantified on three point responsive categories i.e. True, Somewhat true and Not true

Response			
Score	Agreed	Undecided	Disagree
Positive	3	2	1
Negative	1	2	3

Based on the total score of the respondents, they were grouped as follows:

S.No.	Category	Score range
1.	Low market intelligence	Below Mean – S D
2.	Medium market intelligence	Between Mean $\pm$ S D
3.	High market intelligence	Above Mean + S D

3.4.1.9 Risk orientation

It was operationalised as the degree to which a farmer is oriented towards bearing risk and uncertainty in adopting FFS practices. The scale was developed by Supe (1969) with suitable modifications for quantifying the variable. The scale consists of five statements, of which 1,2,4,5 were positive and 3 was negative. These items were rated in five point responsive categories i.e. strongly agree to strongly disagree.

Response					
Score	Strongly agree	Agree	Undecided	Disagree	Strongly disagree
Positive	5	4	3	2	1
Negative	1	2	3	4	5

The final score was calculated by simple addition of all the scores ,the respondents were categorized as followed by keeping mean $\pm$ S D

S.No.	Category	Score range
1.	Low risk orientation	Below Mean – S D
2.	Medium orientation	Between mean $\pm$ S D
3.	High orientation	Above Mean + S D

3.4.1.10 Innovativeness

It was operationalised as the degree to which an individual adopts new ideas and new information related to FFS practices. The innovativeness scale developed by Feaston (1968) was adopted with slight modifications. It consists of nine items, of which 1,2,3,4,6 were positive and 5,7,8,9 were negative. These items were quantified on three point responsive categories i.e. True, Somewhat true and Not true

Response			
Score	Agreed	Undecided	Disagree
Positive	3	2	1
Negative	1	2	3

The final score was calculated by simple addition of all the scores ,the respondents were categorized as followed by keeping mean + S D

S.No.	Category	Score range
1.	Low innovativeness	Below Mean – S D
2.	Medium innovativeness	Between mean $\pm$ S D
3.	High innovativeness	Above Mean + S D

3.4.1.11 Management orientation

Management orientation was operationalized as the degree to which a farmer was oriented towards scientific farm management comprising of planning, production and marketing functions of his farm enterprise. The scale developed by Samantha (1977) was used for the study. The scale consists of 3 sub sections i.e Planning orientation with 4 positive and 3 negative statements, Production orientation with 2 negative and 8 positive statements, and Marketing orientation with 6 positive and one negative statements. The scale with three sub scales was administered to the respondents with three responsive continuum viz., 'agree' 'undecided' and 'disagree'

All the above three variables were measured on three point continuum of agree, undecided and disagree with weights of 3, 2 and 1 for positive statements and 1, 2 and 3 for negative statements, respectively.

The summation of scores of each sub-scale constitutes the total score on management orientation of each farmer.

After summation of all scores obtained the farmers were grouped into three categories based on the mean and standard deviation.

S.No.	Category	Score range
1.	Low Management orientation	Below Mean – S D
2.	Medium Management orientation	Between Mean $\pm$ S D
3.	High Management orientation	Above Mean + S D

3.4.2 Dependent variables

3.4.2.1. Attitude

Attitude is a precondition factor for any action. Attitude of an individual plays an important role in determining ones behavior with respect to a particular

psychological object. For any programme to be successful, it is needless to say that the clients should have a favourable attitude towards that programme. According Allport (1935) “an attitude is a mental and neutral state of readiness, organized through experience, exerting a directive or dynamic influence upon the individual’s response to all objects and situations with which it is related”. Thurstone (1946) explained that the affective component of an attitude, which gives a motivating character, serves as a link between cognition and action tendencies. An upshot of this fact the farmers’ attitude towards FFS will largely determine the nature and extent of their involvement and participation in the programme. Attitude of farmers towards the FFS programme is of crucial importance in explaining the extent to which they use its benefits. It is therefore necessary to measure the attitude of farmers towards FFS and take such steps as they are required to make the programme successful

3.4.2.1.1. Methodology: The method of summated rating scale suggested by Likert (1932) and Edwards was followed in the construction of attitude scale.

3.4.2.1.2 Collection of Statements: Statements covering all aspects of farmers towards Farmers field school were collected with the help of available literature, consultation with experts in the area of FFS and with the help of resource personnel. As such 92 statements representing the attitude of farmers towards FFS were collected.

3.4.2.1.3 Editing the statements : The statements were then edited according to the criterion given by Edwards (1957). Out of 92 statements ,85 statements which satisfied the criterion were selected.

3.4.2.1.4. Selection of items: The above 85 statements were then administered to a group of 60 respondents. The respondents were asked to indicate their degree of agreement or disagreement with each statement on a five continuum ranging from

Strongly agree to strongly disagree. The scores for the positive statements were assigned as Strongly agree (5), Agree (4), Undecided (3), Disagree (2) and Strongly disagree (1). The scoring for negative statements was reversed. The total score for each of the respondent was the sum of scores of all the items.

The subjects were then arranged in an array based on the total score obtained by them. The top 25 per cent of the subjects with highest score (High group) and 25 per cent of the subjects with lowest score (Low group) were used as criterion groups.

3.4.2.1.5 Calculation of 't' value

To evaluate individual statement, the critical ratio i.e. t-value which is a measure of the t-unit to which a given statement differentiates between the high and low group of respondents for each statement was calculated by using the formula suggested by Edwards (1957).

$$t = \frac{X_H - X_L}{\sqrt{\frac{(X_H - X_H)^2 + (X_L - X_L)^2}{N(n-1)}}}$$

Where,

$$\sum (X_H - X_H)^2 = \sum X_H^2 - (\sum X_H)^2$$

$$\sum (X_L - X_L)^2 = \sum X_L^2 - (\sum X_L)^2$$

X_H = The mean score on a given statement for the high group

X_L = The mean score on a given statement for the low group

$\sum X_H^2$ = Sum of squares of the individual score on a given statement for High group

$\sum X_L^2$ = Sum of squares of the individual score on a given statement for Low group

$\sum X_H$ = Summation of scores on a given statement for High group

ΣX_L = Summation of scores on a given statement for low group

n = no. of respondents for in each group

Σ = Summation

3.4.2.1.6 Selection of Attitude statements for final scale

After computing the “t” value for all the items (Appendix.2) 25 statements comprising of 15 positive and 10 negative statements with highest t value equal to or greater than 1.75 were finally selected and included in the attitude scale.

3.4.2.1.7 Scoring techniques: The items on the attitude scale were provided with 5 point psychological continuum i.e. Strongly agree, Agree, Undecided, Disagree and Strongly disagree with weights of 5, 4, 3, 2, and 1 respectively for the positive statements and 1,2,3,4, and 5 for the negative statements. The attitude score of the respondents could be obtained by summing up the scores for all the items in the scale.

3.4.1.2.8 Validity: Validity of a scale is the property that ensures that the obtained scale measures the variables it is supposed to measure. The validity of the scale was tested using the Content validity.

3.4.1.2.9 Content validity. The scale was examined for the content validity by determining how well the content of the scale represented the subject matter under study. As all the possible items covering the universe of content were selected by discussing with experts, Subject matter specialists and from all the available literature on the subject, the scale satisfied the content validity.

3.4.1.2.10 Reliability: A scale is reliable only when it gives consistently the same results when applied to the same sample. The reliability of the scale was found out by using Test and Re-Test method .The scale is administered to a fresh group of 60

respondents (Excluding sample area).After a period of 15 days the scale was again administered to the same respondents and thus two sets of score were obtained. The reliability coefficient was found to be 0.86 which indicate that the scale is reliable.

3.4.1.2.11 Administration of Scale

The twenty five attitude statements were translated into Telugu and administered to the sampled Farmers Field Schools farmers and Non FFS farmers of 6 farmers field schools comprising of 3 districts for studying the attitude of the farmers. Each statement was read out to the respondents by the investigator and the response to each statement in terms of their own degree of agreement or disagreement was noted down in the proper column with a (✓) mark.

The score for each individual in the scale was computed by summing up the weights of individual item response. The possible attitude score was 25 to 125.

3.4.2.1.12 Classification of respondents

Based on the attitude score obtained the farmers were grouped into three categories by using mean and standard deviation.

S.No.	Category	Score range
1.	Less favourable attitude	Below Mean – S.D
2.	Moderately favorable attitude	Between mean $\pm$ S.D
3.	More favorable attitude	Above Mean + S.D

3.4.2.2 Knowledge

In the present study, Knowledge was operationalised as the quantum of eco friendly farming practices known to farmers in order to protect the natural resources in the Farmers Field School area. The main objective of the study was to find out

knowledge levels of FFS farmers and Non FFS farmers about Cotton integrated crop management practices.

3.4.2.2.1 Construction of knowledge test

Collection of items

The content of the test was composed of questions called items. A comprehensive list of knowledge questions on Cotton management practices i.e., with special emphasis on Integrated Crop Management practices was prepared by study of relevant literature, consulting officials of extension staff of state department of Agriculture who have experience in Cotton FFS.

3.4.2.2.2 Selection of items

The selection of items was done on the basis of the following criteria.

1. Response to items should promote thinking than routine memorization
2. They should differentiate the well informed respondent from less informed and should have certain difficulty value.
3. The items included should cover all areas of knowledge about integrated crop production technology in Cotton.

By using above criteria, 42 items were selected for developing knowledge test, after editing carefully and by subjecting them to expert's endorsement, given in Appendix3. The experts consists Extension specialists, master trainers who train the farmers of Farmers Field School of Dept. of Agriculture, Advisory committee and experienced farmers in cotton cultivation.

3.4.2.2.3 Form of questions

The items selected for the construction of knowledge test on Integrated crop management practices in Cotton were framed in the objective form of questions namely

multiple choice, fill in the blanks, True or false and yes or No. The particulars on the type of questions were furnished in the Appendix 4.

3.4.2.2.4 Pre-testing

The items selected for the knowledge test were pre-tested separately by administering the items to 30 respondents. Care was taken to see that selection of matching sample of 30 respondents from outside the main sample of this study.

3.4.2.2.5 Item analysis

Item analysis was carried out by administering the pre-tested items to 30 respondents (selected at random) who are growing Cotton crop. Care was taken to see that they were outside the main sample for this investigation.

Item analysis was carried out to yield two kinds of information i.e index of Item difficulty and index of Item discrimination. The index of 'item discrimination' provided information on how well an item measures or discriminates ,where as the 'Item difficulty ' indicates the extent to which an item was difficult .The function of the item discrimination index was used to find out whether an item really discriminates a well informed respondent from poorly informed respondent.

The data thus obtained was subjected for typical item analysis. The 42 test items were administered to each one of the 30 respondents .The scores allotted were 'one' for correct answer and 'zero' for incorrect response. After computing the total scores were obtained for each of the 30 respondents on 42 items. They were arranged in order from highest score to lowest .Based on which the respondents were then divided into six equal groups. These groups were labeled as G1, G2, G3, G4, G5 and G6 with five respondents in each group. For the purpose of item analysis, middle two groups G3 and G4 were eliminated keeping only four extreme groups with high and low scores.

After getting the four extreme groups for item analysis, the responses for each of the items were subjected to calculate difficulty index, discrimination power and point biserial correlation as shown below.

3.4.2.2.6 Item difficulty index (P)

The item difficulty index was worked out as the percentage of respondents answering an item correctly. The assumption of the item difficulty index was that, the difficulty is linearly related to the level of respondent's knowledge about recommended practices. The items with 'P' values ranging from 20 to 80 were considered for the final selection of the knowledge test battery.

Difficulty Index was computed by using the following formula and presented in Appendix.3

$$\text{Difficulty index} = \frac{\text{No. of respondents answering correctly} \times 100}{\text{Total no. of respondents}}$$

3.4.2.2.7 Discrimination index (E 1/3)

The second criterion for item selection was the item discrimination index indicated by 'E 1/3' which is calculated by the formula.

$$E^{1/3} = \frac{(S1+S2) - (S5+S6)}{N/3}$$

Where S1, S2, and S5 S6 are the frequencies of correct answers in groups G1, G2, G5 and G6, respectively. N is the total number of respondents of the sample selected for items analysis that is 30. The value of the discrimination index for the knowledge items on Cotton management practices with special emphasis on Integrated

Crop Management practices in Farmers Field Schools area were presented in Appendix.3

The items with E 1/3 value ranging from 0.2 to 0.8 were considered for the final selection of knowledge test.

3.4.2.2.8 Point biserial correlation (r pbis)

The main aim of calculating Point biserial correlation (**rpbis**) was to work the internal consistency of the items i.e., the relationship of the total score to a dichotomized answer to any given item. In a way, the validity power of the item was computed by the correlation of the individual item of preliminary knowledge test calculated by using following formula presented in Appendix.

$$r_{pbis} = \frac{M_p - M_Q}{S.D.} \times P/Q$$

Where,

r_{pbis} = point biserial correction coefficient

M_P = Mean of the total scores of the respondents who answered the item correctly or

$M_P = \frac{\text{Sum of total of XY}}{\text{Total number of correct answers}}$

M_Q = Mean of the total scores of the respondents who answered the item incorrectly or

$M_Q = \frac{\text{Sum total of X} - \text{Sum total of XY}}{\text{Total number of wrong answers}}$

S.D = Standard deviation of entire sample

P = Proportion of respondents giving correct answer to the item

$$P = \frac{\text{Total number of correct answers}}{\text{Total number of respondents}}$$

Q = Proportion of respondents giving incorrect answer to the item

$$Q = 1 - P$$

X = Total score of the respondent for all items

Y = Response of the individual for the items

(Correct=1 Incorrect=0)

XY = Total score of the respondent multiplied by the response of the individual to the item

(Correct=1 : Incorrect=0)

Items having significant point bi serial correlation at 1% and 5% level were selected for final knowledge test.

Representativeness of the test

Care was taken to see that the test items selected finally covered the entire universe of the relevant behavioural aspects of respondent's knowledge about recommended cotton ICM practices.

3.4.2.2.9 Selection of the items

Out of 42 items ,30 items were finally selected based on

1. Items with difficulty level indices ranging from 20 to 80
2. Items with discrimination indices ranging from 0.20 to 0.80
3. Items having significant point biserial correlation either at 1 percent or 5 percent level

Thus, the finally selected knowledge items comprising 4 types of questions i.e multiple choice ,fill in the blanks , Yes or No and True or False ,totaling to 30 items of test battery on knowledge of cotton ICM practices.

The final knowledge test items selected for the test are given in the interview schedule furnished in Appendix – 1

3.4.2.2.10 Reliability of the test

The test was administered to 30 respondents separately with an interval of 15 days .The two sets knowledge scores obtained by the farmers were correlated. The correlation co-efficient ($r=0.85$) was highly significant indicating a high degree of dependability of the instrument for measuring knowledge of the farmers.

3.4.2.2.11 Validity of the test

Knowledge test developed on cotton production technology with special emphasis on Integrated Crop Management practices in Farmers field Schools area was subjected to content and construct validity. The construct validity of the test items was tested by the method of point biserial correlation (r_{pbis}). The items have significant values at 1% and 5% level indicated the validity of the test.

The content validity of knowledge test was derived a long list of test items representing the whole universe of recommended practices of ICM on Cotton crop collected from various sources as discussed earlier. It was assumed that the score obtained by administering the knowledge test of this study measures what was intended to measure.

Thus the knowledge test developed in the present study can measure the knowledge of FFS farmers on ICM Cotton as it showed the greater degree of reliability and validity.

3.4.2.2.12 Administration of the test

All the 30 items in the knowledge test read out to the respondents after establishing rapport with them. The respondents were asked to answer the items by themselves.

Scoring procedure : A score of one and zero given for correct and wrong answer for each item respectively and the total number of correct responses given by a respondent out of the 30 items was the knowledge score obtained by him or her. Thus the maximum minimum possible score for a respondent were 30 and Zero respectively.

3.4.2.2.13 Categorization of the respondents

After arriving knowledge scores, the respondents were grouped into three categories based on mean and standard deviation.

S.No.	Category	Score range
1.	Low Knowledge	Below Mean – S.D.
2.	Medium Knowledge	Between Mean $\pm$ S.D.
3.	High Knowledge	Above Mean + S.D.

3.4.2.3 Skill

Skill was operationalised as the ability of the respondent to perform selected skills in the field situation.

The respondents were asked to indicate skills learnt through FFS programme and were recorded on a three point continuum as fully confident, partially confident and not confident through personal interview by the investigator. A score of two was assigned to fully confident, one was assigned to partially confident and Zero was assigned to not confident items.

Based on the total score obtained by the respondents, they were grouped into following three categories by taking mean and standard deviation into consideration.

S.No.	Category	Score range
1.	Less Skilled	Below Mean – S.D
2.	Medium Skilled	Between Mean $\pm$ S.D
3.	High Skilled	Above Mean + S.D

3.4.2.4 Extent of Adoption

It was operationalised as the degree to which farmers adopt the recommended FFS Cotton Integrated crop management practices in his own field.

An index of extent of adoption FFS Cotton was constructed based on extensive review of literature and in consultation with FFS experts. The index consists of 4 parts i.e Experiments adopted (13 items), Adoption of principles of IPM package (13 items). General management practices of Cotton (9 items) and Farmer expert (15 items). The adoption was measured on two point continuum i.e Fully adopted and Not adopted by assigning 2 and 1 respectively. Thus the total score for each respondent was obtained by summing up the scores on all items, which ranged from 0-50. Then adoption index for each individual was worked out by using the formula used by Sengupta (1967)

$$\text{Adoption Index} = \frac{\text{No. of practices adopted}}{\text{No. of practices recommended}} \times 100$$

Based on the adoption index obtained, farmers were then grouped in to three categories as shown below using mean and Standard deviation.

S.No.	Category	Score range
1.	Low adoption	Below Mean – S.D.
2.	Medium adoption	Between Mean $\pm$ S.D
3.	High adoption	Above Mean + S.D

3.4.2.5 Agro ecosystem management

Agro ecosystem management was defined as tool that provide integration and synthesis of soil test results, management priorities, and environmental concerns. An index of Agro ecosystem management in FFS Cotton was constructed based on extensive review of literature and in consultation with FFS experts. The index consists of 4 parts i.e Pest and defender management (8 items), Input management (7 items), Bio diversity conservation (11items) and ITKs practices used. The Agro ecosystem management was measured on dichotomous continuum i.e Yes and No by assigning 1 and 0 respectively. Thus the total score for each respondent was obtained by summing up the scores on all items, which ranged from 0-26.

Based on the total score obtained, farmers were then grouped into three categories as shown below using mean and Standard deviation.

S.No.	Category	Score range
1.	Low agro eco system management	Below Mean – S.D.
2.	Medium agro eco system management	Between Mean $\pm$ S.D
3.	High agro eco system management	Above Mean + S.D

3.4.2.6 Decision Making Ability

It was operationalised as the degree to which an individual justifies his selection of the most efficient means from among the available alternatives on the basis of scientific criteria for achieving maximum economic profits. After scrutinizing the decision areas and checking the relevancy with learned people, some items were

discarded. In all 20 items were included in the decision making process and three point continuum was used with categories as ‘Individual decision’ ‘Decision making along with family members’ and ‘Following group decision’ with weightages 0, 1 and 2 respectively. Total decision making behavior for each respondent was obtained by adding the respective scores on Cotton FFS practices which ranges from 0 to 40.

Then decision making index was calculated for each individual by using the formula given below

$$\text{Decision making index} = \frac{\text{The obtained decision making score of the respondent}}{\text{Maximum possible decision making score}} \times 100$$

Based on the decision making index obtained, farmers were then grouped in to three categories as shown below using mean and Standard deviation.

S.No.	Category	Score range
1.	Low decision making ability	Below Mean – S.D.
2.	Medium decision making ability	Between Mean $\pm$ S.D
3.	High decision making ability	Above Mean + S.D

3.5 CONSTRAINTS AND SUGGESTIONS FROM FARMERS AND EXTENSION OFFICIALS FOR EFFECTIVE IMPLEMENTATION OF FARMERS FIELD SCHOOLS

The seventh objective of the study is to elicit constraints and suggestions from farmers and Extension officials to formulate appropriate strategy for effective functioning of Cotton FFS. In order to satisfy this objective, the respondents were asked to mention the constraints faced in adoption of Cotton ICM practices under FFS and

suggestions for successful implementation of FFS. The responses were then ranked based on the frequency and percentage for significant elucidation.

3.6 TOOLS FOR DATA COLLECTION

3.6.1 Development of interview schedule

Data were collected from the respondents by using an interview schedule developed for the study based on the objectives. The schedule thus constructed was administered in non sample area by interviewing 30 Cotton farmers. Based on the experience gained during pre testing, the schedule layout, question structure and their sequence were modified. The interview schedule is furnished in Appendix-1. The schedule later translated in to Telugu, the local language of the area of study for eliciting responses from the farmers without difficulty.

The schedule was designed in to 3 parts. Part A consists of personal, socio-economic and psychological characteristics of the respondents; part B include Attitude, Knowledge, Skills, Extent of Adoption ,Agro ecosystem management and Decision making ability and part C is designed to measure constraints faced in adoption of Cotton ICM practices under FFS and suggestions for successful implementation of FFS. The complete schedule is appended at Appendix-A of the thesis.

3.6.2 Establishing rapport

Establishing rapport with the farmers was the very important task for any investigation of social science. Hence, initially informal contacts were made with the farmers with the help of local leaders of the villages by taking the assistance of Agriculture officers and scientists of DAATT centers namely Warangal, Kadapa and

Guntur. An atmosphere of friendliness and familiarity was created with farmers, through informal talks pertaining to general problems. All these methods were extremely helpful in not only building up rapport but also resulted in obtaining valid and reliable information.

3.6.3 Data collection

The investigator interviewed all the selected respondents personally and data were recorded directly on the schedule, which enabled to get first hand information and gave an opportunity to observe the reactions of farmers. Friendly atmosphere was maintained during the interview to see that the respondents were at ease and expressed their opinion without restraint personally by the researcher in local language with the help of the interview schedule and the data was recorded directly in the schedule. It was made sure that the respondents correctly understood the questions in the interview schedule by repeating the questions wherever necessary.

3.6.4 Data Analysis procedure

The data collected from all respondents were coded and tabulated .Then data were subjected to different statistical tests keeping in view the objectives of the study. The findings emerge out of data analysis were interpreted, discussed and necessary inferences and conclusions were drawn.

3.7 STATISTICAL TESTS USED TO ANALYZE THE DATA

Following statistical tests and analytical procedures were used for analysis of the data of the present investigation.

3.7.1 Arithmetic mean ($\bar{X}$)

The arithmetic mean is the quotient that results when the sum of all the items scores divided by the number of items (n).

$$\bar{X} = \frac{\sum X}{N}$$

Where,

$$\begin{aligned}\bar{X} &= \text{Arithmetic mean} \\ \sum X &= \text{sum of scores} \\ n &= \text{number of respondents}\end{aligned}$$

3.7.2 Frequency and percentage

Some of the data were subjected to frequencies and percentages and used to know the distribution of respondents according to variables.

3.7.3 Standard deviation (S.D.)

Standard deviation is the square root of the mean of the sum of the squares of the deviation taken from the mean of the distribution.

Where,

$$\sigma = \sqrt{\frac{1}{n} \left[\sum X^2 - \frac{(\sum x)^2}{n} \right]}$$

Where,

σ = Standard deviation

$\sum X$ = sum of the deviation of the scores from mean

n = number of items

3.7.4 Pearson's correlation coefficient (r)

Pearson's correlation coefficient was used to find out the relationship between the scores of variables.

$$r = \frac{\sum XY - \frac{(\sum X)(\sum Y)}{n}}{\sqrt{\left(\sum X^2 - \frac{(\sum X)^2}{n} \right) \left(\sum Y^2 - \frac{(\sum Y)^2}{n} \right)}}$$

Where, r = Co-efficient correlation between x and Y

$\sum X$ = Sum of scores of variable X

$\sum Y$ = Sum of scores of variable Y

$\sum XY$ = sum of product of X and Y variable

$\sum X^2$ = Sum of the squares of X variable

$\sum Y^2$ = Sum of squares of Y variable

n = size of the sample

the computed 'r' values were then compared with the tabulated values of coefficient of correlation at 1 or 5 percent levels of significance.

3.7.5 Multiple linear regression analysis

This statistical tool is used to study the combined or pooled effect of independent variables over dependent variables.

$$Y = a + b_1X_1 + \dots + b_{11}X_{11}$$

Where,

a = Constant

b_i = regression coefficient of i^{th} independent variable

X_1 = Age

X_2 = Education

X_3 = Experience

X_4 = Farm size

X_5 = Mass media exposure

X_6 = Extension contact

X_7 = Group orientation

X_8 = Market intelligence

X_9 = Risk orientation

X_{10} = Innovativeness

X_{11} = Management orientation

And the dependent variables (Y) for the regression equation are

Y_1 = Attitude

Y_2 = Knowledge

Y_3 = Skill

Y_4 = Extent of adoption

Y_5 = Agro ecosystem management

Y_6 = Decision making ability

The regression coefficient b_i were tested for their significance by computing the following formula :

$$t_{(n-k-1) \text{ d.f.}} = \frac{|b_i|}{SE(b_i)}$$

Where,

n is the number of observations

k is the number of independent variables

SE is the standard error

b_i is the regression coefficient, and 't' is the test criterion for significance.

Coefficient of multiple determinations (R^2) was calculated by

$$R^2 = \frac{\text{Regression sum of Squares (RSS)}}{\text{Total sum of squares (TSS)}}$$

R^2 is always less than unity and expressed in percentage. It indicate the extent of variation in dependent variable (Y) that is explained by the independent variables (X_i) in the regression equation r.

3.7.6 'Z' Test

'Z' test has used to test the significant difference between two sample means in respect of dependent variable of respondent i.e. FFS farmers and non FFS farmers. 'Z' value has been calculated by the following formula.

$$Z = \frac{|\bar{X}_1 - \bar{X}_2|}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}}$$

Where,

$\bar{X}_1$ = Mean of the first sample

$\bar{X}_2$ = Mean of the second sample

S_1^2 = Variance of first sample

S_2^2 = Variance of second sample

n_1^1 = No. of individuals in first sample

n_2^2 = No. of individuals in second sample

The computed 'Z' values were compared with the table value at 1% and 5% level of significance from Standard Normal Distribution Tables for drawing meaningful conclusions.

All the above procedures were worked out by feeding the processed data into computer.

**Table : 3.1 . District wise ICDP Cotton FFS programmes conducted during
(2006-2007)**

S.No	District /Region	Target [No. of FFS]	Achievement	Remarks
	Andhra region			
1	Srikakulam	0	0	
2	Vizianagaram	2	2	
3	Visakhapatnam	2	2	
4	East Godavari	0	0	
5	West Godavari	0	0	
6	Krishna	14	14	
7	Guntur	62	62	Selected for study
8	Prakasam	12	12	
9	Nellore	0	0	
	Rayalaseema region			
10	Kurnool	2	1	
11	Ananthapur	0	0	
12	Kadapa	12	10	Selected for study
13	Chittoor	0	0	
	Telangana region			
14	Rangareddy	27	27	
15	Nizamabad	0	0	
16	Medak	28	28	
17	Mahaboobnagar	36	36	
18	Nalgonda	57	57	
19	Warangal	73	73	Selected for study
20	Khammam	70	70	
21	Karimnagar	43	43	
22	Adilabad	67	67	
	Total	510	504	

CHAPTER IV

RESULTS AND DISCUSSION

This chapter highlights the findings of the investigation with reference to the objectives of the study. The data collected were coded, analysed, interpreted and meaningful conclusions were drawn based on the results obtained are presented under the following heads.

- 4.1. Profile characteristics of the FFS and Non FFS farmers
- 4.2 Attitude of FFS and Non FFS farmers towards FFS programme
- 4.3 Level of knowledge of FFS farmers and Non FFS farmer towards Cotton integrated crop management practices.
- 4.4 Skill level of FFS and Non FFS farmers in Cotton
- 4.5 Extent of adoption of Cotton ICM practices by FFS and non FFS
- 4.6 Agro ecosystem management by FFS and Non FFS farmers
- 4.7 Level of Decision making by FFS and Non FFS farmers
- 4.8 Documentation of ITKS in Cotton FFS
- 4.9 Relationship between the selected personal, socio-economic, psychological characteristics and empowerment in terms of Attitude, Knowledge, Skill, Extent of adoption, Agro ecosystem management and Decision making.
- 4.10 Constraints and suggestions from FFS farmers and Extension officials to formulate appropriate strategies for effective functioning.
- 4.11. Empirical model of the study

4.1 PROFILE CHARACTERISTICS OF THE FFS AND NON FFS FARMERS

The distribution of respondents into different categorized based on their selected profile of characteristics were presented in the following tables and interpreted frequencies, percentages, mean and standard deviation.

4.1.1 Age

As per the chronological age of respondents they were grouped into three categories namely young, middle and old age. The distribution of respondents according to age is given in Table 4.1.

It is clear from the above table that majority of FFS farmers belonged to middle age (70.00%) followed by young (36.66%) and old age (2.3%) , whereas in case of Non FFS farmers 67.77 percent belonged to middle age followed by 26.66 percent young and 4.6 percent old age group.

District wise distribution shows that in **Warangal** district majority (58.33 %) of FFS farmers belonged to middle age followed by 40.00 percent in young age and 1.66 percent old aged category and incase of Non FFS majority 70.00 percent belonged to middle age, 21.66 percent of them belonged to young and 5 percent to old age category.

In **Kadapa** district majority (86.66 %) of FFS farmers belonged to middle age followed by 10.00 percent in young age and 3.33 percent old aged category and incase of Non FFS majority 73.33 percent belonged to middle age, 21.66 percent of them belonged to young and 5 percent to old age category.

In **Guntur** district majority (65.00 %) of FFS farmers belonged to middle age followed by 33.33 percent in young age and 1.66 percent old aged category and incase

of Non FFS majority 60.00 percent belonged to middle age, 36.66 percent of them belonged to young and 3.33 percent to old age category.

An insight of table 4.1. reveals that majority of respondents belonged to middle age group both in case FFS and Non FFS farmers .The probable reason for such distribution might be middle and young aged persons actively involved in the training programmes of FFS in Cotton. The other reason was Cotton FFS requires frequent monitoring of field, recording observations on weekly basis as when class is conducted. This finding is in consistent with Ravichandra Prasad (2002).

4.1.2 Education

Based on education, the FFS and Non FFS farmers were grouped in to six categories The distribution is presented in Table 4.2

From the above table 4.2 it could be concluded that majority of FFS farmers belonged to high school education (38.33%), followed by intermediate education (22.22%), primary school education (20.55%), graduate education (10.00%) and illiterate (8.8 %). In case of Non FFS respondents majority were educated up to primary school (40.00%), followed by illiterate (30.00%), high school (22.2%), intermediate (6.66%) and graduates (1.11%).

District wise distribution shows that in **Warangal** district majority (31.66 %) of FFS farmers educated upto high school level, followed by intermediate education (23.33%), illiterate (18.33%), primary school education 16.66%) and graduates (10.00%) and incase of Non FFS majority 46.66 percent educated up to primary school, 25.00 percent of them illiterate, 21.66 percent high school, 5 percent intermediate and 1.66 per cent graduated.

In **Kadapa** district majority (43.33 %) of FFS farmers belonged to high school education followed by primary school (23.33%), intermediate (18.3%), graduation (13.33%) and illiterate (1.66%) and in case of Non FFS majority 35.00 percent were illiterate followed by 28 percent, 26.66 percent, 8.3 percent and 1.66 percent belonged to high school, primary, intermediate and graduate education.

In **Guntur** district majority (40.00 %) of FFS farmers belonged to high school education followed by intermediate (25.00 %), primary (21.66%), graduate (6.6%) and illiterate (6.6%) respectively. Whereas in case of Non FFS, majority 46.66 percent belonged to primary education, 30.00 percent of them illiterate, 16.66 percent high school and 6.66 percent intermediate education.

An insight of table 4.2 reveals that majority of respondents belonged to high school education, intermediate education and primary education level in case of FFS. The probable intention for such distribution might be during selection in to FFS group the officials might have given more emphasis to educated farmers. The focus was after completion of FFS programme these should act as facilitators for next FFS in that village. This finding is in consistent with Madavilatha (2002) and Natarajan (2004).

4.1.3 Experience in farming

Based on farming experience, the FFS and Non FFS farmers were grouped into three categories. The distribution is given in the given Table 4.3.

It was evident from the Table that majority (51.11%) of FFS farmers had 3-13 years of experience in farming followed by 14-27 years (35.55%) and 27 years above (7.77%). In case of Non FFS respondents, majority were under 3-13 years category (50.55%) , 14-27 years (31.66%) and 27 years above (17.7%) respectively.

District wise distribution shows that in **Warangal** district majority (56.66 %) of FFS farmers had 3-13 years of experience followed by 14-27 years (30.00%) and 27 year above (13.33%) and in case of Non FFS majority 53.33 percent had 3-13 years of experience followed by 38.33 percent above 27 years and 8.33 percent 14-27 years.

In **Kadapa** district, majority (58.33 %) of FFS farmers had 14-27 years of experience followed by 3-13 years (31.66%) and 27 year above (10.00%) and in case of Non FFS majority 45.00 percent had 14-27 years of experience followed by 41.66 percent 3-13 years and 13.33 percent 27 year above.

In **Guntur** district majority (65.00 %) of FFS farmers had 3-13 years of experience followed by 14-27 years (35.00%) and in case of Non FFS majority 56.66 percent had 3-13 years of experience followed by 41.66 percent 14- 27 years and 1.66 percent 27 years above.

An insight of table 4.3 reveals that majority of respondents both in FFS and Non FFS belonged to 3-13 years of experience category followed by 14-27 years' experience category in farming. This shows clear indication that majority of farmers were young and middle aged therefore they had 3-13 years of experience in farming and one year experience in FFS. This finding is in consistent with Reddy (2003), Sarada (2004) and Obaiah (2004)

4.1.4 Farm size

Based on farm size the FFS and Non FFS farmers were grouped in to three categories. The distribution is presented in Table 4.4.

From the above table, it could be concluded that majority (61.66%) of FFS respondents were small farmers followed by big (22.22%) and marginal (16.11%). In

case of Non FFS respondents, majority (52.77%) were small followed by marginal (33.33%) and big (13.88%) respectively.

District wise distribution shows that in **Warangal** district majority (73.33 %) of FFS farmers had small farm size followed by marginal (18.33%) and big (8.33%) and in case of Non FFS majority 58.33 percent were small followed by 31.66 percent marginal and 8.33 percent big farmers.

In **Kadapa** district majority (55.00 %) of FFS farmers had small farm size followed by big (36.66%) and marginal (8.33%) and in case of Non FFS majority 41.66 percent were small followed by 38.33 percent marginal and 20.00 percent big farmers.

In **Guntur** district majority (56.66 %) of FFS farmers had small farm size followed by marginal and big (21.66%) and in case of Non FFS majority 58.33 percent were small followed by 30.00 percent marginal and 11.66 percent big farmers.

It was clear from the Table 4.4 that majority of FFS respondents belonged to small farmers. The probable reason might be the small and marginal farmers were given importance in selection for the FFS. This finding is in consistent with Sivanandan (2002) and Natarajan (2004)

4.1.5 Mass media exposure

Based on mass media exposure, the FFS and Non FFS farmers were grouped in to three categories The distribution is given in Table 4.5.

It could be observed from the Table 4.5 that 59.44 percent of FFS farmers had medium level of mass media exposure followed by 22.77 percent low and 17.77 high. In case of Non FFS farmers, majority (37.77%) medium level of exposure followed by low (36.60%) and high mass media exposure (25.55%) respectively.

District wise distribution shows that in **Warangal** district majority (61.66 %) of FFS farmers had medium level mass media exposure followed by low (20.00%) and high (18.33%) and in case of Non FFS majority 38.33 percent medium and low followed by 23.33 high mass media exposure.

In **Kadapa** district, majority (60.00 %) of FFS farmers had medium level of mass media exposure followed by low (26.66%) and high (13.33%) and in case of Non FFS majority (43.33 percent) were low followed by 28.33 percent medium and high mass media exposure.

In **Guntur** district majority (56.66 %) of FFS farmers had medium level of mass media exposure followed by low and high (21.66%) and in case of Non FFS majority 46.66 percent were medium followed by 28.33 percent low and 25.00 percent high mass media exposure.

It is clear from the Table 4.5 that majority of FFS respondents belonged to medium level of mass media exposure. The probable reason might be because majority of farmers were small with minimum access to various mass media, D.V.Ds and Internet etc. The poor financial status also other reason for medium level of mass media exposure. This finding is in consistent with Chatterjee (2000) and Gattu (2001).

4.1.6 Extension contact

Based on extension contact, the FFS and Non FFS farmers were grouped in to three categories The distribution is given in Table 4.6.

From the table 4.6 , it could be observed that 63.88 percent of FFS farmers had medium level of extension contact followed by 21.11 percent low and 15.00 high. In case of Non FFS farmers majority (52.22%) were medium level followed by low (31.66%) and high extension contact (16.11%) respectively.

District wise distribution shows that in **Warangal** district majority (66.66 %) of FFS farmers had medium level extension contact followed by low (16.66%) and high (16.66%) and in case of Non FFS majority 46.66 percent were medium followed by 28.33 percent low and 25.00 high extension contact.

In **Kadapa** district, majority (76.66 %) of FFS farmers had medium level of extension contact followed by high (13.33%) and low (10.00%) and in case of Non FFS, majority 58.33 percent were medium followed by 33.33 percent low and 8.33 percent high extension contact.

In **Guntur** district majority (48.33 %) of FFS farmers had medium level of extension contact followed by low (36.66 %) and high (15.00%) and in case of Non FFS majority 50.00 percent were medium followed by 31.66 percent low and 18.33 percent high extension contact.

It was clear from the Table, 4.6 that majority of FFS respondents belonged to medium level of extension contact. Therefore efforts of extension agencies must be augmented in order to reach the majority of farmers. This could be done by conducting more trainings, exposure visits, rythusadassus field days and farmers scientists interaction meets etc. This finding is in consistent with Ravichandra Prasad (2002) Sivasubramanyam (2003)

4.1.7 Group orientation

Based on group orientation, the FFS and Non FFS farmers were grouped in to three categories The distribution is given in Table 4.7.

From the above table, it could be observed that 53.33 percent of FFS farmers had medium level of group orientation followed by 27.20 percent high and 19.44

percent low. In case of Non FFS farmers majority (46.66%) were medium level followed by low (31.66%) and high group orientation (21.66%) respectively.

District wise distribution shows that in **Warangal** district, majority (60.00 %) of FFS farmers had medium level group orientation followed by high (23.33%) and low (16.66%) and in case of Non FFS, majority 55.55 percent were medium followed by 26.66 percent low and 18.33 high group orientation.

In Kadapa district, majority (52.33 %) of FFS farmers had medium level of group orientation followed by high (28.33%) and low (18.33%) and in case of Non FFS majority 40.00 percent were medium followed by 35.00 percent low and 25.00 percent high group orientation.

In Guntur district, majority (46.66 %) of FFS farmers had medium level of group orientation followed by high (30.00 %) and low (23.33%) and in case of Non FFS majority 45.00 percent were medium followed by 33.33 percent low and 21.66 percent high group orientation.

It was clear from the Table 4.7 that majority of FFS respondents had medium group orientation followed by high. The probable reason is more group related activities were conducted in FFS programme thus farmers had medium to high group orientation.. This finding is in consistent with Bagyalakshimi (2002)

4.1.8 Market intelligence

Based on market intelligence, the FFS and Non FFS farmers were grouped in to three categories The distribution is given in Table 4.8.

It could be observed from the Table 4.8 that 54.44 percent of FFS farmers had medium level of market intelligence followed by 25.00 percent high and 20.55 percent

low. In case of Non FFS farmers, majority (49.44%) were medium level followed by low (27.22%) and high mass media exposure (23.33%) respectively.

District wise distribution shows that in **Warangal** district majority (56.66 %) of FFS farmers had medium level of market intelligence followed by high and low with (21.66%) and incase of Non FFS majority 51.66 percent were medium followed by 26.66 percent low and 21.66 high market intelligence.

In **Kadapa** district majority (58.33 %) of FFS farmers had medium level of market intelligence followed by low (28.33%) and high (13.33%) and incase of Non FFS majority 36.66 percent were medium followed by 33.33 percent low and 30.00 percent high market intelligence.

In **Guntur** district majority (48.33 %) of FFS farmers had medium level of market intelligence by high (31.66%) and low (20.00%) and incase of Non FFS majority 60.00 percent were medium followed by 21.66 percent low and 18.33 percent high market intelligence.

It was clear from the Table 4.8 that majority of FFS respondents had medium level of market intelligence followed by high. The probable reason might be majority of farmers had undergone awareness programmes through FFS and also trainings conducted by Dept of agriculture from time to time. This could be improved by concerted efforts by the Department of agriculture mainly towards market led extension.

4.1.9 Risk orientation

Based on risk orientation the FFS and Non FFS farmers were grouped in to three categories The distribution is given in Table 4.9

It could be observed from the Table 4.9 that 56.11 percent of FFS farmers had medium level of risk orientation followed by 22.77 percent high and 21.11 low. In case

of Non FFS farmers, majority (45.55%) were medium level followed by low (28.55%) and high risk orientation (25.55%) respectively.

District wise distribution shows that in **Warangal** district majority (46.66 %) of FFS farmers had medium level risk orientation followed by low (28.33%) and high (25.00%) and incase of Non FFS majority 41.66 percent were medium followed by 35.00 percent low and 23.33 high risk orientation.

In **Kadapa** district majority (71.66%) of FFS farmers had medium level of risk orientation followed by low (15.00%) and high (13.33%) and incase of Non FFS majority 38.33 percent were medium followed by 33.33 percent low and 28.33 percent high risk orientation.

In **Guntur** district majority (50.00 %) of FFS farmers had medium level of risk orientation followed by high (30.00%) and low (20.00%) and incase of Non FFS majority 56.66 percent were medium followed by 25.00 percent high and 18.33 percent low risk orientation.

It was clear from the Table 4.9 that majority of FFS respondents belonged to medium level of risk orientation followed by high. The probable reason might be majority of FFS farmers were adopting inter cropping system and integrated crop management practices in cotton crop. This finding is in consistent with Madavilatha (2002)

4.1.10 Innovativeness

Based on innovativeness the FFS and Non FFS farmers were grouped in to three categories The distribution is given in Table 4.10.

It could be observed from the Table 4.10 that 50.00 percent of FFS farmers had medium level of innovativeness followed by 26.66 percent high and 23.33 low. In case

of Non FFS farmers' majority (43.88%) were medium level followed by low (32.22%) and high innovativeness (23.88%) respectively.

District wise distribution shows that in **Warangal** district majority (53.33 %) of FFS farmers had medium level innovativeness followed by high (25.00%) and low (21.66%) and in case of Non FFS majority 41.66 percent were medium followed by 36.66 percent low and 21.66 high innovativeness.

In **Kadapa** district majority (55.00%) of FFS farmers had medium level of innovativeness followed by low (21.66%) and high (23.33%) and in case of Non FFS majority 50.00 percent were medium followed by 30.00 percent low and 20.00 percent high innovativeness.

In **Guntur** district majority (41.66 %) of FFS farmers had medium level of innovativeness followed by high (31.66%) and low (26.66%) and in case of Non FFS majority 40.00 percent were medium followed by 30.00 percent low and high innovativeness.

It was clear from the Table 4.10 that majority of FFS respondents belonged to medium level of innovativeness followed by high. The probable reason might be majority of FFS farmers aware of latest information about cotton through various media like FFS weekly class, trainings, interaction meetings etc. This finding is in consistent with Madavilatha (2002), Reddy (2003) and Ravishanker (2005)

4.1.11 Management orientation

Based on management orientation, the FFS and Non FFS farmers were grouped in to three categories The distribution is given in the Table 4.11.

It could be observed from the Table 4.11 that 60.55 percent of FFS farmers had medium level of management orientation followed by 22.22 percent high and 17.22

low. In case of Non FFS farmers' majority (56.11%) were medium level followed by low (23.33%) and high management orientation (20.55%) respectively.

District wise distribution shows that in **Warangal** district majority (65.00 %) of FFS farmers had medium level management orientation followed by high (20.00%) and low (21.66%) and in case of Non FFS majority 48.33 percent were medium followed by 28.33 percent low and 23.33 high management orientation.

In **Kadapa** district, majority (60.00%) of FFS farmers had medium level of management orientation followed by high (23.33%) and high (16.66%) and in case of Non FFS, majority 60.00 percent were medium followed by 20.00 percent low and 20.00 percent high management orientation.

In **Guntur** district majority (56.66%) of FFS farmers had medium level of management orientation followed by high (23.33%) and low (20.00%) and in case of Non FFS majority 60.00 percent were medium followed by 21.66 percent low and 18.33 percent high management orientation.

It was clear from the Table 4.11 that majority of FFS respondents belonged to medium level of management orientation followed by high. The probable reason might be majority of FFS farmers planning and adopting package of practices as per recommendations given by experts. This finding is in consistent with Obaiah (2004)

4.2 ATTITUDE OF FFS AND NON FFS FARMERS

It could be observed from the Table 4.12 that 58.88 percent of FFS farmers expressed moderately favourable attitude followed by 23.33 percent high and 17.77 low. In case of Non FFS farmers, majority (55.55%) were medium level followed by low (30.00%) and high favourable attitude towards FFS programme (14.44%) respectively.

District wise distribution shows that in **Warangal** district majority (58.33 %) of FFS farmers had moderately favourable attitude followed by high (25.00%) and low (16.66%) and in case of Non FFS, majority 46.66 percent were medium followed by 38.33 percent low and 15.00 high favourable attitude towards FFS Programme.

In **Kadapa** district majority (75.00%) of FFS farmers were moderately favourable towards FFS followed by high (23.66%) and low (18.33%) and in case of Non FFS majority 65.00 percent were medium followed by 21.66 percent low and 13.33 percent high favourable attitude towards FFS Programme .

In **Guntur** district majority (60.66%) of FFS farmers had moderately favourable attitude followed by high (21.66%) and low (18.33%) and in case of Non FFS majority 55.55 percent were medium followed by 30.00 percent low and 15.00 percent high favourable attitude towards FFS Programme.

It is clear from the Table 4.12 that majority of FFS respondents belonged to moderately favourable attitude, followed by high where as in Non FFS category majority had moderately favourable attitude followed by low towards FFS programme. The probable reason might be majority of FFS farmers experienced the outcomes of FFS and acting as master trainers and facilitators in the same village. This finding is in consistent with Kappala (2002), Nagadev (1999) and Obaiah (2004)

In order to find out the significance difference in mean of attitude scores of FFS and Non FFS farmers, ' Z ' test was applied .The size of sample, mean and standard deviation of the two groups were given in the table 4.13.

It was evident from the table 4.13 that calculated Z values 56.31, 51.81 and 76.19 were greater than the table Z value at 0.05 level of probability .So the null hypothesis was rejected and hence it could be concluded that there exists a significance

difference between the mean attitude level of FFS farmers and Non FFS farmers towards FFS programme. The mean score were also clearly demarcating the FFS and Non FFS farmers about attitude level towards FFS programme. The Principle of “Seeing is believing” with FFS concept, experiencing the positive outcome from FFS, might have contributed to have more favorable attitude by FFS farmers when compared to non FFS.

4.3 KNOWLEDGE OF FFS AND NON FFS FARMERS

It could be observed from the Table 4.14 that 57.77 per cent of FFS farmers had medium level knowledge level about cotton I.C.M practices followed by 24.44 per cent high and 17.77 per cent low. In case of Non FFS farmers, majority (46.66%) were in the category of medium knowledge level followed by low (36.11%) and high (17.22%) knowledge of cotton ICM practices respectively.

District wise distribution shows that in **Warangal** district, majority (63.33 %) of FFS farmers had medium knowledge about Cotton ICM followed by high (23.33%) and low (13.33%) and in case of Non FFS majority 50.00 percent were medium followed by 35.00 percent low and 15.00 high knowledge of cotton ICM practices respectively.

In **Kadapa** district majority (53.33%) of FFS farmers had medium knowledge about Cotton ICM followed by high (25.00%) and low (21.66%) and in case of Non FFS, majority 46.66 percent were medium followed by 33.33 percent low and 20.00 percent high knowledge of cotton ICM practices respectively

In **Guntur** district majority (56.66%) of FFS farmers had medium knowledge about Cotton ICM followed by high (25.00%) and low (18.33%) and in case of Non FFS, majority 43.33 percent were medium followed by 40.00 per cent high and 16.66 per cent low knowledge of cotton ICM practices respectively .

It was clear from the Table 4.14 that majority of FFS respondents belonged to medium knowledge level followed by high and in Non FFS category majority had medium knowledge about Cotton ICM. The probable reason might be FFS farmers had undergone training on cotton ICM and practiced in their field condition. Weekly classes also might have contributed to their knowledge level when compared to Non FFS farmers. This finding is in consistent with Murthy and Veerabhadraiah (1999), Obaiah (2004)) and Jaswinder Singh and Kuldeep kumar (2006)

Response analysis of knowledge items by FFS farmers and Non FFS

Knowledge

It is clear from the response analysis table 4.15 that majority of FFS farmers know about Deep summer ploughing and destruction of crop residue help to reduce pest/diseases (91%), No. of Bird perches per acre of cotton, Selection of suitable hybrid will give good yields(88%), Insecticide used for Stem application(87%), Neem oil is antifeedent (82%), Indiscriminate spray of insecticides is prime reason for increase in cost of cultivation, Sticky traps are used against white flies and NPV Virus solution is sprayed against Heliothis (81%).FFS farmers lack knowledge about Seed treatment chemical for wilt disease (60%) and Refugee Bt rows around Bt Cotton(58%).They know about Indiscriminate spray of insecticides is prime reason for increase in cost of cultivation(64%),Selection of suitable hybrid will give good yields(58%), Neem oil(57%), Deep summer ploughing (54%) and destruction of crop residue help to reduce pest/ diseases, Cotton+ Greengram intercropping ratio (54%) and crop rotation (52%). In contrary most non FFs farmers were not aware of the seed treatment chemical for wilt disease (82%), Reason for Boll cracking(81%)

Difference in the Knowledge of FFS and Non FFS farmers on ICM Cotton (District wise)

In order to find out the significance difference in mean Knowledge scores of FFS and Non FFS farmers, 'Z' test was applied. The size of sample, mean and standard deviation of the two groups were given in table 4.16.

It was evident from the table 4.16 that calculated Z values 29.11, 21.47 and 21.88 were greater than the table Z value at 0.05 level of probability. So the null hypothesis was rejected and hence it could be concluded that there exists a significance difference between the mean knowledge level of FFS farmers and Non FFS farmers towards ICM in Cotton. This could be due to participation in FFS weekly classes, attending orientation programmes organised by Dept. of Agriculture on cotton crop.

4.4 Skill of FFS and Non FFS farmers

It could be observed from the Table 4.17 that 57.77 percent of FFS farmers were belonged to medium skill learnt category about cotton FFS I.C.M practices followed by 25.00 percent high and 17.22 low. In case of Non FFS farmers, majority (47.22%) were medium skills learnt category followed by low (28.33%) and high (24.44%) skills of cotton FFS ICM practices respectively.

District wise distribution shows that in **Warangal** district majority (63.33 %) of FFS farmers had medium skills level about Cotton ICM followed by high (20.00%) and low (16.66%) and in case of Non FFS majority 53.33 percent farmers had medium skills

followed by 26.00 percent high and 20.00 low skills of cotton ICM practices respectively.

In **Kadapa** district majority (60.00%) of FFS farmers had medium skills level about Cotton ICM followed by high (25.00%) and low (15.00%) and in case of Non FFS majority 35.00 percent were medium category followed by 36.66 percent low and 28.33 percent high skills learnt category of cotton ICM practices respectively

In **Guntur** district majority (50.00%) of FFS farmers belonged to medium skill learnt category about Cotton ICM followed by high (30.00%) and low (20.00%) and in case of Non FFS majority 53.33 percent were medium followed by 28.33 percent high and 18.33 percent low about skills of cotton ICM practices respectively .

It is clear from the Table 4.17 that majority of FFS respondents belonged to medium skills category followed by high and in Non FFS category majority had medium skills about Cotton ICM. The probable reason might be FFS farmers learned the skills during FFS weekly classes conducted by Dept. of Agriculture official and then practicing the same in their field condition. This finding is consistent with Kumar (1996) and Obaiah (2004)

Response analysis

Skills

Is evident from the Table 4.18 that majority of FFS farmers were fully confident in skills like Identification of dead larvae due to Bt spray (82%), Cotton Eco System Analysis (81%), Identification infestation of sucking pests(73%), Preparation of NSKE(70%), Identification of deficiency of micro nutrients(69%), Stem application with Pesticide (69%), Longest line (Resource utilization) (68%), Seed germination test(68%), Collection of soil samples (66%) and Preparation of spray fluid (64%). But

they were not confident in skills like Tricho cards preparation (23%), Pit fall trap method (38%) Water holding capacity of different soils (36%), and Preparation of Green chilli and Garlic extract (40%). While Non FFS farmers about (30%) confident in skills like Identification of dead larvae due to Bt spray, Crop condition Field condition, Pests, Poison bait preparation, Seed germination test and Seed treatment.

In order to find out the significance difference in mean Skill scores of FFS and Non FFS farmers, 'Z' test was applied. The size of sample, mean and standard deviation of the two groups given in the table 4.19

It was evident from the table 4.19 that calculated Z value 28.84, 23.32 and 26.81 were greater than the table Z value at 0.05 level of probability .So the null hypothesis was rejected and hence it could be concluded that there exists a significance difference between the mean skill level of FFS farmers and Non FFS farmers towards ICM in Cotton. The variation between FFS and non FFS farmers is due to skill oriented classes in FFS programme and practicing the same in their field situation. Moreover involvement of farmers in practical sessions definitely improves the efficiency to practice skills.

4.5 ADOPTION

Distribution of FFS and Non FFS farmers' respondents based on their Adoption of ICM Cotton practices are given in Table 4.20

It could be observed from the Table 4.20 that 55.55 percent of FFS farmers were in the medium adoption category about cotton I.C.M practices followed by 23.88 percent high and 20.55 low. In case of Non FFS farmers' majority (46.11%) were in the

medium adoption category followed by low (32.77%) and high (21.11%) adoption of cotton ICM practices respectively.

District wise distribution shows that in **Warangal** district majority (58.33 %) of FFS farmers had medium extent of adoption about Cotton ICM followed by high (21.66%) and low (20.00%) and in case of Non FFS majority 51.66 percent were medium adoption category followed by 25.00 percent low and 23.33 high adoption of cotton ICM practices respectively.

In **Kadapa** district majority (58.33%) of FFS farmers were in the medium adoption of Cotton ICM followed by high (23.33%) and low (18.33%) and in case of Non FFS, majority 46.66 percent were medium followed by 40.00 percent low and 13.33 percent high Adoption of cotton ICM practices respectively

In **Guntur** district majority (50.00%) of FFS farmers in medium adoption about Cotton ICM followed by high (26.66%) and low (23.33%) and incase of Non FFS, majority 46.00 percent were medium adoption category followed by 33.33 percent high and 26.66 percent low adoption category of cotton ICM practices respectively .

Discussion: It is clear from the Table 4.20 that majority of FFS respondents belonged to medium adoption category followed by high and in Non FFS category majority had medium followed by low adoption about Cotton ICM. The probable reason might be that FFS farmers after observing the field results in experimental plot might have adopted the same in their field condition. The interaction with experts and FFS master trainees also might have contributed to adoption of Cotton FFS practices. This finding is in consistent with Thyagarajan (2000) and Natarajan (2004).

Response analysis

Extent of adoption

It could be seen from above table 4.21 that most of FFS farmers were adopting practices recommended seed rate(91%), Deep summer ploughing (88%), Sowing time (87%), Crop residue destruction (82%), Agro ecosystem analysis (81%), Peer group communication(79%), Participation in field day (77%), Daily monitoring (77%), Long term experiments like No. of plants / hole, New Hybrids, De topping, Removal of fruiting bodies (76%)), Analysis of crop condition(73%), Collection and destruction of larvae(72%), Effect of pesticide spray on defenders(71%), Risk management (71%) and Installation of bird perches(70%). But they were not adopting Release of Trichogramma eggs, Seed treatment with *Trichoderma viridae*, PTD and Documentation of experiences. In case of Non FFS farmers they were adopting timely sowing, New Hybrids, Recommended seed rate, Daily monitoring.

Difference in the extent adoption scores of FFS and Non FFS farmers on ICM Cotton (District wise) (Table 4.22)

In order to find out the significance difference in mean adoption scores of FFS and Non FFS farmers, 'Z' test was applied. The size of sample, mean and standard deviation of the two groups were given in Table 4.22.

It was evident from the table 4.22 that calculated Z values 45.01,61.93 and 51.11 were greater than the table Z value at 0.05 level of probability .So the null hypothesis was rejected and hence it could be concluded that there exists a significance difference

between the mean adoption level of FFS farmers and Non FFS farmers towards ICM in Cotton. The significance difference between FFS and non FFS farmers in adoption of cotton ICM practices might be due to their personal experience with technology introduction during FFS programme. It is clear that once the farmer sees the positive results of new technology, then the adoption will be at faster rate. Innovativeness of FFS farmers also contributed to higher adoption than non FFS farmers.

4.6 AGRO ECOSYSTEM MANAGEMENT OF FFS AND NON FFS FARMERS

Distribution of FFS and Non FFS farmers respondents based on their Agro Ecosystem Management of ICM Cotton practices (Table 4.23).

It could be observed from the Table 4.23 that 56.66 percent of FFS farmers had medium agro ecosystem management about cotton Integrated Cotton Management practices followed by 23.88 percent high and 19.44 low. In case of Non FFS farmers' majority (50.55%) were medium agro ecosystem management category followed level by low (28.88%) and high (20.55%) of cotton ICM practices respectively.

District wise distribution shows that in **Warangal** district majority (65.00 %) of FFS farmers had medium agro ecosystem management about Cotton ICM followed by high (20.00%) and low (15.00%) and incase of Non FFS majority 55.00 percent were medium agro ecosystem management category followed by 25.00 percent low and 20.00 high cotton ICM practices respectively.

In **Kadapa** district majority (50.00%) of FFS farmers were had medium agro ecosystem management of Cotton ICM followed by high (26.66%) and low (23.33%) and incase of Non FFS majority 56.66 percent were medium followed by 21.66 percent each low and high agro ecosystem management of cotton ICM practices, respectively

In **Guntur** district majority (55.00%) of FFS farmers had medium agro ecosystem management about Cotton ICM followed by high (25.00%) and low (20.00%) and in case of Non FFS majority 51.66 percent were medium followed by 28.33 percent high and 20.00 percent low agro ecosystem management of cotton ICM practices respectively .

It was clear from the Table 4.23 that majority of FFS respondents belonged to medium level agro ecosystem management of cotton ICM practices followed by high and in Non FFS category majority had medium followed by low agro ecosystem management about Cotton ICM. The probable reason might be that FFS farmers might have observed the AEM by facilitator in the field condition , there by the AEM is better in FFS as against Non FFS farmers. This finding is consistent with Rambabu (1997) and Atchuta Raju (2002) ,

RESPONSE ANALYSIS

Agro ecosystem management

It could be concluded from the Table 4.24 that majority of FFS farmers were convinced that ICM technology under FFS has resulted in biodiversity conservation like Spiders, Coccinellid beetle (Akshinatala purugu), Dragon flies(92%), NPV and Bt solution when used against pests will result in building natural predators population(91%), Spray of botanical pesticides will develop natural predators(85%) ,Use of organic manures like FYM / Vermicomposting improves overall fertility of soil(85%), Use of quality seed will result in better yields (82%), Decomposition of applied FYM in the soil leads to increased microbial activity(82%),Parasites and predators conservation will result in Bio diversity conservation(81%), Use of micro irrigation system will lead to conservation of irrigation water and improves micro

climate(79%), Use of bio control agents like Verticillium , NPV, .Bt. will reduce pest incidence(77%), Insect Zoo/ Cage study will help in identification of Predators/ Parasites to enable Bio diversity conservation (76%), Adoption of soil test based fertilizer application to decrease pest incidence (73%), and Adoption of IPM package for better micro climate (70%) will help in agro ecosystem management in Cotton FFS.

While in Non FFS farmers agreed that Application of soil test based NPK fertilizers to reduce pest and diseases (58%),Use of organic manures like FYM / Vermicompost improves overall fertility of soil (54%) ,Use of quality seed will result in better yields(53%), Use of botanicals like NSKE will helps in developing predators' population(48%), Growing Greengram as inter crop in Cotton for developing predators' population(47%) and Intercropping with Greengram will improve soil fertility(46%).

Z-Test

In order to find out the significance difference FFS and Non FFS farmers Z' test was applied .The size of sample ,mean and standard deviation of the two groups were given in the table 4.25

It was evident from the table 4.25 that calculated Z values 19.41,19.64 and 18.39 were greater than the table Z value at 0.05 level of probability .So the null hypothesis was rejected and hence it could be concluded that there exists a significance difference between the mean AEM level of FFS farmers and Non FFS farmers towards ICM in Cotton. The main principle of FFS is AEM. Exposure to AEM practices in field situation, practicing the same, could be the reasons for significance difference between FFS and non FFS farmers.

4.7 DECISION MAKING ABILITY OF FFS AND NON FFS FARMERS

It could be observed from the Table 4.26 that 51.11 percent of FFS farmers belonged to medium decision making category about cotton I.C.M practices followed by 27.77 percent high and 21.11 low. In case of Non FFS farmers, majority (45.00%) were in medium decision making category followed by low (31.11%) and high (23.88%) of cotton ICM practices respectively.

District wise distribution shows that in **Warangal** district, majority (46.66 %) of FFS farmers had medium decision making category about Cotton ICM followed by high (31.66%) and low (21.66%) and incase of Non FFS majority 38.33 percent were in medium decision making category followed by 36.66 percent low and 15.00 high decision of cotton ICM practices respectively.

In **Kadapa** district, majority (53.33%) of FFS farmers had medium decision making of Cotton ICM followed by high (26.66%) and low (20.00%) and in case of Non FFS majority (46.66 percent) were in medium decision making category followed by 30.00 percent each low and 23.33 high decision of cotton ICM practices respectively

In **Guntur** district majority (53.33%) of FFS farmers had medium decision making category about Cotton ICM followed by high (25.00%) and low (21.66%) and incase of Non FFS, majority (50.00 percent) were medium decision making category followed by 26.66 percent high and 23.33 percent low decision category of cotton ICM practices respectively .

It was clear from the Table 4.26 that majority of FFS respondents belonged to medium decision making category followed by high and in Non FFS category majority had medium followed by low decision making about Cotton ICM. The probable reason was FFS farmers active participation in analyzing the prevailing

condition about cotton with other members might have enhanced their decision making ability when compare to Non FFS group. This finding is consistent with Devi (2000), Obaiah (2004) and Nisha Aravind (2006)

Response analysis

It could be concluded from the table 4.27 that majority of FFS farmers agreed that group decision is better in case of Adoption of IPM(79%), Collection of Soil sample(60%), Sowing of inter crop like Greengram (54%),Time of sowing(53%), Long term experiments(53%), Use of fertilisers, Adoption of Short term experiments(51%), Selection of variety /hybrid(51%), Type /quantity of fertilizer(47%) Use ITKs (46%) and Joint decision with spouse is good in activities like, Source of credit(54%), investment on crop production(48%),Maintain optimum plant density(47%). Individual decision in case of time of application of fertilisers (53%), Sowing of boarder crop around cotton(51%), better option in case of use of bio pesticides(47%), Irrigation schedule (40%) and While majority the non FFS farmers opined that individual decision is better in all activities.

Z-Test

In order to find out the significance difference in mean decision scores of FFS and Non FFS farmers, 'Z' test was applied .The size of sample ,mean and standard deviation of the two groups were given in the table 4.28.

It was evident from the table 4.28 that calculated Z value 21.47,2.42 and 32.05 were greater than the table Z value at 0.05 level of probability .So the null hypothesis was rejected and hence it could be concluded that there exists a significance difference between the mean decision level of FFS farmers and Non FFS farmers towards ICM in Cotton. FFS enhances the analytical skills of farmers to take appropriate decisions to

overcome the field level problems, this might be the reason for higher rate of decision making ability of FFS farmers to that of non FFS farmers

4.8 DOCUMENTATION OF ITKS IN COTTON FFS

1. Sucking pest management in Cotton

1. Title of ITK : Neem seed kernel extract[NSKE] reduce sucking pest in cotton
2. General description of ITK practice: NSKE @ 5 % solution
3. Location where ITK Practiced : Rajasahebpur Porumamilla Kadapa , A.P
4. Purpose for which ITK used : To reduce sucking pest incidence
5. Rationale hypothesis of the treatments used to solve the target problem:
Acts as anti feedent for pest
6. What is the impact of practice as experienced by users : Satisfactory
7. General information: Major crops: Cotton, Maize, Rice
8. Details of farming situation where the practice is adopted : Rainfed black soils
9. Particulars of ITK
 - a. Crop and variety used : Cotton /Private hybrid
10. Provide information on compatibility: Compatible with local crop management practices.
11. Details of users of ITK : FFS groups
12. Since how many years this practice is used and its modifications made over years:
2-3 years
13. How many farmers in the village use the practice : 10 farmers
14. Provide information on reasons in case of non-use : Nil
15. What is the alternate practice of ITK: Carbendazim @ 2 g /kg of seed
16. Documentary evidence of ITK : ---
17. Name of and address of discloser: FFS groups A,P
18. Name and address of person to whom incentive money to be sent:

19. Certified that disclosure on the ITK has been made in the knowledge of the local democratic institution

Place: Rajasahebpet, Porumamilla Kadapa

2. Pest monitoring

1. Title of ITK : Indigenous light trap
2. General description of ITK practice: Putting electrical bulb in the earthen pot with small holes
3. Location where ITK Practiced : Seethampet Hasanparthy mandal Warangal district, A.P
4. Purpose for which ITK used : To monitor pest population
5. Rationale hypothesis of the treatments used to solve the target problem: Acts as light trap
6. What is the impact of practice as experienced by users : Satisfactory
7. General information: Major crops: Cotton, Maize, Rice
8. Details of farming situation where the practice is adopted : Rainfed black soils
9. Particulars of ITK
 - b. Crop and variety used : Cotton /Private hybrid
10. Provide information on compatibility: Compatible with local crop management practices.
11. Details of users of ITK :Adi Reddy/OC/Hindhu/Degree
12. Since how many years this practice is used and its modifications made over years: 2-3 years
13. How many farmers in the village use the practice : 10-15 farmers
14. Provide information on reasons in case of non use : Nil
15. What is the alternate practice of ITK: Plastic Light trap
16. Documentary evidence of ITK : ---
17. Name of and address of discloser: Adi Reddy Seethampet, Waranagal district A,P
18. Name and address of person to whom incentive money to be sent: Adi Reddy Seethampet, Waranagal district A,P

19. Certified that disclosure on the ITK has been made in the knowledge of the local democratic institution

Place: Seethampet, Hasanparthy, Warangal dis

3. Improvement of seed germination in Cotton crop

1. Title of ITK : Anti- biotic for improving germination percentage in Cotton
2. General description of ITK practice: Putta mannu 50g+ Cow urine 50ml+Cow dung 50 g - used for treatment
3. Location where ITK Practiced : Seethampet Hasanparthy mandal Warangal district, A.P
4. Purpose for which ITK used : To reduce incidence of soil borne fungi in cotton
5. Rationale hypothesis of the treatments used to solve the target problem: Acts as anti biotic against soil borne fungi and improves seed germination in cotton.
6. What is the impact of practice as experienced by users : Satisfactory
7. General information: Major crops: Cotton, Maize, Rice
8. Details of farming situation where the practice is adopted : Rainfed black soils
9. Particulars of ITK
 - c. Crop and variety used : Cotton /Private hybrid
10. Provide information on compatibility: Compatible with local crop management practices.
11. Details of users of ITK : FFS group Seethampet
12. Since how many years this practice is used and its modifications made over years: 2-3 years
13. How many farmers in the village use the practice : 20 farmers
14. Provide information on reasons in case of non use : Nil
15. What is the alternate practice of ITK: Trichoderma viridae / Carbendazim
16. Documentary evidence of ITK : ---
17. Name of and address of discloser: Adi Reddy Seethampet, Waranagal district A,P

18. Name and address of person to whom incentive money to be sent: Adi Reddy
Seethampet, Waranagal district A,P

19. Certified that disclosure on the ITK has been made in the knowledge of the
local democratic institution

4. Cotton wilt disease management

1. Title of ITK : Indigenous treatment to reduce wilt disease in cotton
2. General description of ITK practice: Inguva 0.3g/plant and then irrigate to reduce wilt incidence
3. Location where ITK Practiced : Seethampet Hasanparthy mandal Warangal district, A.P
4. Purpose for which ITK used : To monitor disease incidence
5. Rationale hypothesis of the treatments used to solve the target problem: Acts as seed treatment chemical against wilt
6. What is the impact of practice as experienced by users : Satisfactory
7. General information: Major crops: Cotton, Maize, Rice
8. Details of farming situation where the practice is adopted : Rainfed black soils
9. Particulars of ITK
 - d. Crop and variety used : Cotton /Private hybrid
10. Provide information on compatibility: Compatible with local crop management practices.
11. Details of users of ITK :Adi Reddy/OC/Hindhu/Degree
12. Since how many years this practice is used and its modifications made over years:
2-3 years
13. How many farmers in the village use the practice : 10 farmers
14. Provide information on reasons in case of nonuse : Nil
15. What is the alternate practice of ITK: Carbendazim @ 2 g /kg of seed
16. Documentary evidence of ITK : ---
17. Name of and address of discloser: Adi Reddy Seethampet, Waranagal district A,P

18. Name and address of person to whom incentive money to be sent: Adi Reddy
Seethampet, Waranagal district A,P
19. Certified that disclosure on the ITK has been made in the knowledge of the local democratic institution.

Traditional way to control wilt in Cotton

Cotton is a commercial crop grown by farmers in Black cotton soils of A.P. In addition to pest problem now a days wilt disease is causing lot of damage to cotton crop. At present there are no remedial measures to wilt disease during the crop growth period. At this juncture farmers of Warangal district started using **Ingua 0.3 g/ plant** ,which is arresting the spread of disease in Cotton field. Due to this traditional practice the farmers are getting good yields at low cost.

Germination improvement in Cotton

In cotton cultivation sometimes germination is a problem due to soil type , low moisture levels and seed/ soil borne diseases. To overcome soil borne fungus problem the framers of Warangal district adopted an age old practice of mixing **Putta mannu [50 g} +Cow urine [50 ml]+ Cow dung [50 g]** and applying to the seeds. After mixing the cow dung paste ,the seed is shade dried and sown in the field . Due to this practice the growth of cotton crop is good.

Indigenous light trap in Cotton

Light trap is used in cotton ,rice and toher crops to monitor the pest population and to take necessary prophylactic control measures. Farmers of Warangal district of Hasanparthy mandal are using **pots with holes + bulb** for monitoring adult

population of pod borers in Cotton. Due to this practice there is a scope for collecting more number of moths when compare to normal light trap method.

4.9 RELATIONSHIP BETWEEN THE SELECTED PERSONAL, SOCIO-ECONOMIC, PSYCHOLOGICAL CHARACTERISTICS AND EMPOWERMENT IN TERMS OF KNOWLEDGE, SKILL, EXTENT OF ADOPTION, AGRO ECOSYSTEM MANAGEMENT AND DECISION MAKING

4.9.1 Relationship between selected profile characteristics and Attitude of FFS and Non FFS farmers (District wise)

In order to study the nature of relationship between selected independent variables and attitude of FFS and Non FFS farmers towards ICM Cotton, correlation coefficient $s(r)$ were computed and presented in the Table 4.29

The relationship between the scores of selected independent variables and the attitude of FFS and Non FFS farmers was tested by null hypothesis and empirical hypotheses.

Null hypothesis: There is no relationship between the selected independent variables i.e. age, education, experience, farm size, mass media exposure, extension contact, group orientation, market intelligence, risk orientation, innovativeness, management orientation and the attitude of FFS and Non FFS farmers.

Empirical hypothesis: There is a significant relationship between the selected independent variables i.e age, education, experience, farm size, mass media exposure,

extension contact, group orientation, market intelligence, risk orientation, innovativeness, management orientation and the attitude of FFS and Non FFS farmers.

It can be seen from the Table 4.29 that in **Warangal** district, Education (0.93) , Extension contact (0.44), Group orientation (0.50),Market intelligence(0.63),Risk orientation(0.61), Innovativeness(0.65), Management orientation (0.80) were found to be positively significant, Age (-0.60) and Experience in farming (-0.57) were negatively significant and Mass media exposure and Farm size were non-significant with attitude of FFS farmers. In case of Non FFS farmers except Education (0.42) remaining variables were non - significant with Attitude towards Cotton ICM.

It is clear from the Table 4.29 that in **Kadapa** district Education (0.75) and Mass media exposure (0.43) were positively significant at 0.01 level of probability; Innovativeness was significant at 0.05 level, Farm size (0.073), Extension contact (0.14), Group orientation (0.15), Market intelligence(0.07), Risk orientation (0.08) and Management orientation(0.11) were found to be non- significant and Age (-0.34) and Experience in farming (-0.38) were negatively significant with Attitude at 0.01 level of probability. In case of Non FFS farmers Age (0.30) and Education (0.294) were positively were significant and rest of the variables found to be non-significant with attitude towards Cotton ICM.

It is evident from the Table 4.29 that in **Guntur** district Education (0.82) was positively significant at 0.01 level , Age(-0.2626) was negatively significant and rest of the variables were non- significant with attitude of FFS farmers. Hence null hypothesis was accepted for the above variables. In case of Non FFS Farmers Experience (0.266), Extension Contact (0.255) were positively significant while other variables were non-significant with Attitude towards Cotton ICM. Hence the null hypothesis was rejected

and concluded that the attitude of farmers was dependent on independent variables and empirical hypothesis was accepted.

An over view of table 4.29 indicate that Education, Mass media exposure, Market intelligence, Risk orientation, Innovativeness and Management orientation were positively significant, whereas Age and Experience in farming were found be negatively significant with Attitude level of FFS farmers on Cotton ICM practices.

Discussion

Age versus attitude

An over view of table 4.29 indicate that age was negatively significant with attitude of FFS farmers. The probable reason might be increased in age did not favour the new concepts in agriculture extension and FFS. The traditional values also favour to develop negative attitude on new technology.

Education versus Attitude

It could be observed from table 4.29 that Education had positive and significant relationship with attitude of FFS farmers. The trend might be due to the fact that the educated farmers were already aware of FFS practices through various sources of information. Educated farmers think and analyse the new concepts with positive outlook. This finding is in agreement with results of Prasad and Sundaraswamy (2000) and Obaiah (2004)

Farming experience versus attitude

A close observation of table 4.29 reveal that farming experience was negatively significant with attitude of farmers on Cotton FFS .This might be the longer experience in farming and traditional farming approach did not motivate the selected farmers towards FFS.

Mass media exposure versus Attitude

An over view of table 4.29 indicate that mass media exposure had significant relationship with Attitude of FFS farmers. Mass media like Television, Interactive C.Ds, Agril.magazines, news papers might have created greater attitude among farmers towards Cotton ICM . Mass media stimulate the mental ability of farmers to have more knowledge about Cotton ICM. This result is line with the results of Prasad and Sundaraswamy (2000)

Market intelligence versus Attitude

It was clear from the Table 4.29 that there was positive and significant relationship between market intelligence and attitude. High education, rich mass media exposure, risk taking ability might contribute to this relationship. Concerted efforts to be made to create awareness on market intelligence at various forums

Risk orientation versus Attitude

It was evident from the Table 4.29 that risk orientation had positive significant relationship with attitude towards Cotton ICM. Risk orientation was expressed as the degree to which a respondent has desired to take risk and has courage to face uncertainty. A farmer with this trait would have better attitude. This result is line with the results of Atchuta Raju (2002).

Innovativeness versus Attitude

A close observation of Table 4.29 indicated that there was positive and significant relationship between innovativeness and attitude of farmers towards Cotton ICM. Innovativeness is an individual interest and desire to seek change in traditional practices. Farmer introduces change into his own field as and when the practice is practicable and feasible. This result is line with the results of Atchuta Raju (2002).

Management orientation versus Attitude

An over view of table 4.29 shows that management orientation had significant relationship with attitude of FFS farmers. This might be due well planned, executed and monitored demonstrations in FFS programme. Farmers with innovativeness and good market intelligence have good managerial ability in farm. This result is line with the results of Obaiah (2004).

Influence of Independent of variables on Attitude of FFS and Non FFS farmers

Multiple regression analysis

District wise Multiple regression analysis was carried out to determine the combined effect of all independent variables on Attitude of FFS and Non FFS farmers

A perusal of Table 4.30 revealed that in Warangal district, the variation in Attitude by selected independent variables was explained to the extent of 92 percent and 38 percent in FFS and Non FFS farmers. The unexplained variation to the extent of 8 percent may be attributed to variables not included in this study. Education, Farm size, Extension contact, Group orientation, Risk orientation and Management orientation contributed significantly. The computed 'F' Value was 56.4260, Hence it could be concluded that all variables taken for the study together explained a significant amount of variation in attitude of FFS farmers.

A perusal of Table 4.31 revealed that in Kadapa district, the variation in Attitude by selected independent variables was explained to the extent of 64 percent and 20 percent in FFS and Non FFS farmers. The unexplained variation to the extent of 36 percent may be attributed to variables not included in this study. Education, Innovativeness contributed significantly. The computed 'F' Value is 7.86 .Hence it

could be concluded that all variables taken for the study together explained a significant amount of variation in attitude of FFS farmers.

A perusal of Table 4.32 revealed that in Guntur district the variation in Attitude by selected independent variables was explained to the extent of 73 per cent and 20 per cent in FFS and Non FFS farmers. The unexplained variation to the extent of 27 percent in case of FFS farmers may be attributed to variables not included in this study. Education and Risk orientation contributed significantly. The computed 'F' Value was 12.39. Hence it could be concluded that all variables taken for the study together explained a significant amount of variation in attitude of FFS farmers.

From the above, it is clear that variables like Education , Farm size, Extension contact, Group orientation, Risk orientation and Management orientation in Warangal , Education, Innovativeness in Kadapa and Education and Risk orientation in Guntur districts contributed significantly for the most of variation in the Attitude of respondents about FFS Cotton.

Discussion

An overview of three districts indicates that education was a critical element in forming favorable (or) unfavorable attitude towards new concepts like FFS. Higher the education the ability to analyze and adopt concepts like FFS would be more towards the positive mode. As per the findings of study the education level of FFS farmers was better than non FFS farmers as education had positive and significant relationship with attitude of FFS farmers. FFS is a group approach, therefore working in groups enabled individual farmer to discuss, analyse and understand the new concepts and take risk in adopting the same.

The finding showed that there is a need to concentrate efforts on mass media for wide publicity about FFS concept and encourage other farmers to adopt FFS concept.

Similarly awareness programmes to farmers on market intelligence should be arranged as they give rich benefits from new concepts like FFS. Where as in non FFS farmers education contributed significantly to attitude towards FFS.

4.9.2 Relationship between selected profile characteristics of FFS and non FFS farmers and their Knowledge level of Cotton ICM practices

In order to study the nature of relationship between selected independent variables and knowledge level of FFS and Non FFS farmers towards ICM Cotton, correlation coefficient $s(r)$ were computed and the values presented in Table 4.33

The relationship between the scores of selected independent variables and the knowledge level of FFS and Non FFS farmers was tested by null hypothesis and empirical hypotheses.

Null hypothesis: There will be no significant relationship between the selected independent variables i.e age, education, experience, farm size, mass media exposure, extension contact, group orientation, market intelligence, risk orientation, innovativeness, management orientation and the knowledge level of FFS and Non FFS farmers.

Empirical hypothesis: There will be a significant relationship between the selected independent variables i.e age, education, experience, farm size, mass media exposure, extension contact, group orientation, market intelligence, risk orientation, innovativeness, management orientation and the knowledge level of FFS and Non FFS farmers.

It is evident from the Table 4.33 that in **Warangal** district, Education (0.84), Extension contact (0.48), Group orientation (0.47), Market intelligence(0.50), Risk orientation(0.51), Innovativeness (0.63) and Management orientation (0.61), Farm size (0.27) and Mass media exposure (0.26) were found to be positively significant and Age (-0.49) and Experience in farming (-0.47) were negatively significant with Knowledge of FFS farmers on Cotton ICM. In case of Non FFS farmers except Education (.043), remaining variables were found to be non –significant with Knowledge on ICM Cotton. Hence the null hypothesis was rejected and concluded that the Knowledge of farmers was dependent on independent variables, hence empirical hypothesis was accepted.

From the table 4.33 it is observed that in **Kadapa** district Education (0.87), Mass media exposure (0.48) were positively significant, Age (-.029) and experience in farming (-.035) were negatively significant and Extension contact, Group orientation, Market intelligence, Risk orientation, Innovativeness and Management orientation were found to be non- significant with Knowledge In case of Non FFS farmers, all the variables were non-significant with knowledge on ICM Cotton. Hence the null hypothesis was rejected and concluded that the Knowledge of farmers was dependent on independent variables therefore empirical hypothesis was accepted.

It could be clear from the Table 4.33 that in **Guntur** district Education (0.89) was positively significant, Age (-0.331) and Experience in farming (-0.25) negatively significant and rest of the variables were non- significant with Knowledge of FFS farmers on ICM Cotton. In case of Non FFS farmers all the variables were found to be non- significant with Knowledge on ICM Cotton. Hence the null hypothesis was rejected accepting the empirical hypothesis.

Discussion

It is clear from the Table 4.33 that computed 'r' values of independent variables namely **Education, Mass media exposure and Innovativeness were positively significant** whereas Age and Experience in farming were found be negatively significant with Knowledge level of FFS farmers on Cotton ICM practices.

Age versus Knowledge

It is evident from the Table 4.33 that age was negatively significant with Knowledge of FFS farmers towards Cotton ICM. Aged and more experienced farmers have a strong belief and affinity towards traditional farm technologies, their perception level also decreases about latest concepts, this might be the reason for the negative relationship. This result is accordance with results of Ramakrishnan (1999) and Satpal Singh *et al.* (2003)

Education versus Knowledge

It could be observed from table 4.33 that Education had positive and significant relationship with knowledge level of by FFS farmers. Education not only adds knowledge but also expand horizons of individuals. Higher the education, wider will be the interaction of individuals with different sources and increases the ability to grasp facts, analyse and interpret them in accurate way. Educated farmers will have more information seeking habits and better access to all types of communication media. This finding is in agreement with results of Satpal Singh *et al.* (2003) and Obaiah (2004).

Experience versus Knowledge

It was obvious from the Table 4.33 that there was negative and significant relationship between education and experience of FFS farmers on Cotton ICM practices.

The probable reason might be that as experience increases the inquisitiveness to learn and understand new concepts is decreased. The low extension contact, lack of awareness, might be the possible reason for the above trend. This result is line with the results of Sindhe *et al.* (2000) and Veerendranath (2000)

Mass media exposure versus Knowledge

An over view of table 4.33 indicate that mass media exposure had significant relationship with Knowledge of FFS farmers. High level of mass media exposure enhances the respondent knowledge level on several aspects of the Cotton ICM practices. News paper, agriculture magazines, television, radio, Village knowledge centres and mobile message services considered to be the accelerators of diffusion of innovations. Farmers with constant touch with mass media were likely to have better knowledge on current advances in technology. This result is line with the results of Chatterjee (2000) and Gattu (2001)

Innovativeness versus Knowledge

It could be observed from the table 4.33 that there was positive and significant relationship between innovativeness and knowledge level of Cotton ICM by FFS farmers. Innovativeness associated with the individuals earliness in use of new practices. The possession of this particular trait predisposes the individual for better acquisition of technology in terms of knowledge about Cotton ICM practices, hence the above trend was noticed. This result is line with the results of Kalaskar *et al.*(2001) and Obaiah (2004).

Influence of Independent of variables on Knowledge of FFS and Non FFS farmers

Multiple regression analysis

Further to determine the combined effect of all selected independent variables in explaining variation in Knowledge of FFS and non FFS farmers, multiple linear regression analysis was carried out and the results presented in the Table 35,36,37.

A perusal of Table 4.34 revealed that in Warangal district the variation in Knowledge by selected independent variables was explained to the extent of 73 percent and 39 percent in FFS and Non FFS farmers. The unexplained variation to the extent of 27 percent in case of FFS farmers may be attributed to variables not included in this study. Education in FFS farmers and farm size in Non FFS farmers contributed significantly. The computed 'F' Value was 12.12, Hence it could be concluded that all variables taken for the study together explained a significant amount of variation in Knowledge of FFS farmers.

An over view of Table 4.35 revealed that in Kadapa district the variation in Knowledge by selected independent variables was explained to the extent of 82 percent and 17 percent in FFS and Non FFS farmers. The unexplained variation to the extent of 18 percent in case of FFS farmers may be attributed to variables not included in this study. In FFS farmers Education and Innovativeness contributed significantly. The computed 'F' Value was 20.67, Hence it could be concluded that all variables taken for the study together explained a significant amount of variation in Knowledge of FFS farmers.

A perusal of Table 4.36 revealed that in Guntur district the variation in Knowledge by selected independent variables was explained to the extent of 85 percent and 16 percent in FFS and Non FFS farmers. The unexplained variation to the extent of 15 percent in case of FFS farmers may be attributed to variables not included in this

study. In FFS farmers Age, Education and Risk orientation contributed significantly. The computed 'F' Value was 26.20, Hence it could be concluded that all variables taken for the study together explained a significant amount of variation in Knowledge of FFS farmers.

From the above it is evident that Education in Warangal, Education and Innovativeness in Kadapa and age, education and risk orientation in Guntur districts contributed significantly for most of the variation in Knowledge of respondents about ICM practices in Cotton. Therefore, it is clear that education level plays a vital role in acquiring knowledge about Cotton ICM. The farmers with medium innovativeness will have interest to learn and practice new farming practices in their fields and expose themselves to different sources of information. The risk orientation is more in farmers with higher education and innovativeness. Where as in case of non FFS farmers Education and Farm size in Warangal district contributed significantly.

Relationship between selected profile characteristics of FFS and non FFS farmers with their Skill towards Cotton ICM practices

In order to study the relationship between selected profile characteristics of FFS and non FFS farmers with their Skill towards Cotton ICM practices, correlation coefficient $s(r)$ were computed and presented in the Table 4.37

The relationship between the scores of selected independent variables and the skill of FFS and Non FFS farmers was tested by relevant null and empirical hypotheses.

Null hypothesis: There will be no significant relationship between the selected independent variables i.e age, education, experience, farm size ,mass media exposure, extension contact, group orientation, market intelligence, risk orientation, innovativeness, management orientation and the skill of FFS and Non FFS farmers.

Empirical hypothesis : There will be a significant relationship between the selected independent variables i.e age, education, experience , farm size ,mass media exposure, extension contact, group orientation, market intelligence, risk orientation, innovativeness, management orientation and the skill of FFS and Non FFS farmers.

As seen from Table 4.37 that in Warangal district Education (0.86), Extension contact (0.43), Group orientation (0.54), Market intelligence(0.55), Risk orientation(0.57), Innovativeness (0.60) and Management orientation (0.60) were found to be positively significant, Age (-0.47) and Experience (-0.43) were negatively significant while Farm size and Mass media exposure were non- significant with Skills on Cotton ICM. In case of Non FFS farmers except Education (0.332), Market intelligence(0.273) remaining variable were found to be non-significant with Skill. Hence the null hypothesis was rejected confirming the significant relationship between scores on the independent variables and scores of Skill on ICM Cotton.

It was evident from the table 4.37 that in Kadapa district, Education (0.76), Mass media exposure (0.42) were positively significant at 0.01 level of probability, Extension contact (0.30) significant at 0.05 level, Age (-0.29) negatively non-significant at 0.05 level while Experience, Farm size, Risk orientation were negatively non-significant and rest of variables were non-significant with Skill of FFS farmers. In case of Non FFS farmers Age, Experience in farming ,Farm size, Mass media exposure, Market intelligence, Innovativeness were negatively and rest of the variables non-significant with Skill. Hence the null hypothesis was rejected confirming the significant relationship between scores on the independent variables and scores of Skill on ICM Cotton.

It could be noted from the Table 4.37 in Guntur district, Education (0.869) was positively significant at 0.01 level, Age, Experience were negatively non-significant and rest of the variables were non-significant with Skill of FFS farmers on ICM Cotton. In case of Non FFS farmers mass media, market intelligence were negatively and rest of the variables non-significant with Skill on ICM Cotton. Hence the null hypothesis was rejected confirming the significant relationship between scores on the independent variables and scores of Skill on ICM Cotton.

An over view of table 4.37 indicate that Education, Mass media exposure and Innovativeness were significant with Skill of FFS farmers on Cotton ICM practices, whereas all the variables were found to be non -significant with skills of non FFS farmers.

Discussion

Education versus Skill

Education had positive and significant relationship with skill learnt by FFS farmers. It was quite logic that farmers with high education could learn skills of ICM cotton and practice in their farm. This finding was in agreement with results of Kumar (1996) and Ramakrishnan (1999).

Mass media exposure versus Skills

An over view of table 4.37 indicate that mass media exposure had significant relationship with Skill learnt by FFS farmers. This might be due to increased exposure to different media like T,V. D.V.Ds, Interactive C.D.s by FFS farmers. This result is line with the results of Ramakrishnan (1999)

Innovativeness versus Skill

It could be observed from the table 4.37 that innovativeness is positively significant with skills learnt by FFS farmers. Innovativeness is an individual's interest and inclination towards learning new skills. The individuals with high education learn new skills easily and also transfer the same to his field condition. FFS also teach field based skills to farmers. This result is in line with the results of Obaiah (2004).

Influence of Independent of variables on Skill of FFS and Non FFS farmers

Multiple regression analysis

Further in order to determine the combined effect of all the independent variables in explaining variation in skill of FFS and non FFS farmers towards Cotton ICM practices, multiple linear regression analysis was carried out and the results were presented in Tables 4.38, 4.39 and 4.40

A perusal of Table 4.38 revealed that in Warangal district the variation in Skill by selected independent variables was explained to the extent of 80 percent and 24 percent in FFS and Non FFS farmers. The unexplained variation to the extent of 20 percent in case of FFS farmers may be attributed to variables not included in this study. Education and Farm size contributed significantly. The computed 'F' Value was 18.32, Hence it could be concluded that all variables taken for the study together explained a significant amount of variation in Skill of FFS farmers.

A perusal of Table 4.39 revealed in Kadapa district the variation in Skill by selected independent variables was explained to the extent of 71 percent and 17 percent

in FFS and Non FFS farmers. The unexplained variation to the extent of 29 percent in case of FFS farmers may be attributed to variables not included in this study. Age, Education, Experience and Extension contact contributed significantly. The computed 'F' Value was 11.05, Hence it could be conclude that all variables taken for the study together explained a significant amount of variation in Skill of FFS farmers.

A perusal of Table 4.40 revealed that Guntur district the variation in Skill by selected independent variables was explained to the extent of 80 percent and 27 percent in FFS and Non FFS farmers. The unexplained variation to the extent of 20 percent in case of FFS farmers may be attributed to variables not included in this study. Education and Group orientation contributed significantly. The computed 'F' Value was 17.56, Hence it could be conclude that all variables taken for the study together explained a significant amount of variation in Skill of FFS farmers.

Discussion : From the above it is clear that in Warangal district Education and Farming experience, in Kadapa district Age, Education , Experience and Extension contact were positively significant while in Guntur district Education and Group orientation contributed significantly for most the of variation in the Skills of FFS farmers about Cotton ICM practices.

It could be concluded from above that education helps an individual to understand and practice the skill easily with regard to cotton ICM practices. More experience in FFS programme enable the farmers to practice the skills and also to show the same to other farmers. This finding need attention and there should be provision to utilise services of experienced FFS farmers in training the newly selected FFS farmers, there by transfer of skills will be essay from farmer to farmer.

Where as in non FFS farmers education and experience contributed significantly as explained in case of FFS farmers.

Relationship between selected profile characteristics of FFS and non FFS farmers with their Adoption towards Cotton ICM practices

In order to study the nature of relationship between selected independent variables and adoption of FFS and Non FFS farmers towards ICM Cotton , correlation coefficient s (r) were computed and the values presented in the Table.4.41

The relationship between the scores of selected independent variables and the adoption of FFS and Non FFS farmers was tested by null hypothesis and empirical hypotheses.

Null hypothesis: There will be no significant relationship between the selected independent variables i.e age, education, experience, farm size, mass media exposure, extension contact, group orientation, market intelligence, risk orientation, innovativeness, management orientation and the adoption of FFS and Non FFS farmers.

Empirical hypothesis : There will be a significant relationship between the selected independent variables i.e age, education, experience, farm size ,mass media exposure, extension contact, group orientation, market intelligence, risk orientation, innovativeness, management orientation and the adoption of FFS and Non FFS farmers.

It can be seen from the Table 4.41 in Warangal district, Education (0.89), Extension contact (0.33), Group orientation (0.499), Market intelligence (0.54), Risk orientation(0.47), Innovativeness (0.54) and Management orientation (0.60) were was positively significant at 0.01 level, Age, Experience were negatively significant at 0.01 level of probability and Farm size and Mass media exposure were non-significant with Adoption. In case of Non FFS farmers Education (0.630) and Management

orientation (0.256) were positively significant and remaining variables were non-significant with Adoption. Hence the null hypothesis was rejected and concluded that the Adoption of farmers was dependent on independent variables and empirical hypothesis was accepted.

It is clear from the Table 4.41 that in Kadapa district, Education (0.73), Mass media exposure (0.45) were positively significant at 0.01 level, Innovativeness (0.27) was significant at 0.05 level, Age, Experience, Farm size, Market intelligence, Risk orientation were negatively non-significant and Extension contact, Group orientation and Management orientation were non-significant with adoption. In case of Non FFS farmers, Age (0.336) and Experience (0.322) were positively significant and rest of variables were found to be non-significant with Adoption. Hence the null hypothesis was rejected and concluded that the Adoption of farmers was dependent on independent variables and empirical hypothesis was accepted.

It can be seen from the Table 4.41 in Guntur district, Education (0.821) was positively significant at 0.01 level and Age, Experience, Extension contact, Group orientation, Management orientation were negatively non-significant whereas Farm size, Mass media exposure, Market intelligence, Risk orientation, Innovativeness were non-significant with adoption. In case of Non FFS farmers except mass media exposure and Market intelligence, all the variables were non-significant with Adoption. Hence the null hypothesis was rejected and concluded that the Adoption of farmers was dependent on independent variables and empirical hypothesis was accepted.

Discussion

It is clear from the Table 4.41 that computed 'r' values of independent variables namely Education, Mass media exposure and Innovativeness were positively significant

whereas Age and Experience in farming found be negatively significant with Knowledge level of FFS farmers on Cotton ICM practices. Whereas incase of non FFS farmers age, education and experience were found to be positively significant relationship with Adoption of Cotton ICM practices.

Age versus Adoption

It is evident from Table 4.41 that age was negatively significant with Adoption of FFS farmers towards Cotton ICM. The probable reason might be that over aged individuals ability to understand and analyse the new concept like FFS will be less and also the affinity in old farm practices make them to reject new ideas. This finding was in agreement with results of Raju (1999).

Age was significant relationship with Adoption of Cotton ICM practices in case of non FFS farmers. The probable reason might be that more experience in Cotton cultivation, education levels, sharing of ideas with experts etc contributed. This result is accordance with results of Avinash Kumar Singh *et al.* (2003).

Education versus Adoption

It could be observed from the table 4.41 that Education had positive and significant relationship with Adoption of Cotton ICM practices by FFS and non FFS farmers. With increase in education, farmers have more information seeking habits resulting better access to farm information sources to know latest recommendations. Another fact that educated farmers had better understanding of new innovations which might have made them to accept and adopt cotton ICM practices. Hence the above relationship was noticed. This finding was in agreement with results of Avinash Kumar Singh *et al.* (2003) Satish (2003).

Experience versus Adoption

It was obvious from the Table 4.41 that there was negative and significant relationship between experience of FFS farmers on Cotton ICM practices. The probable reason might be that with increased farming experience, farmers will have negative attitude to adopt new practices particularly which involve risk. They have confidence in their age old practices with which they could get good yields. This finding was in agreement with results of Natarajan (2004)

Where as incase of non FFS farmers experience had positive relationship with adoption. A farmer who had more experience might be knowing the potentiality, applicability and utility of taking up more practices and aware of relevant remedial measures incase of ill effects. This finding was in agreement with results of Baswarajaiah (2001))

Mass media exposure versus Adoption

An over view of table 4.41 indicate that mass media exposure had significant relationship with adoption of FFS farmers. Increased mass media exposure by different sources provide enormous opportunity for repeated exposure to new technologies, which in turn will lead to more adoption and lessen the gap in use of technology. This might be the probable reason for this kind of relationship. High level of mass media exposure enhances the respondents knowledge level on several aspects of the Cotton ICM practices. This result is line with the results of Madhaviatha (2002).

Market intelligence versus Adoption

Market intelligence had negatively non significant relationship with adoption of FFs practices .It is natural that market intelligence facilities was not available and useful to small and marginal farmers .

Innovativeness versus Adoption

It could be observed from table 4.41 that there was positive and significant relationship between innovativeness and adoption level of Cotton ICM by FFS farmers. Innovators are early adopters of new ideas, information related to Cotton ICM. When convinced of new technology, they were at a considerable advantage over others because of the experience already gained which results in the continuous use over considerable period of time. This result is line with the results of Ravishankar (2005).

Influence of Independent of variables on Adoption of FFS and Non FFS farmers

Multiple regression analysis

District wise Multiple regression analysis was carried out to determine the combine effect of all independent variables on Adoption of FFS and Non FFS farmers.

A perusal of Table 4.42 indicate that in Warangal district the variation in Adoption by selected independent variables was explained to the extent of 83 percent and 51 percent in FFS and Non FFS farmers. The unexplained variation to the extent of 17 percent in case of FFS farmers may be attributed to variables not included in this study. Education contributed significantly. The computed 'F' Value was 22.53, Hence it could be concluded that all variables taken for the study together explained a significant amount of variation in Adoption of FFS farmers.

Kadapa

A perusal of Table 4.43 revealed that in Kadapa district the variation in Adoption by selected independent variables was explained to the extent of 66 percent and 26 percent in FFS and Non FFS farmers. The unexplained variation to the extent of

27 percent in case of FFS farmers may be attributed to variables not included in this study. Education and Innovativeness contributed significantly. The computed 'F' Value was 8.66, Hence it could be conclude that all variables taken for the study together explained a significant amount of variation in Adoption of FFS farmers.

Guntur

A perusal of Table 4.44 revealed that in Guntur district the variation in Adoption by selected independent variables was explained to the extent of 73 percent and 20 percent in FFS and Non FFS farmers. The unexplained variation to the extent of 27 percent in case of FFS farmers may be attributed to variables not included in this study. Age, Education and Experience contributed significantly. The computed 'F' Value was 12.29, Hence it could be concluded that all variables taken for the study together explained a significant amount of variation in Adoption of FFS farmers.

Discussion : From the above it is clear that in Warangal district Education was positively significant, in Kadapa district Education and Innovativeness were positively significant and in Guntur district Age, Education and Farming experience contributed significantly for the most of variation in the Adoption of FFS farmers about Cotton ICM practices. It is clear that education is a motivating force in adoption of new concepts. It triggers the earning to adoption process FFS farmers. In addition to education, experience in FFS / farming also hastens the adoption of new concepts. This finding indicates that for introduction of new technologies at field level, education and experience should be considered.

Relationship between selected profile characteristics and Agro Ecosystem Management of Cotton FFS

In order to study the nature of relationship between selected independent variables and AEM of FFS and Non FFS farmers towards ICM Cotton, correlation coefficient (r) were computed and the values presented in the Table 4.45.

The relationship between the scores of selected independent variables and the AEM of FFS and Non FFS farmers was tested by null hypothesis and empirical hypotheses.

Null hypothesis: There will be no significant relationship between the selected independent variables i.e age , education, experience , farm size ,mass media exposure, extension contact, group orientation ,market intelligence, risk orientation, innovativeness, management orientation and the AEM of FFS and Non FFS farmers.

Empirical hypothesis: There will be significant relationship between the selected independent variables i.e age, education, experience, farm size, mass media exposure, extension contact, group orientation, market intelligence, risk orientation, innovativeness, management orientation and the AEM of FFS and Non FFS farmers.

It can be seen from the Table 4.45 that in Warangal district, Education (0.59), Group orientation(0.34), Market intelligence (0.303), Risk orientation (0.364), Innovativeness (0.50) and Management orientation (0.56) were positively significant at 0.01 level, Mass media exposure was positively significant at 0.05 level, Age, Experience were negatively significant at 0.05 level of probability, Farm size and Extension contact were non-significant with Agro ecosystem management. In case of Non FFS farmers Education (0.47) was positively significant, age, experience in farming, farm size, Mass media exposure, Market intelligence were negatively non-significant and rest of the variables were found to be non- significant with Agro ecosystem management. Hence the null hypothesis was rejected and concluded that the

Agro ecosystem management of farmers was dependent on independent variables and empirical hypothesis was accepted.

It is clear from the Table 4.45 that in Kadapa district, Education (0.69), Mass media exposure (0.43) were positively significant at 0.01 level, Age and experience were negatively significant at 0.05 level ,Farm size and Risk orientation were negatively non-significant and Extension contact, Group orientation, Market orientation, Innovativeness and Management orientation were non-significant with Agro ecosystem management. In case of Non FFS farmers all the variables found to be non-significant with Agro ecosystem management. Hence the null hypothesis was rejected and concluded that the Agro ecosystem management of farmers was dependent on independent variables and empirical hypothesis was accepted.

It can be seen from the Table 4.45 in Guntur district, Education (0.735) was positively significant at 0.01 level and Age was negatively significant at 0.01 level, Experience, Extension contact, Management orientation were negatively non-significant whereas Farm size , Mass media exposure, Group orientation, Market intelligence, Risk orientation, Innovativeness were non-significant with Agro ecosystem management. In case of Non FFS farmers all the variables found to be non-significant with Agro ecosystem management. Hence the null hypothesis was rejected and concluded that the Agro ecosystem management of farmers was dependent on independent variables and empirical hypothesis was accepted.

Discussion

It is clear from the Table 4.45 that computed 'r' values of independent variables for all three districts namely Education, Mass media exposure and Innovativeness were positively significant whereas Age and Experience in farming were

found be negatively significant with agro ecosystem management of FFS farmers on Cotton ICM practices. Whereas incase of non FFS farmers all the variables were found to be non- significant relationship with agro ecosystem management of Cotton ICM practices.

Age versus agro ecosystem management

It is evident from the Table 4.45 that age was negatively significant with agro ecosystem management of FFS farmers towards Cotton ICM. The probable reason might be that with increase in age the ability to perceive new concepts and their management is difficult, as some time they involve risk, costly, and yields less returns.

Education versus agro ecosystem management

It could be observed from the table 4.45 that Education had positive and significant relationship with agro ecosystem management of Cotton ICM practices by FFS farmers. Highly educated farmers know management skills about crop, the agro ecosystem and biodiversity. The planning execution and implementation was also in line with recommendations of experts.

Experience versus agro ecosystem management

It was obvious from the Table 4.45 that there was negative and significant relationship between experience of FFS farmers on Cotton ICM practices. The probable reason might be that with old age, rich experience in various crops ,farmers will look for better profits with least risk. Therefore they have negative attitude to adopt new practices particularly which involve risk.

Mass media exposure versus agro ecosystem management

An overview of Table 4.45 indicate that mass media exposure had significant relationship with agro ecosystem management of FFS farmers. Mass media plays a

significant role in transfer of technology from lab to land. The farmers with easy access to different sources of information might manage crops without disturbing the crop surroundings.

Innovativeness versus agro ecosystem management

It could be observed from the table 4.45 that there was positive and significant relationship between innovativeness and agro ecosystem management level of Cotton ICM by FFS farmers. Innovators have optimistic thinking, approach towards new concepts, they take risks and try new technologies and implement in their field.

Influence of Independent of variables on AEM of FFS and Non FFS farmers

Multiple regression analysis

District wise Multiple regression analysis was carried out to determine the combined effect of all independent variables on AEM of FFS and Non FFS farmers.

A perusal of Table 4.46 revealed that in Warangal district the variation in Agro ecosystem management by selected independent variables was explained to the extent of 46 percent and 43 percent in FFS and Non FFS farmers. The unexplained variation to the extent of 54 percent in case of FFS farmers may be attributed to variables not included in this study. Education in FFS and Group orientation in Non FFS contributed significantly. The computed 'F' Value was 3.77, Hence it could be concluded that all variables taken for the study together explained a significant amount of variation in Agro ecosystem management of FFS farmers.

Kadapa

A perusal of Table 4.47 revealed that in Kadapa district the variation in Agro ecosystem management by selected independent variables was explained to the extent of 56 percent and 46 percent in FFS and Non FFS farmers. The unexplained variation to the extent of 44 percent in case of FFS farmers may be attributed to variables not included in this study. Education in FFS and Market intelligence in Non FFS contributed significantly. The computed 'F' Value was 5.72, Hence it could be concluded that all variables taken for the study together explained a significant amount of variation in Agro ecosystem management of FFS farmers.

Guntur

A perusal of Table 4.48 revealed that in Guntur district the variation in Agro ecosystem management by selected independent variables was explained to the extent of 64 percent and 23 percent in FFS and Non FFS farmers. The unexplained variation to the extent of 36 percent in case of FFS farmers may be attributed to variables not included in this study. Age, Education, Experience in farming and Risk orientation in FFS and Management orientation in Non FFS contributed significantly. The computed 'F' Value was 8.029, Hence it could be concluded that all variables taken for the study together explained a significant amount of variation in Agro ecosystem management of FFS farmers.

Discussion : From the above it is clear that in Warangal district (Education), in Kadapa district (Education) and in Guntur district (Age, Education, experience and risk orientation) contributed significantly for the most of variation in the Agro ecosystem management among FFS farmers about Cotton. In case of untrained farmers, Group

orientation and Market intelligence and Management orientation significantly contributed in the Agro ecosystem management.

It is clear from the above that to practice AEM education is crucial, as it help to understand the concept, analyze its feasibility and judges the adoptability. Experiences also contributed in taking appropriate decisions about AEM practices and its cost effectiveness. In case of non FFS farmers group orientation, management orientation, market intelligence contributed significantly. This indicated that they have experience in working groups like Rythu Mitra groups, Farmer's club etc.

Relationship between selected profile characteristics and Decision making on Cotton ICM Practices (District wise)

In order to study the nature of relationship between selected independent variables and decision of FFS and Non FFS farmers towards ICM Cotton , correlation coefficient s (r) were computed and the values presented in the Table 4.49. The relationship between the scores of selected independent variables and the decision of FFS and Non FFS farmers was tested by null hypothesis and empirical hypotheses.

Null hypothesis: There will be no significant relationship between the selected independent variables i.e age, education, experience, farm size, mass media exposure, extension contact, group orientation, market intelligence, risk orientation, innovativeness, management orientation and the decision of FFS and Non FFS farmers.

Empirical hypothesis : There will be a significant relationship between the selected independent variables i.e age, education, experience, farm size ,mass media exposure,

extension contact, group orientation, market intelligence, risk orientation, innovativeness, management orientation and the decision of FFS and Non FFS farmers.

It can be seen from the Table 4.49 that in Warangal district, Education (0.85), Extension contact (0.36), Group orientation(0.51), Market intelligence (0.54), Risk orientation(0.52),Innovativeness (0.52) and Management orientation(0.59) were positively significant at 0.01 level, Age, Experience were negatively significant at 0.01 level of probability and Farm size and Mass media exposure were non-significant with Decision. In case of Non FFS farmers Education (0.50) and Management orientation(0.33) were positively significant at 0.01 level and rest of the variables were non significant with Decision .Hence the null hypothesis was rejected and concluded that the Decision of farmers was dependent on independent variables and empirical hypothesis was accepted.

It can be seen from the Table 4.49 that in Kadapa district, Education (0.75), Mass media exposure(0.38) were positively significant at 0.01 level, Age ,Experience were negatively significant whereas Farm size, Extension contact, Group orientation, Market intelligence, Risk orientation, Innovativeness and Management orientation were non-significant with Decision. In case of Non FFS farmers Risk orientation (0.262) was positively significant at 0.01 level and Farm size was negatively significant with Decision making. Hence the null hypothesis was rejected and concluded that the Decision of farmers was dependent on independent variables and empirical hypothesis was accepted.

It can be seen from the Table 4.49 that in Guntur district, Education (0.758) was positively significant at 0.01 level, and Age was negatively significant at 0.01 level; Experience, Group orientation were negatively non-significant whereas Farm

size, Mass media exposure, Extension contact, Market intelligence, Risk orientation, Innovativeness and Management orientation were non-significant with Decision. In case of Non FFS farmers farm size was significant with Decision. Hence the null hypothesis was rejected and concluded that the Decision of farmers was dependent on independent variables and empirical hypothesis was accepted.

Discussion

It is clear from the Table 4.49 that computed 'r' values of independent variables for all three districts namely Education, Innovativeness were positively significant whereas Age and Experience in farming were found to be negatively significant with decision of FFS farmers on Cotton ICM practices. Whereas in case of non FFS farmers Education and management orientation were found to be positively significant relationship with decision of Cotton ICM practices.

Age versus Decision

It is evident from the Table 4.49 that age was negatively significant with decision of FFS farmers towards Cotton ICM. As age increases the analytical skills to take appropriate decision of individual decreased. This might be due to poor risk bearing ability, lack of awareness, low mass media exposure. This finding was in agreement with results of Mahitha Kiran (2000)

Education versus Decision

It could be observed from the table 4.49 that Education had positive and significant relationship with decision on Cotton ICM practices by FFS and non FFS farmers. With increase in education, farmers decision making ability will be increase. The access to various sources of information, exposure visits might also contribute to significance. This finding was in agreement with results of Natarajan (2004)

Experience versus decision

It was obvious from the Table 4.49 that there was negative and significant relationship between experience of FFS farmers on Cotton ICM practices. The probable reason might be that well experienced, farmers may not venture to take up latest innovation with doubts in their mind about success. This finding was in agreement with results of Sumana (1996)

Innovativeness versus decision

It could be observed from the table 4.49 that there was positive and significant relationship between innovativeness and decision making level of FFS farmers indicating that more the innovativeness, greater the would be the decision making behaviour. It was natural that an individual receptive to new ideas and information on Cotton ICM tries to experiment with them and takes decisions quickly. The result is line with the results of Ravishankar (2005) .

Management orientation versus Decision

It is clear that from table 4.49 that management orientation of Non FFS farmer had positively significant relationship with decision making. This might be due to their vast experience in farm management. Good managers always take smart decisions and become model farmers.

Influence of Independent of variables on Decision making of FFS and Non FFS farmers

Multiple regression analysis

District wise Multiple regression analysis was carried out to determine the combine effect of all independent variables on Decision making of FFS and Non FFS farmers

A perusal of Table 4.50 revealed that in Warangal district, the variation in Decision by selected independent variables was explained to the extent of 78 percent and 36 percent in FFS and Non FFS farmers. The unexplained variation to the extent of 22 percent in case of FFS farmers may be attributed to variables not included in this study. Education contributed significantly. The computed 'F' Value was 15.47, Hence it could be concluded that all variables taken for the study together explained a significant amount of variation in Decision of FFS farmers.

Kadapa

A perusal of Table 4.51 revealed that in Kadapa district, the variation in Decision by selected independent variables was explained to the extent of 63 percent and 54 percent in FFS and Non FFS farmers. The unexplained variation to the extent of 37 percent in case of FFS farmers may be attributed to variables not included in this study. Education contributed significantly. The computed 'F' Value was 7.60, Hence it could be conclude that all variables taken for the study together explained a significant amount of variation in Decision of FFS farmers.

Guntur

A perusal of Table 4.52 revealed that in Guntur district, the variation in Decision by selected independent variables was explained to the extent of 70 percent and 39 percent in FFS and Non FFS farmers. The unexplained variation to the extent of 30 percent in case of FFS farmers may be attributed to variables not included in this study. Age, Education, Farming experience and Risk orientation contributed significantly. The computed 'F' Value was 10.67, Hence it could be conclude that all variables taken for the study together explained a significant amount of variation in Decision of FFS farmers.

Discussion : From the above it is clear that in Warangal (Education), in Kadapa district (Education) and in Guntur district (Education, experience and risk orientation) were contributed significantly for the most of variation in the Agro ecosystem management FFS farmers about Cotton. In case of non FFS farmers Extension contact and Market intelligence contributed significantly in decision making

It is clear that education level plays a vibrant role in analyzing the crop situation and take appropriate decisions on Cotton FFS practices. Education helps FFS farmers to assess the new concepts and take correct decisions. The farmers with more experience in FFS programme take quick decisions and adopt FFS practices. Education and experience are like modern and traditional visions of Agriculture.

4.10 Constraints and suggestions from FFS farmers and Extension officials to formulate appropriate strategy for effective functioning of FFS Programme

Table 4.53 : Constraints expressed by FFS Farmers

N=180

S.No	Problem	Frequency	Percentage	Rank
1	Non supply of required Quality inputs on time	148	82	1
2	Delay in soil test reports drawn for FFS programme	138	77	2
3	Short term and long term experiments are not planned and conducted regularly	129	72	3
4	Wide Publicity is lacking	125	69	4
5	Women participation is less	124	69	4
6	Effective linkages should be provided to market their produce at higher price	108	60	5
7	Conducting department meetings on FFS days disrupting FFS	92	51	6
8	Amount allotted per week is not sufficient	85	47	8

9	Non- involvement of experts in FFS sessions	82	46	9
10	Awards and incentives for best FFS is not there for motivating farmers.	80	44	10

A perusal of table 4.53 revealed that a high majority (82%) of FFS farmers expressed ‘non supply of required Quality inputs on time as the major constraint, this indicate that there is need to supply all the critical inputs in advance for successful conducting of FFS programme by Department of Agriculture.

While 77.00 per cent of farmers perceived delay in soil test reports drawn for FFS programme as the next major constraint. This calls the attention of Department agriculture to make arrangements to test soil samples of FFS farmers and results should be made available to use in FFS programme.

Short term and long term experiments are not planned, and conducted regularly by 72.00 per cent of FFS farmers. The major reason was lack of awareness to facilitators and busy schedule of officers.

Wide Publicity is lacking and women participation is less by 69.00 per cent. Therefore publicity should be given by utilizing mass media like press ,T.V and print media for encouraging other farmers towards FFS programme. Similarly women should be encouraged to participate in FFS as majority of agriculture operations were done by women.

Effective linkages should be provided to market their produce at higher price (60%) , 51 per cent expressed conducting department meetings on FFS days disrupting FFS as constraint , 47.00 per cent revealed amount allotted per week is not sufficient as a limitation , 46.00 percent opined non- involvement of experts in FFS sessions as yet

another constraint, while 44.00 percent of farmers viewed awards and incentives for best FFS is not there for motivating farmers were the other constraints in FFS programme implementation.

4.10.2 Suggestions given by farmers

Table 4.54 : Suggestions given by farmers

S.No	Suggestion	Frequency	Percentage	Rank
1	All FFS Inputs should be supplied well in advance	146	81	1
2	Soil sample analysis and results should be communicated immediately	135	75	2
3	Short term and long term experiments should be planned and conducted regularly	123	68	3
4	Better market facilities or linkages should be created for getting remunerative returns	119	66	4
5	Wide publicity to FFS	108	60	5
6	Experts should be involved in sessions	105	58	6
7	No other meetings should be conducted on FFS days	105	58	7
8	More Women should be involved	95	53	8
9	Low cost technologies should be popularized	92	51	9
10	Upscaling of FFS should be done based on results of good FFS	88	49	10
11	Awards and incentives for best FFS should be initiated.	85	47	11

The major suggestions given by FFS farmers were, All FFS Inputs should be supplied well in advance by (81%) , soil sample analysis and results should be communicated immediately by (75%), short term and long term experiments should be planned and conducted regularly by (68%), better market facilities or linkages should be created for

getting remunerative returns by (66%),,, wide publicity to FFS by (60%), experts should be involved in sessions by (58%), no other meetings should be conducted on FFS days(58%), more Women should be involved (53%), low cost technologies should be popularized(51%), upscaling of FFS should be done based on results of good FFS(49%) and awards and incentives for best FFS should be initiated by (47%) of the framers..

4.10.3. Constraints expressed by officials:

Table 4.55 : Constraints expressed by officials

N= 18

S.No	Problem	Frequency	Percentage	Rank
1	No Mobility or vehicle facility to visit FFS sessions punctually	18	100	1
2	Budget and funds/ inputs are not released in time	18	100	1
3	FFS should not be purely target oriented	18	100	1
4	Insufficient funds for weekly classes	18	100	1
5	No motivation for good FFS programme to farmers and Officers	15	83	2
6	Lack experience to field staff in FFS	13	72	3
7	Lack of buyback facilities for quality produce	13	72	3
8	There is no scope to bring experts in sessions	12	66.66	4
9	Other meetings are conducted on FFS days	12	66.66	4
10	There is no revolving fund for conducting FFS at agril officer level	10	55.55	5

The officials expressed that no Mobility or vehicle facility to visit FFS sessions punctually , budget and funds/ inputs are not released in time , FFS should not be purely target oriented, insufficient funds for weekly classes by (100%) as a major constraints.

No motivation for good FFS programme to farmers and Officers by (83%), lack experience to field staff in FFS by (72%) , lack of buyback facilities for quality produce by (72%), there is no scope to bring experts in sessions by (66.66%), other meetings are conducted on FFS days by (66.66%) and there is no revolving fund for conducting FFS at agril.officer level by (55.55%) constraints in implementing the FFS programme.

4.10.4 Suggestions given by officials

Table 4.56 : Suggestions given by officials

S.No	Suggestion	Frequency	Percentage	Rank
1	Mobility / Vehicle should be provided to Officers for punctual work	18	100	1
2	Target and crop should be decided by Agril Officers	15	83	2
3	Funds should be released well in advance	15	83	2
4	Timely supply of critical inputs	12	67	3
5	No other Meetings should be conducted on FFS days	12	67	3
6	Season long technical training programme to newly recruited staff on FFS	12	67	3

The officials suggested that Mobility / Vehicle should be provided to Officers for punctual work (100%), target and crop should be decided by Agril Officers by (83%) ,funds should be released well in advance by (83 %), timely supply of critical inputs ,no other Meetings should be conducted on FFS days and season long technical training programme to newly recruited staff on FFS by (67%), for proper and successful implementation of FFS programme.

Strategy for empowerment of farmers and better implementation of FFS

Farmer empowerment remains a central component for agricultural sector development and an important pillar for a country's overall development. The Strategy formulated for empowering farmers and successful implementation of FFS is presented as per the personal observation, interaction with stake holders , constraints and suggestions by the respondents apart from findings of research.

Strategy can be broadly divided into Administrative, Technological and Extension strategies.

Administrative

1. Package & Placement:

The study revealed that majority of farmers and extension officials expressed for supply of critical inputs and release of funds in time for effective implementation of FFS programme. All sorts of Govt assistance like funds placement or input placement should be done well in advance before the onset of the season so that FFS can be implemented in a systematic manner. It gives time to plan and execute all Pre and Post FFS activities efficiently in time.

2. Capacity building programmes for newly recruited officers for effective implementation of FFS

Imparting and updating necessary knowledge and skill to newly recruited officers by conducting capacity building training programmes like Season Long Training

Programme [SLTP] is essential so that FFS can be conducted successfully. The trained officers should not be given other duties or meetings especially on the days when they are supposed to conduct FFS. This recalls the suggestion made by officials during their interaction with the researcher.

3. Targets For FFS

FFS should not be target oriented. All new interventions like FFS programmes which are proactive and change oriented and also have risk taking feature, hence FFS should not be target oriented because their success depends on voluntary participation rather than on demand participation.

4. Flexibility and independence should be given to local officials for effective implementation of FFS

The study revealed that most of the interventions are designed by top to down approach, not permitting any modification according to location specific needs. Therefore to explore the inner potential of farmers and officers the controlling authority should formulate flexible guidelines for FFS. All issues and factors for good productivity are location specific and sufficient flexibility should be there for effective planning and implementation of weekly sessions based on needs and baseline survey. Based on critical gaps the short and long term experiments should be finalized. There should be scope for mid- season correction by experts intervention during their monitoring.

Technological

1. Low cost and ecofriendly technologies and ITKs should be popularized in FFS programmes

The low cost technologies especially ITK methods should be given due importance in FFS package as these yield maximum returns with less cost and maintain ecological balance thus protecting beneficial insects. The research finding revealed that except neem based ITKs no other ITKs are used by FFS farmers. This calls attention of scientific and extension officials to identify, refine, standardize the ITKs and include in FFS package as per location specific needs.

2. Involvement of experts in FFS programs to boost the morale of farmers and officials

FFS is field based technical activity, therefore backstopping by experts should also be made mandatory as to build farmer's confidence on technology by clarifying apprehensions and the doubts. The study revealed that most of the officials and farmers expressed that participation of scientists should be made mandatory to take forward the FFS concept.

3. Research should be initiated and develop a crop wise package for FFS

The need based research by the university and research institutes on FFS, ITKs their applicability and validity is the need of the hour. The findings revealed that skills like preparation of *Trichoderma viridae* and its performance should be shown to farmers at field level. Therefore a detailed study of cost of cultivation and ecosystems is highly essential to take forward the FFS technology.

Extension strategies

1. Motivational incentives and awards should be sanctioned for best FFS villages

It can be elicited from the findings that both farmer and officials suggested to encourage the best FFS by giving some incentive / awards as it acts as stimulating force to other FFS groups and encourage them to perform better. Motivation is the driving force for successful implementation of any programme. The staff and farmers should be motivated by recognizing their services in FFS. Based on the performance indicators officials and farmers should be awarded during field day gatherings.

2. Strengthen the farmers with training programmes

The finding revealed that there is need to give regular training programmes to newly selected farmers by experienced FFS facilitator/ master trainers at mandal level. Capacity building is the only way to reap fruitful results of new technology as methodology. Identification of critical gaps and strategies to bridge will always help to pull on the right track.

3. Monitoring team at District level

As per the study most of the farmers and officials opined that there is no proper monitoring of FFS activities therefore a monitoring team should be formed to inspect regularly and guide / suggest/ correct FFS implementation effectively. There should be a team with experts and DDA cadre officer for regular monitoring of FFS. The team must visit all the mandals at least once in season and ascertain the actual field situation. The feedback from concurrent monitoring and evaluation will help to formulate reforms and refinement of the technology.

4.Up scaling of FFS technologies should be done based on results of good FFS

To up scale the good FFS practices, wide publicity need to be given, critical inputs must be supplied at right time. The findings confirmed that lack of publicity about FFS programmes is a hurdle in taking FFS programme in a bigger way. Therefore wide publicity should be given on FFS programmes by conducting field days, involving local body representatives and district level officials. The success stories of FFS should be published in all agric. farm magazines for motivating other farmers to adopt the FFS practices and harvest rich benefits with low cost.

5. Farmer as facilitator: The successful farmers may be utilized as motivators in new villages. Motivational strategies like awards and recognition certificates should be given every year on Ugadi or Sankranti festival day.

6. Documentation of FFS activities.

Documentation of FFS as a necessary record of work done is an element for bringing in transparency and in up scaling of FFS programmes. FFS registers; Photographs during sessions, Agro Ecosystem System Analysis charts and field boards speak volumes of the way FFS is conducted.

4.11 EMPIRICAL MODEL OF THE STUDY

Table 4.1 : Distribution of FFS and Non FFS farmers based on their age

S. No	Category	Warangal				Kadapa				Guntur				Total			
		FFS	%	Non FFS	%	FFS	%	Non FFS	%	FFS	%	Non FFS	%	FFS	%	Non FFS	%
1	Young [below 35 years]	24	40.00	13	21.66	6	10.00	13	21.66	20	33.33	22	36.66	50	27.77	48	26.6
2	Middle [35-58 years]	35	58.33	42	70.00	52	86.66	44	73.33	39	65.00	36	60.00	126	70.00	124	67.7
3	Old [Above 58 years]	1	1.66	3	5.00	2	3.33	3	5.0	1	1.66	2	3.33	4	2.3	8	4.6
	Total	60		60		60		60		60		60		180		180	
	Mean	37.5		41.48		41.75		42.46		37.66		40.11					
	S.D	9.75		8.77		7.27		9.06		7.11		10.24					

Table 4.2 : Distribution of respondents according to their education

S. No	Category	Warangal				Kadapa				Guntur				Total			
		FFS	%	Non FFS	%	FFS	%	Non FFS	%	FFS	%	Non FFS	%	FFS	%	Non FFS	%
1	Illiterate	11	18.33	15	25.00	1	1.66	21	35.00	4	6.66	18	30.00	16	8.8	54	30.00
2	Primary school	10	16.66	28	46.66	14	23.33	16	26.66	13	21.66	28	46.66	37	20.55	72	40.0
3	High school	19	31.66	13	21.66	26	43.33	17	28.33	24	40.00	10	16.66	69	38.33	40	22.2
4	Intermediate	14	23.33	3	5.00	11	18.33	5	8.33	15	25.00	4	6.66	40	22.22	12	6.66
5	Graduate	6	10.00	1	1.66	8	13.33	1	1.66	4	6.66	0	0	18	10	2	1.11
6	Post Graduate	0		0		0		0		0		0		0	0	0	0
	Total	60		60		60		60		60		60		180		180	
	Mean	2.9		2.11		3.18		2.15		3.03		1.98					
	S.D	1.24		0.90		0.99		1.05		1.00		0.83					

Table 4.3: Distribution of respondents according to their experience (In farming)

S. No	Category	Warangal				Kadapa				Guntur				Total			
		FFS	%	Non FFS	%	FFS	%	Non FFS	%	FFS	%	Non FFS	%	FFS	%	Non FFS	%
1	3-13 years	34	56.66	32	53.33	19	31.66	25	41.66	39	65.00	34	56.66	92	51.11	91	50.55
2	14-27 years	18	30.00	5	8.33	35	58.33	27	45.00	21	35.00	25	41.66	64	35.55	57	31.66
3	27 years and above	8	13.33	23	38.33	6	10.00	8	13.33	--		1	1.66	14	7.77	32	17.7
	Total	60		60		60		60		60		60		180		180	

Mean **14.03** **13.9** **17.23** **16.45** **11.68** **12.16**

S.D **8.61** **7.36** **7.05** **8.53** **4.94** **6.84**

Table 4.4 : Distribution of respondents according to their farm size

S.No	Category	Warangal				Kadapa				Guntur				Total			
		FFS	%	Non FFS	%	FFS	%	Non FFS	%	FFS	%	Non FFS	%	FFS	%	Non FFS	%
1	Marginal [2.5 ac]	11	18.33	19	31.66	5	8.33	23	38.33	13	21.66	18	30.00	29	16.11	60	33.33
2	Small [2.5 to 5 ac]	44	73.33	35	58.33	33	55.00	25	41.66	34	56.66	35	58.33	111	61.66	95	52.77
3	Big [Above 5 ac]	5	8.33	6	10.00	22	36.66	12	20.00	13	21.66	7	11.66	40	22.22	25	13.88
	Total	60		60		60		60		60		60		180		180	
	Mean	3.25		3.21		4.26		3.56		3.66		3.03					
	S.D	1.18		1.42		1.80		1.78		1.84		1.28					

Table 4.5 : Distribution of respondents according to their mass media exposure

S.No	Category	Warangal				Kadapa				Guntur				Total			
		FFS	%	Non FFS	%	FFS	%	Non FFS	%	FFS	%	Non FFS	%	FFS	%	Non FFS	%
1	Low	12	20.00	23	38.33	16	26.66	26	43.33	13	21.66	17	28.33	41	22.77	66	36.66
2	Medium	37	61.66	23	38.33	36	60.00	17	28.33	34	56.66	28	46.66	107	59.44	68	37.77
3	High	11	18.33	14	23.33	8	13.33	17	28.33	13	21.66	15	25.00	32	17.77	46	25.55
	Total	60		60		60		60		60		60		180		180	
	Mean	11.65		6.51		12.63		6.03		11.65		7.10					
	S.D	2.29		1.56		2.62		1.42		2.29		2.04					

Table 4.6 : Distribution of FFS and Non FFS farmers based on their extension contact

S.No	Category	Warangal				Kadapa				Guntur				Total			
		FFS	%	Non FFS	%	FFS	%	Non FFS	%	FFS	%	Non FFS	%	FFS	%	Non FFS	%
1	Low	10	16.66	18	30.00	6	10.00	20	33.33	22	36.66	19	31.66	38	21.11	57	31.66
2	Medium	40	66.66	29	48.33	46	76.66	35	58.33	29	48.33	30	50.00	115	63.88	94	52.22
3	High	10	16.66	13	21.66	8	13.33	5	8.33	9	15.00	11	18.33	27	15.00	29	16.11
	Total	60		60		60		60		60		60		180		180	
	Mean	13.31		6.86		13.16		6.43		13.15		8.33					
	S.D	2.57		1.56		1.93		1.45		1.64		2.60					

Table 4.7: Distribution of FFS and Non FFS farmers based on their group orientation

S.No	Category	Warangal				Kadapa				Guntur				Total			
		FFS	%	Non FFS	%	FFS	%	Non FFS	%	FFS	%	Non FFS	%	FFS	%	Non FFS	%
1	Low	10	16.66	16	26.66	11	18.33	21	35.00	14	23.33	20	33.33	35	19.44	57	31.66
2	Medium	36	60.00	33	55.00	32	52.33	24	40.00	28	46.66	27	45.00	96	53.33	84	46.66
3	High	14	23.33	11	18.33	17	28.33	15	25.00	18	30.00	13	21.66	49	27.22	39	21.66
	Total	60		60		60		60		60		60		180		180	

Mean **15.38** **8.13** **13.75** **6.58** **13.63** **7.45**

S.D **2.12** **1.71** **1.68** **1.31** **1.69** **1.83**

Table 4.8 : Distribution of FFS and Non FFS farmers based on their market intelligence

S.No	Category	Warangal				Kadapa				Guntur				Total			
		FFS	%	Non FFS	%	FFS	%	Non FFS	%	FFS	%	Non FFS	%	FFS	%	Non FFS	%
1	Low	13	21.66	16	26.66	12	28.33	20	33.33	12	20.00	13	21.66	37	20.55	49	27.22
2	Medium	34	56.66	31	51.66	35	58.33	22	36.66	29	48.33	36	60.00	98	54.44	89	49.44
3	High	13	21.66	13	21.66	13	13.33	18	30.00	19	31.66	11	18.33	45	25.00	42	23.33
	Total	60		60		60		60		60		60		180		180	

Mean **18.85** **7.08** **20.15** **7.9** **20.76** **9.26**

S.D **2.07** **1.61** **1.16** **1.18** **1.43** **2.38**

Table 4.10 : Distribution of FFS and Non FFS farmers based on their innovativeness

S.No	Category	Warangal				Kadapa				Guntur				Total			
		FFS	%	Non FFS	%	FFS	%	Non FFS	%	FFS	%	Non FFS	%	FFS	%	Non FFS	%
1	Low	13	21.66	22	36.66	13	21.66	18	30.00	16	26.66	18	30.00	42	23.33	58	32.22
2	Medium	32	53.33	25	41.66	33	55.00	30	50.00	25	41.66	24	40.00	90	50.00	79	43.88
3	High	15	25.00	13	21.66	14	23.33	12	20.00	19	31.66	18	30.00	48	26.66	43	23.88
	Total	60		60		60		60		60		60		180		180	

Mean **16.65** **7.91** **18.51** **7.95** **17.75** **9.71**

S.D **2.52** **1.85** **1.73** **1.62** **1.73** **3.06**

Table 4.11 : Distribution of FFS and Non FFS farmers based on their management orientation

S.No	Category	Warangal				Kadapa				Guntur				Total			
		FFS	%	Non FFS	%	FFS	%	Non FFS	%	FFS	%	Non FFS	%	FFS	%	Non FFS	%
1	Low	9	15.00	17	28.33	10	16.66	12	20.00	12	20.00	13	21.66	31	17.22	42	23.33
2	Medium	39	65.00	29	48.33	36	60.00	36	60.00	34	56.66	36	60.00	109	60.55	101	56.11
3	High	12	20.00	14	23.33	14	23.33	12	20.00	14	23.33	11	18.33	40	22.22	37	20.55
	Total	60		60		60		60		60		60		180		180	

Mean **52.83** **21.40** **56.66** **29.33** **55.50** **23.61**

S.D **5.21** **4.49** 3.06 7.79 2.58 7.05

Table 4.12 : Distribution of FFS and Non FFS farmers respondents based on their Attitude towards FFS

S.No	Category	Warangal				Kadapa				Guntur				Total			
		FFS	%	Non FFS	%	FFS	%	Non FFS	%	FFS	%	Non FFS	%	FFS	%	Non FFS	%
1	Less favourable	10	16.66	23	38.33	11	18.33	13	21.66	11	18.33	18	30.00	32	17.77	54	30.00
2	Moderately favourable attitude	35	58.33	28	46.66	45	75.00	39	65.00	36	60.00	33	55.55	106	58.88	100	55.55
3	More favourable attitude	15	25.00	9	15.00	14	23.33	8	13.33	13	21.66	9	15.00	42	23.33	26	14.44
	Total	60		60		60		60		60		60		180		180	

Mean **73.91** **38.06** **76.98** **41.96** **79.13** **32.06**

S.D **16.25** **6.73** **17.3** **8.4** **15.85** **6.1**

Table 4.13 : Difference in the attitude of FFS and Non FFS farmers towards FFS programme [District wise]

S.No.	Category	Size of the sample	Warangal			Kadapa			Guntur		
			Mean	S.D.	Z value	Mean	S.D.	Z value	Mean	S.D.	Z value
1.	FFS farmers	60	73.91	16.25	56.31*	76.98	17.3	51.81*	79.13	15.85	76.19*
2.	Non FFS farmers	60	38.06	6.73		41.96	8.56		32.0	6.1	

*- Significant at 0.05 level of probability

Table 4.14 : Distribution of FFS and Non FFS farmers respondents based on their Knowledge on ICM Cotton

S.No	Category	Warangal				Kadapa				Guntur				Total			
		FFS	%	Non FFS	%	FFS	%	Non FFS	%	FFS	%	Non FFS	%	FFS	%	Non FFS	%
1	Low	8	13.33	21	35.00	13	21.66	20	33.33	11	18.33	24	40.00	32	17.77	65	36.11
2	Medium	38	63.33	30	50.00	32	53.33	28	46.66	34	56.66	26	43.33	104	57.77	84	46.66
3	High	14	23.33	9	15.00	15	25.00	12	20.00	15	25.00	10	16.66	44	24.44	31	17.22
	Total	60		60		60		60		60		60		180		180	

Mean 19.56 10.8 18.43 10.95 19.03 11.2

S.D 2.38 1.86 3.57 1.89 3.81 2.06

Table 4.15 : Response analysis of knowledge items by FFS farmers and Non FFS

Knowledge

S. No	Knowledge item	FFS farmers [n=180]				Non Farmers [n=180]			
		Correct		Incorrect		Correct		Incorrect	
		Frequency	%	Frequency	%	Frequency	%	Frequency	%
1	Cotton+ Greengram intercropping ratio is a]. 1: 3 b] 1: 6 c] 2:6 d] 1: 8	123	68	57	32	98	54	82	46
2	Neem oil is a] Insecticide b]Repellent c] Anti feedent d] All	148	82	32	11 8	102	57	72	43
3	Reddening of leaves from boarder is symptom of a] Zn deficiency b] Mg Deficiency c] Jassids d] Boran deficiency	132	73	48	27	56	31	124	69
4	Insecticide used for Stem application a] Endosulfan b] Chlorpyrriphos c] Monocrotophos d] all the chemicals	156	87	24	13	74	41	106	59
5	Cotton should only be grown on ----- soils for better yields. a] Black soils b] Red light soils c] Sandy soils d]Any soil	125	69	45	31	88	49	92	51
6	Pest and defender ratio in FFS is a] 4:1 b] 1:2 c] 3:1 d] 5:1	132	73	48	27	45	25	135	75
7	NPV Virus solution is sprayed against a] Heliothis b] Pink boll worm c] Stem borer c] None	145	81	35	19	72	40	108	60
8	Bt formulation should be sprayed during a] Morning b] Noon time c] Evening d] Any time	128	71	52	29	69	38	111	62
9	Stem application is done up to ----days a] 90 b] 30 c] 60 d] any time	112	62	68	38	76	42	104	58
10	Latest concept of FFS is a] ICM b] IPM c] INM d] None	126	70	44	30	62	34	118	66
11	Refugee Bt is sown in ---- rows around Bt Cotton.	105	58	75	42	45	25	135	75
12	Trap crop for Spodoptera is -----	124	69	66	31	69	44	101	56
13	Potassium fertilizer is applied for better ----- quality	138	77	42	23	48	27	132	73

S. No	Knowledge item	FFS farmers [n=180]				Non Farmers [n=180]			
		Correct		Incorrect		Correct		Incorrect	
		Frequency	%	Frequency	%	Frequency	%	Frequency	%
14	Dose of Zinc sulphate per acre is-----	122	68	58	32	58	38	112	62
15	Boll cracking is due to deficiency of -----.	118	66	62	34	32	18	148	82
16	Sticky traps are used against -----	145	81	35	19	46	26	134	74
17	No. of Bird perches per acre of cotton-----	158	88	22	12	82	46	98	54
18	Deep summer ploughing and destruction of crop residue help to reduce pest/ diseases. T/F	164	91	16	9	98	54	82	46
19	Selection of suitable hybrid will give good yields. T/F	158	88	22	12	105	58	75	42
20	Indiscriminate spray of insecticides is prime reason for increase in cost of cultivation T/F	145	81	35	19	115	64	65	26
21	Timely sowing helps in overcoming pest problem T/F	124	69	56	31	78	43	102	57
22	Sowing of Cotton in light soils is risk taking T/F	136	76	44	24	85	47	95	53
23	Better drainage is required for Cotton cultivation T/F	128	71	52	29	74	41	106	59
24	Crop rotation helps in maintaining soil fertility T/F	115	64	65	36	95	53	85	47
25	Stem application conserves natural predators T/F	125	69	55	31	46	26	134	74
26	Do you know the inter crops of cotton Yes/No If Yes please mention a few	116	64	64	36	56	31	124	69
27	Do you know the seed treatment chemical for wilt disease Yes/No If Yes name one chemical	108	60	72	40	35	19	145	81
28	Do you know about pheromone trap action Yes/No If Yes what is the use	142	79	38	21	46	26	134	74
29	Do you know the boarder crops grown in Cotton Yes/No If Yes mention few	118	66	62	34	58	32	122	68
30	Do you know about soil testing Yes/No If Yes mention the weight of Soil sample to be sent to STL	142	79	38	21	56	31	124	69

Table 4.16 : Difference in the Knowledge of FFS and Non FFS farmers on ICM Cotton [District wise]

S.No.	Category	Size of the sample	Warangal			Kadapa			Guntur		
			Mean	S.D.	Z value	Mean	S.D.	Z value	Mean	S.D.	Z value
1.	FFS farmers	60	19.56	2.38	29.21*	18.43	3.57	21.47*	19.03	3.81	21.88*
2.	Non FFS farmers	60	10.8	1.86		10.95	1.9		11.2	2.06	

*- Significant at 0.05 level of probability

Table 4.18 : Response analysis skill of FFS and Non FFS farmers about Cotton ICM practices

S.No	Skill	FFS Farmers						Non FFS Farmers					
		Skilled		Partially skilled		unskilled		Skilled		Partially skilled		unskilled	
		F	%	F	%	F	%	F	%	F	%	F	%
1	Collection of soil samples	118	66	34	19	28	15	35	19	28	15	117	66
2	Seed treatment	106	59	51	28	23	13	54	30	35	19	91	51
3	Stem application with Pesticide	125	69	35	19	20	11	46	26	49	27	85	47
4	Poison bait preparation	98	54	62	34	20	11	63	35	32	18	85	47
5	Seed germination test	123	68	45	25	12	9	59	33	42	23	79	44
6	Cage study	95	53	26	14	59	23	17	9	25	14	138	77
7	Water holding capacity of different soils	65	36	45	25	70	39	19	11	15	8	146	81
8	Cotton Eco System Analysis : Identification of												
	a. Crop condition [Age of the crop, No.of Bolls etc]	145	81	29	16	6	3	68	38	25	14	87	48
	b. Field condition [Moisture condition]	128	71	43	24	9	5	72	40	19	11	89	49
	c. Pests	138	77	35	19	7	4	65	37	35	19	80	44
	d. Natural enemies of Pests [Spiders, Parasites, Wasps]	143	79	31	17	6	3	45	25	28	16	107	59
	e. Weeds	95	53	57	32	28	15	23	13	16	9	141	78
9	Tricho cards preparation	42	23	38	21	100	56	8	5	15	8	157	87

S.No	Skill	FFS Farmers						Non FFS Farmers					
		Skilled		Partially skilled		unskilled		Skilled		Partially skilled		unskilled	
		F	%	F	%	F	%	F	%	F	%	F	%
10	Identification of deficiency of micro nutrients	125	69	43	24	12	9	23	13	29	16	128	71
11	Identification infestation of sucking pests.	132	73	35	19	13	8	42	23	38	21	100	56
12	Preparation of NPV	84	47	42	23	54	30	21	12	19	11	140	77
13	Identification of dead larvae due to Bt spray.	148	82	25	14	7	4	65	37	42	23	73	40
14	Preparation of NSKE	126	70	42	23	12	9	32	18	28	15	120	67
15	Preparation of spray fluid	115	64	28	16	37	20	42	23	25	14	113	73
16	Preparation of Green chilli and Garlic extract	72	40	46	26	62	34	24	13	32	18	124	69
17	Pit fall trap method	68	38	43	24	69	38	8	5	18	9	154	86
18	Group dynamics												
	Nine dot game [Broad thinking]	95	53	38	21	47	26	12	6	23	13	145	81
	Longest line [Resource utilization]	123	68	45	25	12	9	19	10	28	16	133	74
	Building towers [Team work]	86	48	32	18	62	34	9	5	15	9	156	86
19	Communication skills	93	52	45	25	42	23	23	13	35	19	122	68
20	Facilitation skills	98	54	38	21	44	24	18	10	26	14	136	75

Table 4.19 . Difference in the Skill scores of FFS and Non FFS farmers in FFS on ICM Cotton [District wise]

S.No.	Category	Size of the sample	Warangal			Kadapa			Guntur		
			Mean	S.D.	Z value	Mean	S.D.	Z value	Mean	S.D.	Z value
1.	FFS farmers	60	22.36	5.09	28.84*	22.66	5.54	23.32*	22.3	6.43	26.81*
2.	Non FFS farmers	60	11.6	1.79		11.95	2.32		12.38	2.34	

*- Significant at 0.05 level of probability

Table 4.20 : Distribution of FFS and Non FFS farmers' respondents based on their Adoption of ICM Cotton practices

S.No	Category	Warangal				Kadapa				Guntur				Total			
		FFS	%	Non FFS	%	FFS	%	Non FFS	%	FFS	%	Non FFS	%	FFS	%	Non FFS	%
1	Low	12	20.00	15	25.00	11	18.33	24	40.00	14	23.33	20	33.33	37	20.55	59	32.77
2	Medium	35	58.33	31	51.66	35	58.33	28	46.66	30	50.00	24	40.00	100	55.55	83	46.11
3	High	13	21.66	14	23.33	14	23.33	8	13.33	16	26.66	16	26.66	43	23.88	38	21.11
	Total	60		60		60		60		60		60		180		180	

Mean 61.45 35.26 65.63 34.03 71.16 32.35

S.D 13.64 5.14 14.12 7.39 16.07 6.29

Table 4.21 : Extent of adoption ICM Cotton practices of FFS and Non FFS farmers about Cotton ICM practices

S.No	Management Practice	FFS farmers				Non FFS farmers				Reasons for non -adoption
		Fully adopted		Not adopted		Fully adopted		Not adopted		
		F	%	F	%	F	%	F	%	
1	Short term									1. Lack of facilities for quick analysis 2. Unaware of chemical for seed treatment 3. Non availability of sticky traps, and other IPM kits on subsidy from Dept of Agril.
	a. Soil test	125	69	55	31	38	21	142	79	
	b. Seed treatment	108	60	72	40	42	23	138	77	
	c. Seed germination test	116	64	64	36	53	29	127	71	
	d. Sowing time	156	87	34	13	85	47	95	53	
	e. Pit fall trap method	75	42	105	68	-	---	180	100	
	f. Establishment of delta sticky for white fly	125	69	55	31	29	16	151	84	
	g. Cage study [Defender exclusion]	93	52	87	48	12		180	100	
	h. Effect of pesticide spray on defenders	128	71	52	29	38	21	142	79	
	Long term									
	a. No. of plants / hole	138	77	42	23	54	30	136	70	
	b. New Hybrids	145	81	35	19	85	47	95	53	
	c. De topping	132	73	48	27	36	20	144	80	
	d. Removal of fruiting bodies	128	71	52	29	53	29	127	71	
2	Adoption of principles of IPM package									Non availability of sticky traps, and other IPM kits on subsidy from Dept of Agril.
	a. Use of Pheromone traps	118	66	62	34	42	23	138	77	
	b. Installation of yellow sticky traps	105	58	75	42	63	35	117	65	
	c. Installation of bird perches	126	70	54	30	48	27	134	73	
	d. Release of Trichogramma eggs	38	21	142	79	5	3	145	97	
	e. Seed treatment with <i>Trichoderma viridae</i>	65	36	115	64	8	4	142	96	

S.No	Management Practice	FFS farmers				Non FFS farmers				Reasons for non -adoption
		Fully adopted		Not adopted		Fully adopted		Not adopted		
		F	%	F	%	F	%	F	%	
	f. Use of NSKE	112	62	68	38	38	21	142	79	Late supply of bio pesticides
	g. Use of NPV	105	58	75	42	25	14	155	86	
	h. Collection and destruction of larvae	128	71	52	29	18	10	162	90	
	i. Crop residue destruction	148	82	32	18	56	31	124	69	
	j. Destroying fallen squares to reduce pink boll worm incidence	98	54	82	46	54	30	126	70	
	k. Use of bio pesticides [Bt]	95	53	85	47	32	18	148	82	
	l. Trap cropping	86	48	114	52	23	13	157	87	
3	General management practices									Lack of knowledge
	a. Method of cultivation [Mono/Inter cropping]	96	53	84	47	42	23	138	77	
	b. Deep summer ploughing	158	88	22	12	75	42	105	58	
	c. Recommended seed rate	163	91	17	9	83	46	97	54	
	d. Optimum plant density	116	64	64	36	49	27	131	73	
	e. Time of sowing	125	69	55	31	63	35	117	65	
	f. Adoption of soil test based fertilizer application	113	63	67	27	48	27	132	73	
4	Farmer expert									Lack of awareness
	a. Agro ecosystem analysis	95	53	85	47	-		180	100	
	b. Daily monitoring	145	81	35	19	25	14	155	86	
	c. Pest/disease identification	138	77	42	23	82	46	98	54	
	d. Participation in meetings	115	64	65	36	46	26	134	84	
	e. Analysis of crop condition	124	69	56	31	65	31	124	69	
	f. Participation in group discussion	132	73	48	27	42	23	132	73	
	g. Participatory Technology Development	105	58	75	42	26	14	154	86	

S.No	Management Practice	FFS farmers				Non FFS farmers				Reasons for non -adoption
		Fully adopted		Not adopted		Fully adopted		Not adopted		
		F	%	F	%	F	%	F	%	
	h. Peer group communication	68	38	112	62	8	4	172	96	
	i. Participation in field day	143	79	37	21	25	14	155	86	
	j. Active role in field day	138	77	42	23	46	26	134	74	
	k. Risk management	116	64	64	36	18	10	162	90	
	l. Developing linkages with extension functionaries	128	71	52	29	45	25	135	75	
	m. Sharing experiences with others	98	54	82	46	28	16	152	84	
	n. Documentation of experiences	135	75	45	25	46	26	134	74	
		78	43	102	57	12	7	168	93	

Table 4.22 : Difference in the extent adoption scores of FFS and Non FFS farmers on ICM Cotton [District wise]

S.No.	Category	Size of the sample	Warangal			Kadapa			Guntur		
			Mean	S.D.	Z value	Mean	S.D.	Z value	Mean	S.D.	Z value
1.	FFS farmers	60	61.45	13.64	45.07*	65.63	14.12	61.93*	71.16	16.07	51.11*
2.	Non FFS farmers	60	35.06	5.14		34.03	7.09		32.35	6.3	

*- Significant at 0.05 level of probability

Table 4.23 : Distribution of FFS and Non FFS farmers respondents based on their Agro Ecosystem Management of ICM Cotton practices

S.No	Category	Warangal				Kadapa				Guntur				Total			
		FFS	%	Non FFS	%	FFS	%	Non FFS	%	FFS	%	Non FFS	%	FFS	%	Non FFS	%
1	Low	9	15.00	15	25.00	14	23.33	20	33.33	12	20.00	17	28.33	35	19.44	52	28.88
2	Medium	39	65.00	33	55.00	30	50.00	27	45.00	33	55.00	31	51.66	102	56.66	91	50.55
3	High	12	20.00	12	20.00	16	26.66	13	21.66	15	25.00	12	20.00	43	23.88	37	20.55
	Total	60		60		60		60		60		60		180		180	

Mean 16.46 10.01 16.98 10.26 17.0 10.70

S.D 3.20 1.53 3.33 1.76 2.85 2.13

Table 4.24 : Response analysis of Agro ecosystem management of FFS and Non FFS farmers about Cotton ICM practices

S.No	AEM item	FFS farmers [n=180]				Non Farmers [n=180]			
		Adopted		Not adopted		Adopted		Not adopted	
		Frequency	%	Frequency	%	Frequency	%	Frequency	%
	Pest and defender management								
1	Spray of botanical pesticides will develop natural predators	153	85	27	15	68	38	112	72
2	Growing Greengram as inter crop in Cotton for developing predators' population.	98	54	82	46	85	47	95	53
3	Adoption of IPM package for better micro climate	126	70	54	30	28	16	152	84
4	Adoption of soil test based fertilizer application to decrease pest incidence.	132	73	48	27	39	22	141	78
5	Use of NPV and Bt solution when used against pests will result in building natural predators population	163	91	17	9	54	30	126	70
6	Sowing of Border crops like Maize /Bajra/Jowar for reducing sucking pest incidence.	124	69	56	31	35	19	145	81
7	Trap crop for diverting pest from main crop	116	64	64	36	62	34	118	66
	Input management								
8	Use of organic manures like FYM / Vermicompost improves overall fertility of soil.	152	84	28	16	98	54	82	46
9	Application of soil test based NPK fertilizers to	145	81	35	19	105	58	75	42

S.No	AEM item	FFS farmers [n=180]				Non Farmers [n=180]			
		Adopted		Not adopted		Adopted		Not adopted	
		Frequency	%	Frequency	%	Frequency	%	Frequency	%
	reduce pest and diseases.								
10	Use of PSB bio fertilizer for solubilizing insoluble P fertilizers in the soil.	85	47	95	53	42	23	138	77
11	Use of bio control agents like Tricho cards, NPV, .Bt. will reduce pest incidence	138	77	42	23	35	19	145	81
12	Use of botanicals like NSKE will helps in developing predators' population.	162	90	18	10	86	48	94	52
13	Intercropping with Greengram will improve soil fertility	112	62	68	38	83	46	97	54
14	Use of quality seed will result in better yields	148	82	32	18	95	53	85	47
15	Bio diversity conservation Use of ICM technology under FFS has resulted in biodiversity conservation like Spiders, Coccinellid beetle [Akshinatala purugu], Dragon flies.	165	92	15	8	45	25	135	75
16	Decomposition of applied FYM in the soil leads to increased microbial activity	148	82	32	18	54	30	126	70
17	Water holding capacity of soil will increase due to increase of microbial activity.	102	57	78	43	36	20	144	80
18	Parasites and predators conservation will result in Bio diversity conservation	145	81	35	19	46	26	134	74
19	Insect Zoo/ Cage study will help in identification	136	76	44	24	32	18	148	82

S.No	AEM item	FFS farmers [n=180]				Non Farmers [n=180]			
		Adopted		Not adopted		Adopted		Not adopted	
		Frequency	%	Frequency	%	Frequency	%	Frequency	%
	of Predators/ Parasites to enable Bio diversity conservation.								
20	Diversification of crops/varieties will help in Bio diversity conservation.	112	62	68	38	59	33	121	77
21	Reduction of inorganic fertilizers usage will result in improved soil microbial activity.	108	60	72	40	28	16	152	84
22	Conservation of native plant species	95	53	85	47	32	18	148	82
23	Conservation of bird species	94	52	86	48	29	16	151	81
24	Conservation of animals	92	51	88	49	45	25	135	75
25	Use of micro irrigation system will lead to conservation of irrigation water and improves micro climate.	142	79	38	21	63	35	117	65

Table 4.25: Difference in the AEM scores of FFS and Non FFS farmers in FFS on ICM Cotton [District wise]

S.No.	Category	Size of the sample	Warangal			Kadapa			Guntur		
			Mean	S.D.	Z value	Mean	S.D.	Z value	Mean	S.D.	Z value
1.	FFS farmers	60	16.46	3.20	19.41*	16.98	3.33	19.64*	17.0	2.85	18.39*
2.	Non FFS farmers	60	10.1	1.53		10.26	1.76		10.7	2.13	

Table 4.26 : Distribution of FFS and Non FFS farmers respondents based on their Decision making ability ICM Cotton practices

S.No	Category	Warangal				Kadapa				Guntur				Total			
		FFS	%	Non FFS	%	FFS	%	Non FFS	%	FFS	%	Non FFS	%	FFS	%	Non FFS	%
1.	Low	13	21.66	22	36.66	12	20.00	18	30.00	13	21.66	16	26.66	38	21.11	56	31.11
2.	Medium	28	46.66	23	38.33	32	53.33	28	46.66	32	53.33	30	50.00	92	51.11	81	45.00
3.	High	19	31.66	15	15.00	16	26.66	14	23.33	15	25.00	14	23.33	50	27.77	43	23.88
	Total	60		60		60		60		60		60		180		180	

Mean 21.01 17.15 23.71 15.71 24.65 15.41

S.D 5.16 4.14 5.74 3.71 5.31 3.27

Table 4.27 : Response analysis of Decision making ability of FFS and Non FFS farmers about Cotton ICM practices

		FFS farmers				Non FFS farmers			
S.No	Area of decision	Self-decision / Individual decision	Decision making along with Spouse / family members	Group decision	Self-decision / Individual decision	Decision making along with Spouse / family members	Group decision		
		F %	F %	F %	F %	F %	F %		
1	Collection of Soil sample	47 21	35 19	108 60	108 60	55 31	17 9		
2	Time of sowing	31 17	54 30	95 53	125 69	36 20	19 11		
3	Maintain optimum plant density	31 17	85 47	64 36	105 58	48 27	27 15		
4	Use of fertilisers Type / quantity	77 43	18 10	85 47	119 66	42 23	19 11		
5	Use of Bio pesticides	85 47	22 12	73 41	126 70	15 8	39 22		
6	Time of application of fertilizers	95 53	17 9	68 38	139 77	22 12	19 11		
7	Adoption of IPM	19 11	19 11	142 79	135 75	10 6	35 19		
8	Sowing of inter crop like Greengram	65 36	18 10	98 54	142 79	12 6	26 15		
9	Source of credit	17 9	98 54	65 37	76 42	85 47	19 13		
10	Sale of produce	49 27	45 25	86 48	83 46	68 38	29 16		
11	Adoption of Short term	35 20	53 29	92 51	94 52	86 48	---		

		FFS farmers			Non FFS farmers		
S.No	Area of decision	Self-decision / Individual decision	Decision making along with Spouse / family members	Group decision	Self-decision / Individual decision	Decision making along with Spouse / family members	Group decision
		F %	F %	F %	F %	F %	F %
	experiments						
12	Long term experiments	43 24	42 23	95 53	115 64	48 27	17 9
13	Maintenance of farm records	33 19	69 38	78 43	124 69	35 20	21 11
14	Purchase of inputs	42 23	63 35	75 42	115 64	63 35	2 1
15	Selection of crops	49 27	46 26	85 47	132 73	46 26	2 1
16	Selection of variety /hybrid	12 6	73 41	95 53	98 54	72 40	13 6
17	Irrigation schedule	72 40	65 37	33 23	135 75	25 14	20 11
18	Investment on crop production	19 11	86 48	75 42	85 47	92 51	3 2
19	Sowing of boarder crop	92 51	36 20	52 29	138 77	18 10	27 13
20	Use ITKs	52 29	45 25	83 46	125 70	21 11	34 19

Table 4.28 : Difference in the Decision making scores of FFS and Non FFS farmers in FFS on ICM Cotton [District wise]

S.No.	Category	Size of the sample	Warangal			Kadapa			Guntur		
			Mean	S.D.	Z value	Mean	S.D.	Z value	Mean	S.D.	Z value
1.	FFS farmers	60	21.01	5.16	21.47*	23.71	5.74	2.42*	24.65	5.31	32.05*
2.	Non FFS farmers	60	12.23	2.72		13.83	2.21		12.35	2.71	

*- Significant at 0.05 level of probability

Table 4.29 : District wise distribution of Simple Correlation analysis of independent variables with Attitude of FFS and non FFS farmers

S.No	Independent variables	Correlation coefficient [r] values							
		Warangal		Kadapa		Guntur		Total	
		FFS	Non FFS	FFS	Non FFS	FFS	Non FFS	FFS	Non FFS
X ₁	Age	-0.60 ^{**}	0.063	-0.34 ^{**}	0.304 [*]	-0.2626 [*]	0.252	-0.219 ^{**}	0.100
X ₂	Education	0.93 ^{**}	0.42 ^{**}	0.75 ^{**}	0.023	0.82 ^{**}	0.30	0.544 ^{**}	0.253
X ₃	Experience in farming	-0.57 ^{**}	0.0456	-0.38 ^{**}	0.294 [*]	-0.23 ^{NS}	0.266 [*]	-0.244 ^{**}	0.045
X ₄	Farm size	0.02 ^{NS}	0.197	0.073 ^{NS}	0.056	0.014 ^{NS}	0.028	0.068 ^{NS}	0.009
X ₅	Mass Media exposure	0.25 ^{NS}	0.155	0.43 ^{**}	0.11	0.127 ^{NS}	0.240	0.224 ^{**}	0.015
X ₆	Extension contact	0.44 ^{**}	0.209	0.14 ^{NS}	0.01	0.032 ^{NS}	0.255 [*]	0.085 ^{NS}	0.063
X ₇	Group orientation	0.50 ^{**}	0.034	0.15 ^{NS}	0.022	0.017 ^{NS}	0.210	0.003 ^{NS}	0.024
X ₈	Market intelligence	0.63 ^{**}	0.018	0.07 ^{NS}	0.231	0.138 ^{NS}	0.154	0.179 [*]	0.063
X ₉	Risk orientation	0.61 ^{**}	0.099	0.08 ^{NS}	0.049	0.218 ^{NS}	0.167	0.192 ^{**}	0.143
X ₁₀	Innovativeness	0.65 ^{**}	0.034	0.25 [*]	0.0075	0.251 ^{NS}	0.234	0.296 ^{**}	0.094
X ₁₁	Management orientation	0.80 ^{**}	0.047	0.11 ^{NS}	0.008	0.006 ^{NS}	0.010	0.151 [*]	0.150

****** --- Significant at 0.01 probability level; ***** --- Significant at 0.05 probability level, **NS** —Non significant

Table 4.30: District wise Regression analysis of selected independent variables with Attitude

Warangal

S.No	Independent variable	FFS farmers[N=60]			Non FFS farmers [N=60]		
		Regression coefficient	Std. error	't' value	Regression coefficient	Std. error	't' value
X ₁	Age	-0.38	0.21	1.7	0.196	0.22	0.885
X ₂	Education	10.3	1.17	8.75 **	4.55	1.00	4.5**
X ₃	Experience in polam badi and farming	0.41	0.24	1.66	-0.089	0.26	0.342
X ₄	Farm size	-1.53	0.70	2.18 *	-0.66	0.58	1.13
X ₅	Mass Media exposure	-0.29	0.32	0.89	1.18	0.53	2.2
X ₆	Extension contact	0.72	0.29	2.41 *	0.619	0.52	1.17
X ₇	Group orientation	-1.35	0.43	3.11 **	-0.033	0.48	0.068
X ₈	Market intelligence	0.38	0.45	0.845	-0.027	0.49	0.056
X ₉	Risk orientation	1.03	0.47	2.14 *	0.505	0.60	0.840
X ₁₀	Innovativeness	-0.46	0.42	1.10	-0.543	0.48	1.13
X ₁₁	Management orientation	0.68	0.21	3.15 **	-0.205	0.19	1.04

R² : 0.92 F value: 56.4260

R² : 0.38 F value: 2.68855

** -- Significant at 0.01 probability level; *- Significant at 0.05 probability level; NS - Non significant

Table 4.31: District wise Regression analysis of selected independent variables with Attitude

KADAPA

S.No	Independent variable	FFS farmers[N=60]			Non FFS farmers [N=60]		
		Regression coefficient	Std. error	't' value	Regression coefficient	Std. error	't' value
X ₁	Age	-0.307	0.53	0.58	-0.33	0.35	0.94
X ₂	Education	14.3	2.07	6.91**	-0.52	1.29	0.40
X ₃	Experience in polam badi and farming	0.244	0.54	0.45	0.0001	0.37	0.00
X ₄	Farm size	1.01	0.86	1.16	-0.597	0.63	0.93
X ₅	Mass Media exposure	-0.93	0.89	1.05	1.499	1.06	1.41
X ₆	Extension contact	0.27	0.82	0.33	-0.037	0.94	0.04
X ₇	Group orientation	-0.42	0.97	0.43	-0.325	1.12	0.288
X ₈	Market intelligence	0.51	1.34	0.38	1.69	1.00	1.68
X ₉	Risk orientation	0.88	1.00	0.88	0.120	0.93	0.12
X ₁₀	Innovativeness	2.51	1.02	2.44*	-0.822	1.01	0.810
X ₁₁	Management orientation	0.38	0.53	0.71	0.123	0.20	0.613

R² : 0.64 F value:7.8674

R² : 0.20 F:value:1.1119

** -- Significant at 0.01 probability level; *- Significant at 0.05 probability level; NS —Non significant

Table 4.32: District wise Regression analysis of selected independent variables with Attitude

Guntur

S.No	Independent variable	FFS farmers[N=60]			Non FFS farmers [N=60]		
		Regression coefficient	Std. error	't'value	Regression coefficient	Std. error	't'value
X ₁	Age	-0.286	0.369	0.776	0.019	0.26	0.074
X ₂	Education	13.021	1.31	9.886**	4.39	2.92	1.5
X ₃	Experience in polam badi and farming	0.359	0.52	0.684	-0.10	0.39	0.25
X ₄	Farm size	-1.016	0.71	1.54	-0.61	0.67	0.90
X ₅	Mass Media exposure	-0.230	0.62	0.371	0.32	0.65	0.49
X ₆	Extension contact	0.439	0.788	0.557	-0.11	0.87	0.13
X ₇	Group orientation	0.234	0.767	0.306	-0.16	0.63	0.025
X ₈	Market intelligence	0.141	0.904	0.157	-0.203	0.44	0.45
X ₉	Risk orientation	2.07	0.778	2.667*	-0.41	0.54	0.76
X ₁₀	Innovativeness	0.888	0.803	1.106	0.24	0.34	0.70
X ₁₁	Management orientation	0.197	0.5017	0.394	-0.27	0.16	1.73

R² : 0.73 F value: 12.3962

R² : 0.20 F value: 1.1103

** -- Significant at 0.01 probability level; *- Significant at 0.05 probability level; NS —Non significant

Table 4.33 : District wise distribution of Simple Correlation analysis of independent variables with Knowledge of FFS and non FFS farmers

S.No	Independent variables	'r' values							
		Warangal		Kadapa		Guntur		Total	
		FFS	Non FFS	FFS	Non FFS	FFS	Non FFS	FFS	Non FFS
X ₁	Age	-0.49**	0.053	-0.29*	0.128	-0.331**	0.022	-0.226**	0.249
X ₂	Education	0.84**	0.436**	0.87**	0.158	0.89**	0.228	0.598**	0.022
X ₃	Experience in farming	-0.47**	0.060	-0.35**	0.153	-0.25*	0.077	-0.217**	0.126
X ₄	Farm size	0.27*	0.150	0.01 ^{NS}	0.133	0.164 ^{NS}	0.124	0.045	0.012
X ₅	Mass Media exposure	0.26*	0.173	0.48**	0.206	0.041 ^{NS}	0.187	0.181*	0.125
X ₆	Extension contact	0.48**	0.164	0.23 ^{NS}	0.010	0.001 ^{NS}	0.132	0.074	0.014
X ₇	Group orientation	0.47**	0.187	0.14 ^{NS}	0.052	-0.057 ^{NS}	0.185	0.028	0.030
X ₈	Market intelligence	0.50**	0.078	0.01 ^{NS}	0.070	0.050 ^{NS}	0.061	0.080	0.169
X ₉	Risk orientation	0.51**	0.095	0.03 ^{NS}	0.067	0.163 ^{NS}	0.232	0.107	0.077
X ₁₀	Innovativeness	0.63**	0.024	0.20 ^{NS}	0.133	0.167 ^{NS}	0.188	0.213**	0.148
X ₁₁	Management orientation	0.61**	0.122	0.11 ^{NS}	0.188	0.061 ^{NS}	0.209	0.102	0.021

** --- Significant at 0.01 probability level: * --- Significant at 0.05 probability level , NS —Non significant

Table 4.34: District wise distribution of Regression analysis of selected independent variables with Knowledge on ICM Cotton Warangal

S.No	Independent variable	FFS farmers[N=60]			Non FFS farmers [N=60]		
		Regression coefficient	Std. error	't'value	Regression coefficient	Std. error	't'value
X ₁	Age	-0.024	0.06	0.41	0.029	0.06	0.485
X ₂	Education	1.57	0.33	4.77 **	1.15	0.27	4.18**
X ₃	Experience in polam badi and farming	0.028	0.069	0.41	0.010	0.07	0.14
X ₄	Farm size	0.055	0.197	0.28	0.361	0.16	2.25*
X ₅	Mass Media exposure	0.044	0.0919	0.48	-0.140	0.14	0.96
X ₆	Extension contact	0.11	0.0839	1.36	0.24	0.14	1.72
X ₇	Group orientation	-0.064	0.1223	0.523	-0.17	0.13	1.32
X ₈	Market intelligence	-0.042	0.129	0.328	-0.17	0.13	1.30
X ₉	Risk orientation	0.013	0.135	0.102	0.26	0.16	1.6
X ₁₀	Innovativeness	0.065	0.11	0.554	-0.10	0.13	0.78
X ₁₁	Management orientation	-0.033	0.061	0.545	-0.04	0.05	0.889

R² : 0.73 F value: 12.1224

R² : 0.39 F value: 2.90

** -- Significant at 0.01 probability level; *- Significant at 0.05 probability level; NS —Non significant

Table 4.35: District wise distribution of Regression analysis of selected independent variables with Knowledge on ICM Cotton

KADAPA

S.No	Independent variable	FFS farmers[N=60]			Non FFS farmers [N=60]		
		Regression coefficient	Std. error	't' value	Regression coefficient	Std. error	't' value
X ₁	Age	-0.032	0.07	0.423	0.024	0.07	0.305
X ₂	Education	3.53	0.29	11.80**	0.256	0.29	0.877
X ₃	Experience in polam badi and farming	0.09	0.07	1.61	-0.047	0.085	0.559
X ₄	Farm size	0.108	0.125	0.86	0.150	0.144	1.04
X ₅	Mass Media exposure	-0.110	0.128	0.85	-0.27	0.240	1.14
X ₆	Extension contact	0.189	0.119	1.59	0.11	0.213	0.53
X ₇	Group orientation	-0.199	0.141	1.4	-0.066	0.255	0.26
X ₈	Market intelligence	-0.026	0.194	0.13	0.027	0.227	0.119
X ₉	Risk orientation	0.048	0.145	0.332	0.122	0.212	0.576
X ₁₀	Innovativeness	0.39	0.148	2.6*	-0.232	0.229	1.01
X ₁₁	Management orientation	0.094	0.076	1.2	0.050	0.045	1.11

R² : 0.82 F value: 20.6754

R² : 0.177 F value: 0.94

** -- Significant at 0.01 probability level; *- Significant at 0.05 probability level; NS —Non significant

Table 4.36 : District wise distribution of Regression analysis of selected independent variables with Knowledge on Cotton ICM

Guntur

S.No	Independent variable	FFS farmers[N=60]			Non FFS farmers [N=60]		
		Regression coefficient	Std. error	't' value	Regression coefficient	Std. error	't' value
X ₁	Age	-0.165	0.065	2.52*	-0.04	0.09	0.47
X ₂	Education	3.459	0.233	14.79**	1.37	1.19	1.15
X ₃	Experience in polam badi and farming	0.185	0.093	1.98	0.13	0.133	0.99
X ₄	Farm size	0.025	0.127	0.20	0.026	0.23	0.112
X ₅	Mass Media exposure	-0.108	0.1101	0.986	0.091	0.21	0.42
X ₆	Extension contact	-0.0004	0.14	0.000	-0.40	0.29	1.37
X ₇	Group orientation	-0.066	0.13	0.489	0.153	0.22	0.668
X ₈	Market intelligence	-0.153	0.16	0.954	-0.096	0.15	0.618
X ₉	Risk orientation	0.292	0.13	2.114*	0.017	0.18	0.093
X ₁₀	Innovativeness	-0.057	0.14	0.400	0.081	0.12	0.6661
X ₁₁	Management orientation	0.177	0.089	0.089	0.011	0.06	0.161

R² : 0.85 F value: 26.2025

R² : 0.16 F value: 0.87

** -- Significant at 0.01 probability level; *- Significant at 0.05 probability level; NS —Non significant

Table 4.37 : District wise distribution of Simple Correlation analysis of independent variables with Skill of FFS and non FFS farmers

S.No	Independent variables	'r' values							
		Warangal		Kadapa		Guntur		Total	
		FFS	Non FFS	FFS	Non FFS	FFS	Non FFS	FFS	Non FFS
X ₁	Age	-0.47 ^{**}	0.074	-0.29 [*]	0.071	-0.310 [*]	0.130	-0.124	0.002
X ₂	Education	0.86 ^{**}	0.332 ^{**}	0.76 ^{**}	0.002	0.869 ^{**}	0.038	0.483 ^{**}	0.087
X ₃	Experience in farming	-0.43 ^{**}	0.099	-0.24 ^{NS}	0.079	-0.272 [*]	0.160	-0.095	0.021
X ₄	Farm size	0.133 ^{NS}	0.226	-0.06 ^{NS}	0.078	0.145 ^{NS}	0.153	0.0477	0.062
X ₅	Mass Media exposure	0.221 ^{NS}	0.040	0.42 ^{**}	0.163	0.035 ^{NS}	0.072	0.173 [*]	0.064
X ₆	Extension contact	0.43 ^{**}	0.010	0.30 [*]	0.051	-0.035 ^{NS}	0.051	0.063	0.081
X ₇	Group orientation	0.54 ^{**}	0.020	0.15 ^{NS}	0.208	-0.0231 ^{NS}	0.232	-0.107	0.094
X ₈	Market intelligence	0.55 ^{**}	0.273 [*]	0.03 ^{NS}	0.185	0.116 ^{NS}	0.058	0.109	0.063
X ₉	Risk orientation	0.57 ^{**}	0.001	-0.04 ^{NS}	0.115	0.019 ^{NS}	0.159	0.0087	0.152
X ₁₀	Innovativeness	0.60 ^{**}	0.173	0.13 ^{NS}	0.036	0.114 ^{NS}	0.129	1.57 [*]	0.139
X ₁₁	Management orientation	0.60 ^{**}	0.018	0.01 ^{NS}	0.105	-0.118 ^{NS}	0.004	0.037	0.065

**** --- Significant at 0.01 probability level ; * --- Significant at 0.05 probability level ; NS —Non significant**

Table 4.38 : District wise distribution of Regression analysis of selected independent variables with Skill on ICM Cotton

Warangal

S.No	Independent variable	FFS farmers[N=60]			Non FFS farmers [N=60]		
		Regression coefficient	Std. error	't' value	Regression coefficient	Std. error	't' value
X ₁	Age	-0.034	0.11	0.313	0.046	0.064	0.71
X ₂	Education	4.20	0.60	6.97 **	2.56	0.94	2.71 **
X ₃	Experience in polam badi and farming	0.099	0.12	0.78	-0.080	0.07	1.06
X ₄	Farm size	-0.94	0.35	2.64 *	0.214	0.15	1.357
X ₅	Mass Media exposure	0.015	0.16	0.095	-0.22	0.13	1.70
X ₆	Extension contact	0.247	0.15	1.62	-0.028	0.18	0.15
X ₇	Group orientation	-0.195	0.22	0.877	-0.017	0.17	0.101
X ₈	Market intelligence	0.146	0.23	0.59	-0.255	0.18	1.38
X ₉	Risk orientation	0.32	0.24	1.32	-0.094	0.16	0.58
X ₁₀	Innovativeness	-0.108	0.21	0.500	-0.067	0.15	0.42
X ₁₁	Management orientation	-0.169	0.11	1.52	-0.053	0.056	0.95

R² : 0.80 F value: 18.3277

R² : 0.24 F value: 1.40

** -- Significant at 0.01 probability level; *- Significant at 0.05 probability level; NS —Non significant

Table 4.39: District wise distribution of Regression analysis of selected independent variables with Skill on ICM Cotton

Kadapa

S.No	Independent variable	FFS farmers[N=60]			Non FFS farmers [N=60]		
		Regression coefficient	Std. error	't' value	Regression coefficient	Std. error	't' value
X ₁	Age	-0.43	0.15	2.9**	0.100	0.08	1.237
X ₂	Education	5.17	0.59	8.7**	2.74	1.015	2.7**
X ₃	Experience in polam badi and farming	0.54	0.15	3.5**	-0.046	0.086	0.545
X ₄	Farm size	0.05	0.24	0.24	-0.057	0.161	0.356
X ₅	Mass Media exposure	-0.32	0.25	1.2	-0.188	0.209	0.898
X ₆	Extension contact	0.63	0.23	2.69**	0.167	0.22	0.739
X ₇	Group orientation	-0.22	0.27	0.79	-0.465	0.29	1.57
X ₈	Market intelligence	0.008	0.38	0.021	0.103	0.16	0.64
X ₉	Risk orientation	-0.40	0.28	1.4	-0.151	0.17	0.886
X ₁₀	Innovativeness	0.50	0.29	1.71	0.116	0.17	0.680
X ₁₁	Management orientation	-0.02	0.15	0.14	0.017	0.05	0.347

R² : 0.71 F value: 11.0593

R² : 0.59 F value: 6.4189

** -- Significant at 0.01 probability level; *- Significant at 0.05 probability level; NS —Non significant

Table 4.40: District wise distribution of Regression analysis of selected independent variables with Skill on ICM Cotton

Guntur

S.No	Independent variable	FFS farmers[N=60]			Non FFS farmers [N=60]		
		Regression coefficient	Std. error	't' value	Regression coefficient	Std. error	't' value
X ₁	Age	-0.133	0.12	10.02	-0.184	0.11	1.6
X ₂	Education	5.55	0.46	12.03**	1.29	1.5	0.85
X ₃	Experience in polam badi and farming	0.106	0.18	0.578	0.40	0.16	2.4 *
X ₄	Farm size	0.046	0.25	0.185	0.482	0.301	1.6
X ₅	Mass Media exposure	-0.148	0.21	0.683	0.006	0.270	0.022
X ₆	Extension contact	-0.123	0.27	0.447	-0.354	0.371	0.95
X ₇	Group orientation	-0.580	0.26	2.15*	0.472	0.29	1.63
X ₈	Market intelligence	0.093	0.31	0.294	0.172	0.19	0.87
X ₉	Risk orientation	-0.044	0.27	0.164	0.148	0.23	0.61
X ₁₀	Innovativeness	-0.255	0.28	0.908	-0.224	0.155	1.4
X ₁₁	Management orientation	-0.073	0.17	0.417	0.0012	0.08	0.014

R² : 0.80 F value: 17.5629

R² : 0.38 F value: 2.6924

** -- Significant at 0.01 probability level; *- Significant at 0.05 probability level; NS —Non significant

Table 4.41.: District wise distribution of Simple Correlation analysis of independent variables with Adoption of FFS and non FFS farmers

S.No	Independent variables	'r' values							
		Warangal		Kadapa		Guntur		Total	
		FFS	Non FFS	FFS	Non FFS	FFS	Non FFS	FFS	Non FFS
X ₁	Age	-0.52 ^{**}	0.21	-0.21 ^{NS}	0.336 ^{**}	-0.31 [*]	0.130	-0.221 ^{**}	0.155 [*]
X ₂	Education	0.89 ^{**}	0.630 ^{**}	0.73 ^{**}	0.134	0.821 ^{**}	0.038	0.476 ^{**}	0.235 ^{**}
X ₃	Experience in farming	-0.47 ^{**}	0.17	-0.24 ^{NS}	0.322 [*]	-0.225 ^{NS}	0.160	-0.192 ^{**}	0.171 [*]
X ₄	Farm size	0.18 ^{NS}	0.005	-0.12 ^{NS}	0.138	0.104 ^{NS}	0.153	-0.080	0.059
X ₅	Mass Media exposure	0.186 ^{NS}	0.176	0.45 ^{**}	0.136	0.134 ^{NS}	0.072	0.182 [*]	0.045
X ₆	Extension contact	0.33 ^{**}	0.016	0.23 ^{NS}	0.108	-0.052 ^{NS}	0.051	0.055	0.019
X ₇	Group orientation	0.499 ^{**}	0.013	0.076 ^{NS}	0.242	-0.057 ^{NS}	0.232	0.041	0.059
X ₈	Market intelligence	0.54 ^{**}	0.151	-0.003 ^{NS}	0.187	0.063 ^{NS}	0.058	-0.009	0.118
X ₉	Risk orientation	0.47 ^{**}	0.181	-0.008 ^{NS}	0.222	0.156 ^{NS}	0.159	0.009	0.011
X ₁₀	Innovativeness	0.54 ^{**}	0.117	0.27 [*]	0.145	0.222 ^{NS}	0.129	0.147 [*]	0.070
X ₁₁	Management orientation	0.60 ^{**}	0.256 [*]	0.044 ^{NS}	0.146	-0.121 ^{NS}	0.004	-0.057	0.095

^{**} --- Significant at 0.01 probability level ; ^{*} --- Significant at 0.05 probability level ;

NS —Non significant

Table 4.42: District wise distribution of Regression analysis of selected independent variables with Adoption of Cotton ICM practices.

Warangal

S.No	Independent variable	FFS farmers[N=60]			Non FFS farmers [N=60]		
		Regression coefficient	Std. error	't'value	Regression coefficient	Std. error	't'value
X ₁	Age	-0.15	0.27	0.57	-0.11	0.15	0.74
X ₂	Education	13.33	1.48	8.98 **	0.74	2.33	0.32
X ₃	Experience in polam badi and farming	0.26	0.31	0.855	0.076	0.18	0.40
X ₄	Farm size	-1.02	0.88	1.15	-0.06	0.39	0.17
X ₅	Mass Media exposure	-0.007	0.41	0.018	0.23	0.32	0.73
X ₆	Extension contact	-0.154	0.37	0.412	0.836	0.46	1.81
X ₇	Group orientation	-0.461	0.54	0.84	0.01	0.43	0.045
X ₈	Market intelligence	0.271	0.57	0.46	0.09	0.45	0.198
X ₉	Risk orientation	-0.409	0.60	0.677	0.36	0.39	0.91
X ₁₀	Innovativeness	-0.658	0.53	1.23	0.244	0.39	0.61
X ₁₁	Management orientation	-0.38	0.27	1.41	-0.12	0.14	0.92

R² : 0.83 F value: 22.5342

R² **0.51** **F value: 4.59**

** -- Significant at 0.01 probability level; *- Significant at 0.05 probability level; NS —Non significant

Table 4.43 District wise distribution of Regression analysis of selected independent variables with Adoption of Cotton ICM practices.

Kadapa

S.No	Independent variable	FFS farmers[N=60]			Non FFS farmers [N=60]		
		Regression coefficient	Std. error	't'value	Regression coefficient	Std. error	't'value
X ₁	Age	-0.055	0.41	0.13	-0.122	0.37	0.329
X ₂	Education	12.01	1.61	7.4**	3.04	4.64	0.655
X ₃	Experience in polam badi and farming	0.48	0.42	1.15	-0.073	0.39	0.187
X ₄	Farm size	-0.69	0.67	1.03	-0.77	0.73	1.047
X ₅	Mass Media exposure	-0.17	0.69	0.25	0.577	0.95	0.604
X ₆	Extension contact	0.92	0.64	1.44	1.55	1.03	1.49
X ₇	Group orientation	-1.06	0.76	1.39	0.206	1.34	0.153
X ₈	Market intelligence	-0.27	1.04	0.26	0.378	0.74	0.511
X ₉	Risk orientation	-0.38	0.78	0.49	0.211	0.78	0.27
X ₁₀	Innovativeness	2.34	0.80	2.9**	-0.203	0.78	0.260
X ₁₁	Management orientation	-0.116	0.41	0.28	0.0075	0.23	0.033

R² : 0.66 F value: 8.6630

R² : 0.26 F value: 1.5484

** -- Significant at 0.01 probability level; *- Significant at 0.05 probability level; NS —Non significant

Table 4.44: District wise distribution of Regression analysis of selected independent variables with Adoption of Cotton ICM practices.

Guntur

S.No	Independent variable	FFS farmers[N=60]			Non FFS farmers [N=60]		
		Regression coefficient	Std. error	't'value	Regression coefficient	Std. error	't'value
X ₁	Age	-0.86	0.36	2.341*	-0.024	0.45	0.053
X ₂	Education	12.81	1.31	9.73**	0.162	6.01	0.027
X ₃	Experience in polam badi and farming	1.06	0.52	2.034*	0.024	0.67	0.036
X ₄	Farm size	-0.69	0.71	0.96	-1.69	1.2	1.4
X ₅	Mass Media exposure	0.52	0.61	0.84	-0.388	1.07	0.36
X ₆	Extension contact	-0.76	0.78	0.95	0.73	1.48	0.493
X ₇	Group orientation	-0.12	0.76	0.159	-0.601	1.15	0.519
X ₈	Market intelligence	-0.77	0.90	0.859	-0.326	0.78	0.413
X ₉	Risk orientation	1.12	0.77	1.45	0.998	0.95	1.04
X ₁₀	Innovativeness	0.34	0.80	0.42	-0.675	0.62	1.08
X ₁₁	Management orientation	-0.43	0.50	0.87	0.621	0.35	1.77

R^2 : 0.73 F value: 12.2933

R^2 : **0.20.** **F value: 1.14**

** -- Significant at 0.01 probability level; *- Significant at 0.05 probability level; NS —Non significant

Table 4.45 : District wise distribution of Simple Correlation analysis of independent variables with AEM of FFS and non FFS farmers

S.No	Independent variables	Correlation values [r]							
		Warangal		Kadapa		Guntur		Total	
		FFS	Non FFS	FFS	Non FFS	FFS	Non FFS	FFS	Non FFS
X ₁	Age	-0.29 [*]	0.07	-0.25 [*]	0.083	-0.34 ^{**}	0.140	-0.149 [*]	0.11
X ₂	Education	0.59 ^{**}	0.475 ^{**}	0.69 ^{**}	0.104	0.735 ^{**}	0.083	0.383 ^{**}	0.099
X ₃	Experience in farming	-0.29 [*]	0.070	-0.27 [*]	0.048	-0.230 ^{NS}	0.160	-0.133 [*]	0.107
X ₄	Farm size	0.066 ^{NS}	0.05	-0.189 ^{NS}	0.058	0.095 ^{NS}	0.04	-0.064	0.018
X ₅	Mass Media exposure	0.27 [*]	0.181	0.43 ^{**}	0.171	0.028 ^{NS}	0.077	0.175 [*]	0.060
X ₆	Extension contact	0.13 ^{NS}	0.141	0.15 ^{NS}	0.231	-0.097 ^{NS}	0.107	0.055	0.185
X ₇	Group orientation	0.34 ^{**}	0.012	0.026 ^{NS}	0.009	0.131 ^{NS}	0.138	-0.061	0.012
X ₈	Market intelligence	0.303 [*]	0.021	0.005 ^{NS}	0.011	0.186 ^{NS}	0.160	0.044	0.135
X ₉	Risk orientation	0.364 ^{**}	0.086	-0.048 ^{NS}	0.238	0.186 ^{NS}	0.057	0.047	0.166
X ₁₀	Innovativeness	0.50 ^{**}	0.119	0.149 ^{NS}	0.064	0.183 ^{NS}	0.099	0.214 ^{**}	0.041
X ₁₁	Management orientation	0.56 ^{**}	0.111	0.07 ^{NS}	0.077	-0.168 ^{NS}	0.266	0.058	0.130

** --- Significant at 0.01 probability level ; * --- Significant at 0.05 probability level ;

NS —Non significant

Table 4.46: District wise distribution of Regression analysis of selected independent variables with AEM of Cotton ICM practices.

Warangal

S.No	Independent variable	FFS farmers[N=60]			Non FFS farmers [N=60]		
		Regression coefficient	Std. error	't'value	Regression coefficient	Std. error	't'value
X ₁	Age	0.018	0.11	0.15	0.010	0.04	0.21
X ₂	Education	1.47	0.64	2.26*	-1.17	0.70	1.664
X ₃	Experience in polam badi and farming	0.044	0.13	0.325	0.014	0.05	0.259
X ₄	Farm size	0.084	0.38	0.21	-0.040	0.11	0.34
X ₅	Mass Media exposure	0.171	0.18	0.95	0.163	0.098	1.66
X ₆	Extension contact	-0.208	0.16	1.26	0.199	0.13	1.43
X ₇	Group orientation	-0.013	0.24	0.056	0.377	0.13	2.89**
X ₈	Market intelligence	-0.27	0.25	1.07	0.259	0.13	1.88
X ₉	Risk orientation	0.013	0.26	0.49	-0.131	0.11	1.09
X ₁₀	Innovativeness	0.043	0.23	0.18	0.006	0.11	0.05
X ₁₁	Management orientation	0.157	0.11	1.32	0.022	0.04	0.52

R² : 0.46 F value: 3.77

R² : 0.28 F value: 1.77

** -- Significant at 0.01 probability level; *- Significant at 0.05 probability level; NS —Non significant

Table 4.47: District wise distribution of Regression analysis of selected independent variables with AEM of Cotton ICM practices

Kadapa

S.No	Independent variable	FFS farmers[N=60]			Non FFS farmers [N=60]		
		Regression coefficient	Std. error	't' value	Regression coefficient	Std. error	't' value
X ₁	Age	-0.05	0.112	0.53	-0.051	0.085	0.604
X ₂	Education	2.7	0.43	6.1**	0.47	1.071	0.439
X ₃	Experience in polam badi and farming	0.13	0.11	1.14	0.060	0.09	0.664
X ₄	Farm size	-0.282	0.18	1.5	-0.059	0.17	0.349
X ₅	Mass Media exposure	-0.012	0.18	0.068	0.207	0.22	0.940
X ₆	Extension contact	0.062	0.17	0.36	0.299	0.23	1.25
X ₇	Group orientation	-0.303	0.20	1.4	-0.017	0.311	0.055
X ₈	Market intelligence	-0.059	0.28	0.211	0.373	0.17	2.18*
X ₉	Risk orientation	-0.128	0.21	0.60	-0.101	0.18	0.5464
X ₁₀	Innovativeness	0.23	0.21	1.06	-0.171	0.181	0.94
X ₁₁	Management orientation	0.065	0.11	0.57	-0.021	0.053	0.400

R^2 : 0.56 F value: 5.7258

R^2 : 0.22 F value: 1.27

** -- Significant at 0.01 probability level; *- Significant at 0.05 probability level; NS —Non significant

Table 4.48 : District wise distribution of Regression analysis of selected independent variables with AEM of Cotton ICM practices

Guntur

S.No	Independent variable	FFS farmers[N=60]			Non FFS farmers [N=60]		
		Regression coefficient	Std. error	't' value	Regression coefficient	Std. error	't' value
X ₁	Age	-0.177	0.07	2.339*	-0.169	0.109	1.55
X ₂	Education	1.96	0.27	7.24**	-2.59	1.43	1.81
X ₃	Experience in polam badi and farming	0.21	0.108	20.23*	0.206	0.16	1.27
X ₄	Farm size	-0.121	0.147	0.82	0.252	0.28	0.87
X ₅	Mass Media exposure	-0.106	0.127	0.838	0.262	0.25	1.022
X ₆	Extension contact	0.121	0.162	0.75	0.179	0.35	0.50
X ₇	Group orientation	-0.184	0.158	1.16	0.144	0.27	0.52
X ₈	Market intelligence	0.126	0.186	0.678	-0.092	0.18	0.491
X ₉	Risk orientation	0.331	0.160	2.07*	-0.129	0.22	0.567
X ₁₀	Innovativeness	0.146	0.165	0.886	-0.05	0.14	0.361
X ₁₁	Management orientation	0.117	0.103	1.13	0.228	0.083	2.7 **

R² : 0.64 F value: 8.0929 -

R² : 0.27 F value: 1.68

** -- Significant at 0.01 probability level; *- Significant at 0.05 probability level; NS —Non significant

Table 4.49. District wise distribution of Simple Correlation analysis of independent variables with Decision making of FFS and non FFS farmers

S.No	Independent variables	Correlation values [r]							
		Warangal		Kadapa		Guntur		Total	
		FFS	Non FFS	FFS	Non FFS	FFS	Non FFS	FFS	Non FFS
X ₁	Age	-0.51 ^{**}	0.052	-0.35 ^{**}	0.009	-0.37 ^{**}	-0.53	-0.28 ^{**}	0.008
X ₂	Education	0.85 ^{**}	0.504 ^{**}	0.75 ^{**}	0.107	0.758 ^{**}	0.124	0.474 ^{**}	0.292 ^{**}
X ₃	Experience in farming	-0.44 ^{**}	0.013	-0.40 ^{**}	0.071	-0.234 ^{NS}	0.073	-0.241 ^{**}	0.059
X ₄	Farm size	0.14 ^{NS}	0.086	0.036 ^{NS}	0.253 [*]	0.168 ^{NS}	0.261 [*]	0.005	0.045
X ₅	Mass Media exposure	0.199 ^{NS}	0.076	0.38 ^{**}	0.157	0.040 ^{NS}	0.037	0.112	0.033
X ₆	Extension contact	0.36 ^{**}	0.082	0.18 ^{NS}	0.033	0.071 ^{NS}	0.062	0.115	0.020
X ₇	Group orientation	0.51 ^{**}	0.018	0.14 ^{NS}	0.080	-0.071 ^{NS}	0.045	0.077	0.109
X ₈	Market intelligence	0.54 ^{**}	0.192	0.15 ^{NS}	0.012	0.039 ^{NS}	0.053	0.048	0.050
X ₉	Risk orientation	0.52 ^{**}	0.149	0.006 ^{NS}	0.262 [*]	0.205 ^{NS}	0.079	0.070	0.074
X ₁₀	Innovativeness	0.52 ^{**}	0.050	0.14 ^{NS}	0.224	0.192 ^{NS}	0.004	0.161 [*]	0.016
X ₁₁	Management orientation	0.59 ^{**}	0.333 ^{**}	0.11 ^{NS}	0.248	0.0115 ^{NS}	0.082	0.031	0.299 ^{**}

** --- Significant at 0.01 probability level ; * --- Significant at 0.05 probability level ;

NS —Non significant

**Table 4.50 : District wise distribution of Regression analysis of selected independent variables with Decision making of Cotton ICM practices
Warangal**

S.No	Independent variable	FFS farmers[N=60]			Non FFS farmers [N=60]		
		Regression coefficient	Std. error	't' value	Regression coefficient	Std. error	't' value
1	Age	-0.16	0.11	1.38	-0.03	0.08	0.43
2	Education	4.43	0.65	6.77 **	1.54	0.39	3.9**
3	Experience in polam badi and farming	0.23	0.13	1.70	0.108	0.10	1.05
4	Farm size	-0.7	0.38	1.80	0.29	0.23	1.26
5	Mass Media exposure	0.066	0.18	0.36	-0.12	0.21	0.57
6	Extension contact	0.13	0.16	0.80	0.184	0.20	0.88
7	Group orientation	-0.22	0.24	0.92	0.065	0.19	0.33
8	Market intelligence	0.094	0.255	0.36	-0.40	0.19	2.04*
9	Risk orientation	0.22	0.26	0.85	0.48	0.23	20.3*
10	Innovativeness	-0.34	0.23	1.4	-0.12	0.18	0.67
11	Management orientation	-0.099	0.12	0.82	0.065	0.077	0.856

R^2 : 0.78 F value: 15.4700

R^2 : 0.41 F value: 3.09

Table 4.51 : District wise distribution of Regression analysis of selected independent variables with Decision making of Cotton ICM practices

Kadapa

S.No	Independent variable	FFS farmers[N=60]			Non FFS farmers [N=60]		
		Regression coefficient	Std. error	't' value	Regression coefficient	Std. error	't' value
X ₁	Age	-0.19	0.17	1.08	0.140	0.088	1.59
X ₂	Education	4.9	0.688	7.12**	-0.25	0.32	0.78
X ₃	Experience in polam badi and farming	0.13	0.17	0.76	-0.19	0.09	2.02*
X ₄	Farm size	0.22	0.28	0.77	-0.32	0.15	2.01*
X ₅	Mass Media exposure	-0.474	0.29	1.6	-0.06	0.26	0.23
X ₆	Extension contact	0.226	0.27	0.82	-0.22	0.23	0.955
X ₇	Group orientation	-0.140	0.32	0.43	-0.23	0.28	0.822
X ₈	Market intelligence	0.384	0.44	0.86	-0.020	0.25	0.083
X ₉	Risk orientation	-0.007	0.33	0.023	0.37	0.23	1.58
X ₁₀	Innovativeness	0.47	0.34	1.3	0.33	0.25	1.3
X ₁₁	Management orientation	0.19	0.17	1.1	0.038	0.05	0.76

R^2 : 0.63 F value: 7.6025

R^2 : 0.26 F value: 1.56

** -- Significant at 0.01 probability level; *- Significant at 0.05 probability level; NS —Non significant

Table 4.52 : District wise distribution of Regression analysis of selected independent variables with Decision making of Cotton ICM practices

Guntur

S.No	Independent variable	FFS farmers[N=60]			Non FFS farmers [N=60]		
		Regression coefficient	Std. error	't'value	Regression coefficient	Std. error	't'value
X ₁	Age	-0.42	0.12	3.32**	-0.263	0.09	2.856**
X ₂	Education	3.82	0.46	8.2**	0.897	1.20	0.744
X ₃	Experience in polam badi and farming	0.501	0.18	2.7**	0.402	0.13	2.96**
X ₄	Farm size	0.051	0.25	0.205	0.379	0.24	1.57
X ₅	Mass Media exposure	-0.149	0.21	0.68	0.072	0.21	0.33
X ₆	Extension contact	0.263	0.27	0.95	-0.036	0.29	0.123
X ₇	Group orientation	-0.276	0.26	1.03	-0.092	0.23	0.40
X ₈	Market intelligence	-0.065	0.31	0.206	-0.06	0.15	0.38
X ₉	Risk orientation	0.669	0.27	2.45*	-0.11	0.19	0.57
X ₁₀	Innovativeness	0.128	0.28	0.45	-0.026	0.12	0.21
X ₁₁	Management orientation	0.239	0.17	1.36	-0.037	0.070	0.53

R² : 0.70 F value: 10.6782

R² : **0.23** **F value: 1.30**

** -- Significant at 0.01 probability level; *- Significant at 0.05 probability level; NS —Non significant

Strategy for empowerment of farmers and better Implementation of FFS

Administrative

Package & Placement:

Capacity building programmes for newly recruited officers for effective implementation of FFS

Targets For FFS

Flexibility and independence should be given to local officials for effective implementation of FFS

Technological

Low cost and ecofriendly technologies and ITKs should be popularized in FFS programmes

Involvement of experts in FFS programs to boost the morale of farmers and officials

Research should be initiated and develop a crop wise package for FFS

Research should be initiated and develop a package for all FFS Crops

Extension strategies

Motivational incentives and awards should be sanctioned for best FFS villages

Strengthen the farmers with training programmes

Monitoring team at District level

Up scaling of FFS technologies should be done based on results of good FFS

Farmer as facilitator

Documentation of FFS activities.

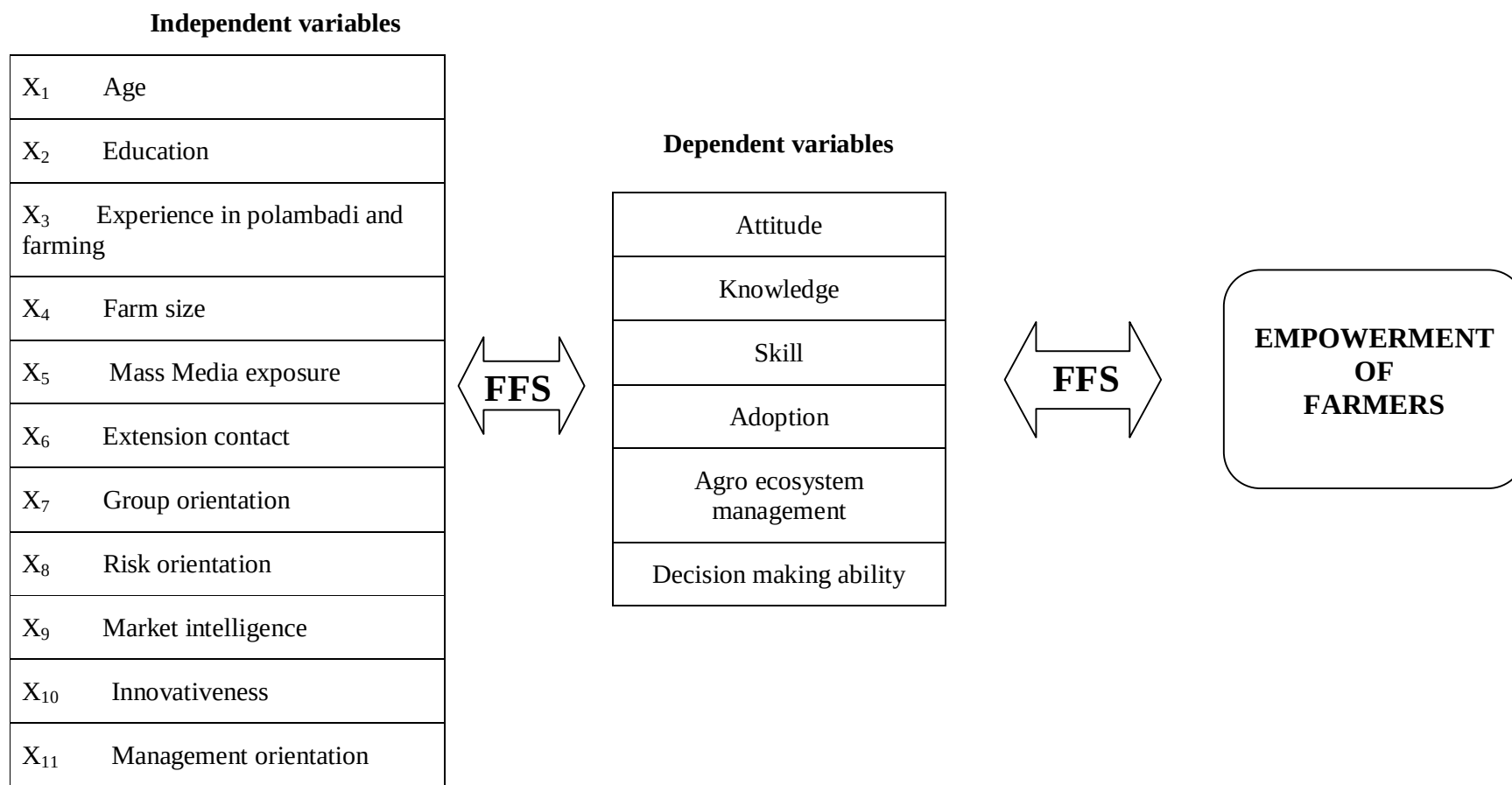
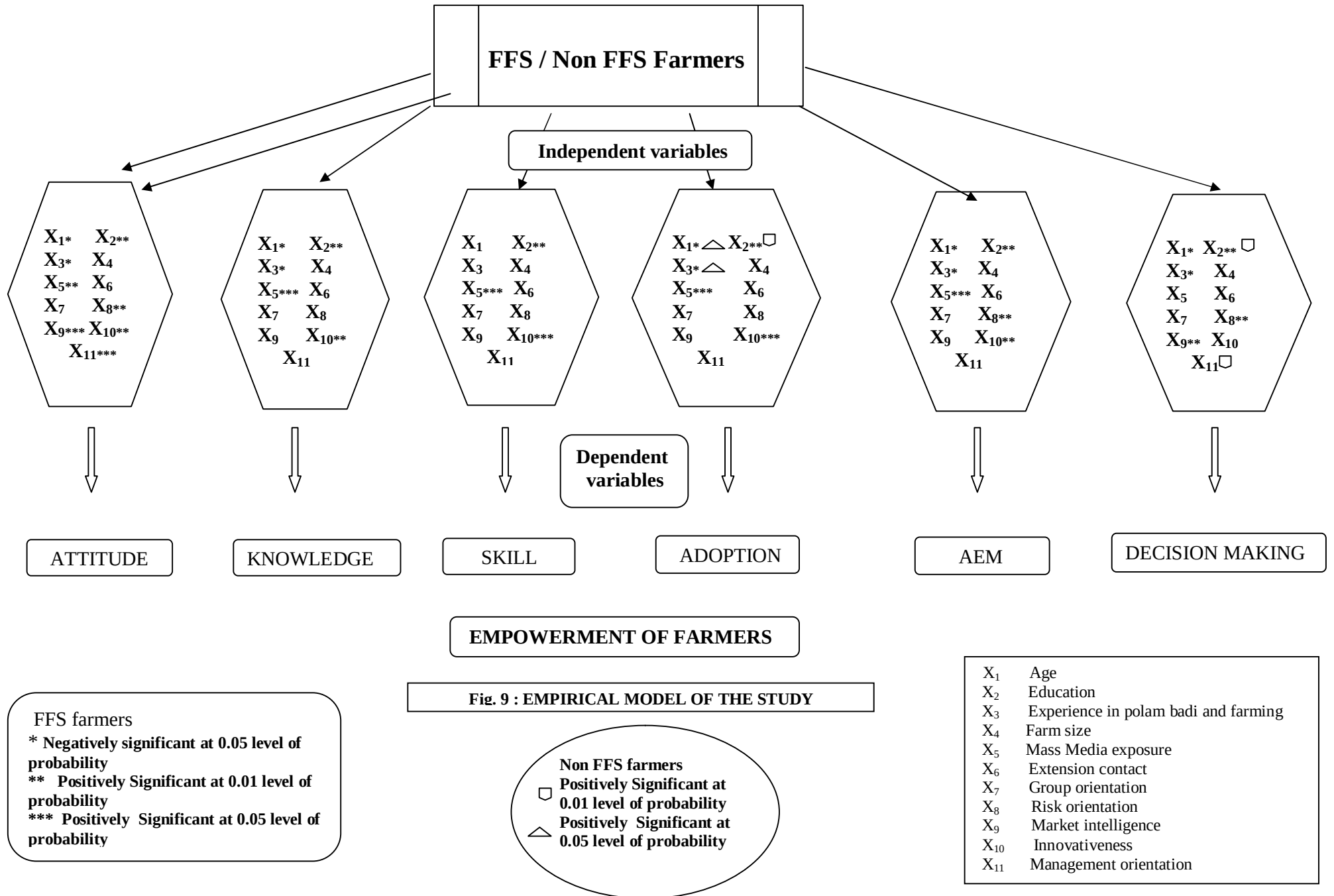


Fig. 1 : CONCEPTUAL MODEL OF THE STUDY



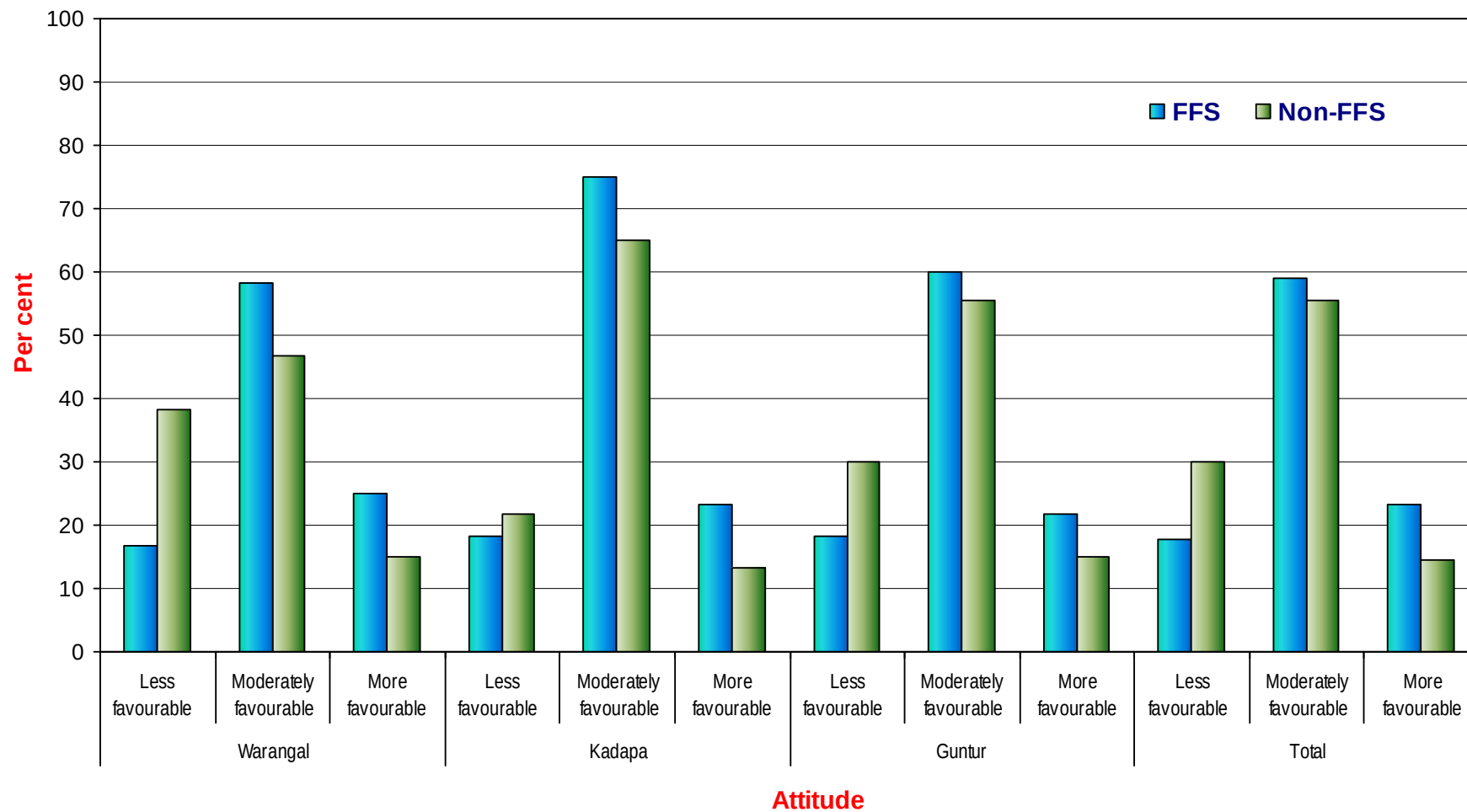


Fig. 2 : Distribution of FFS and Non FFS farmers based on their Attitude towards FFS

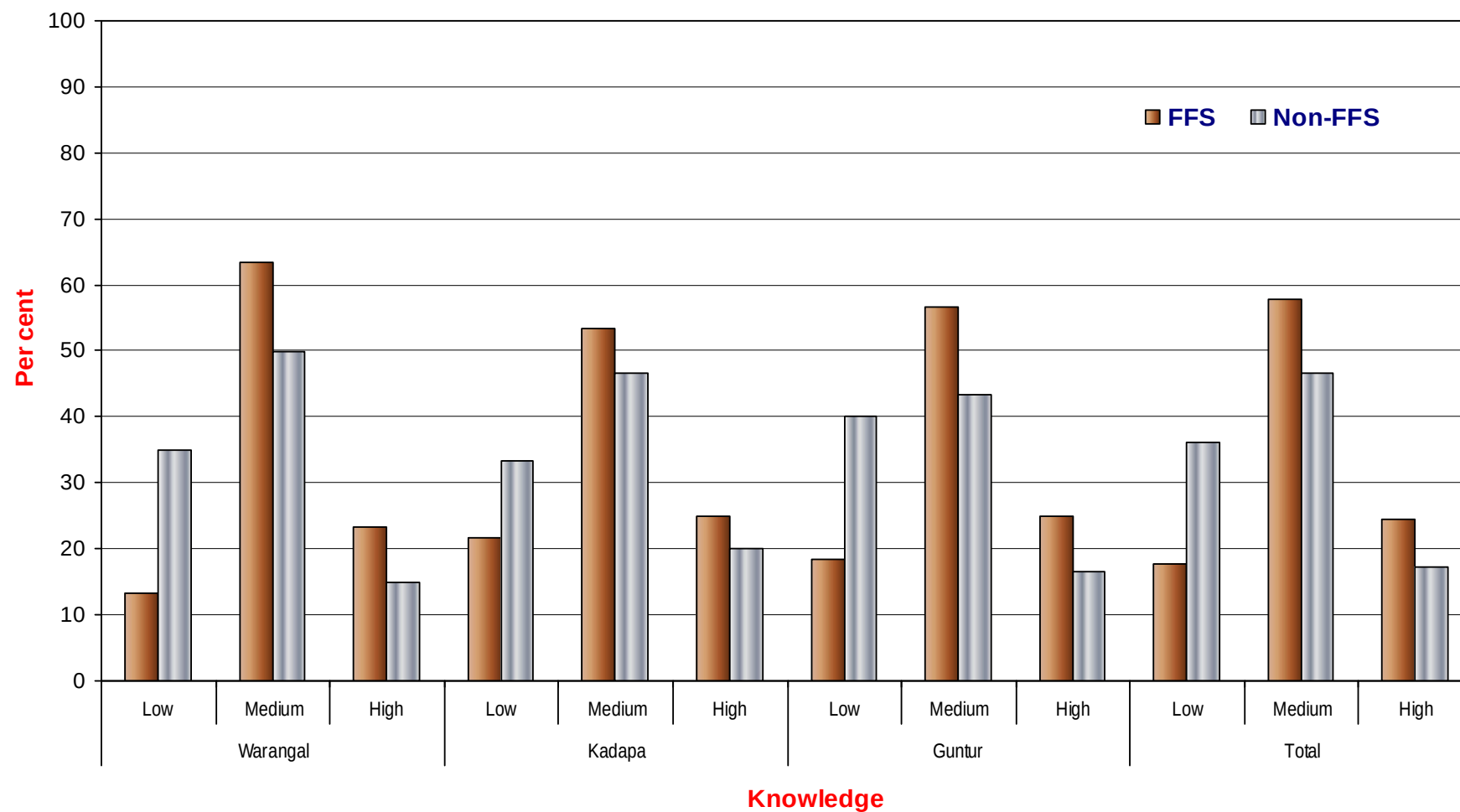


Fig. 3: Distribution of FFS and Non FFS farmers based on their Knowledge on ICM Cotton practices

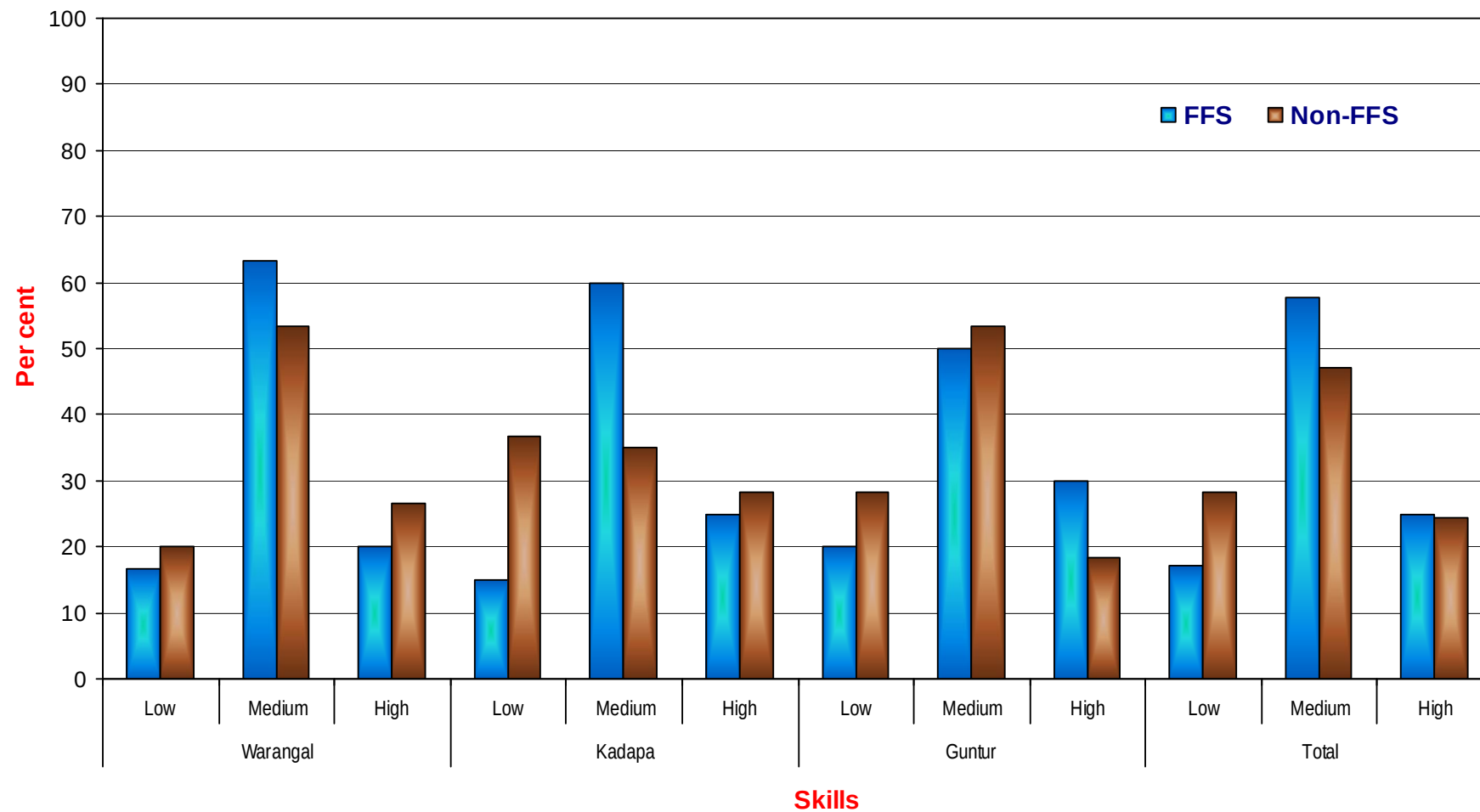


Fig. 4 : Distribution of FFS and Non FFS farmers based on their Skills learnt on ICM Cotton practices

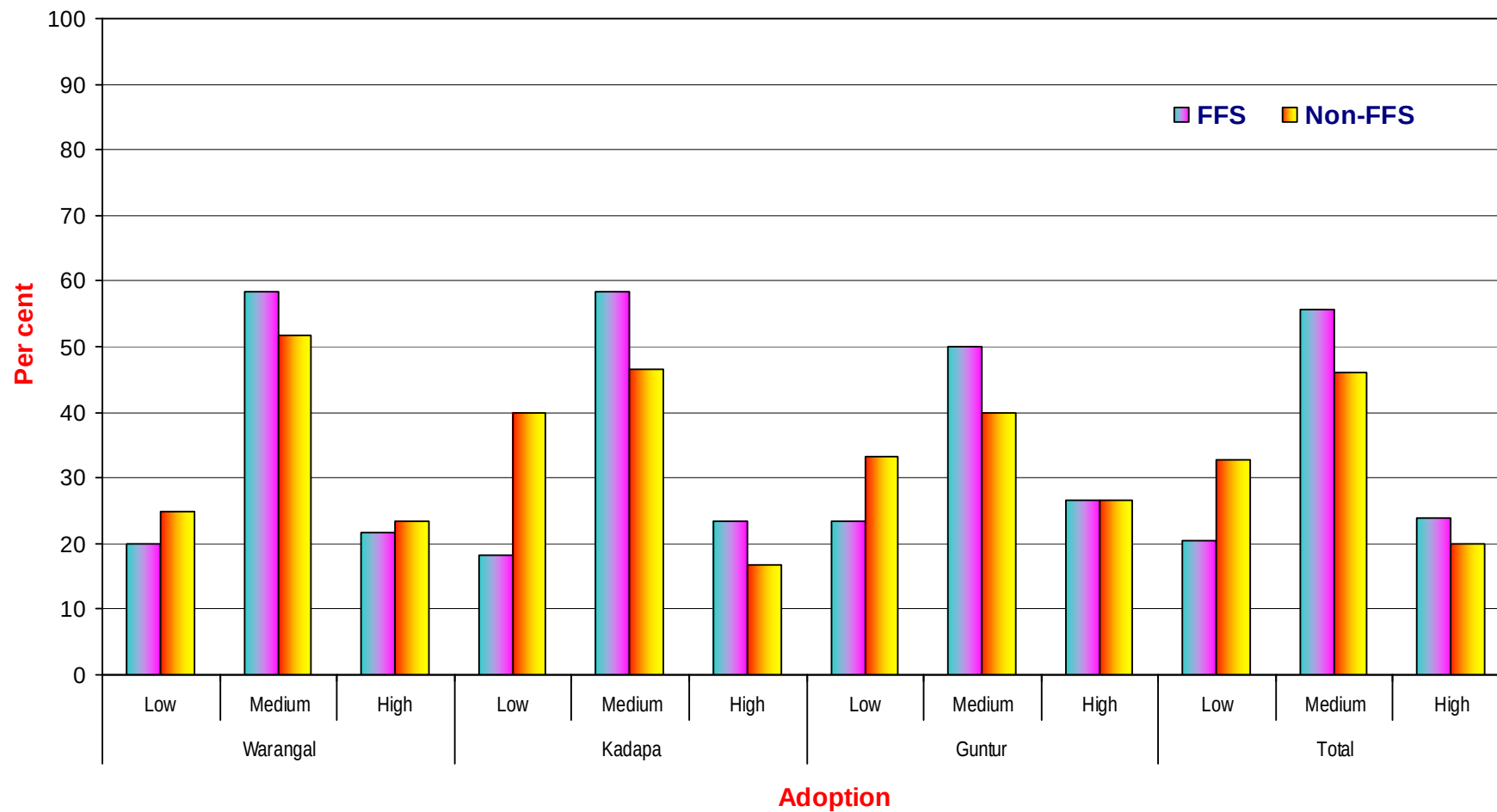


Fig. 5 : Distribution of FFS and Non FFS farmers based on their Adoption of ICM Cotton practices

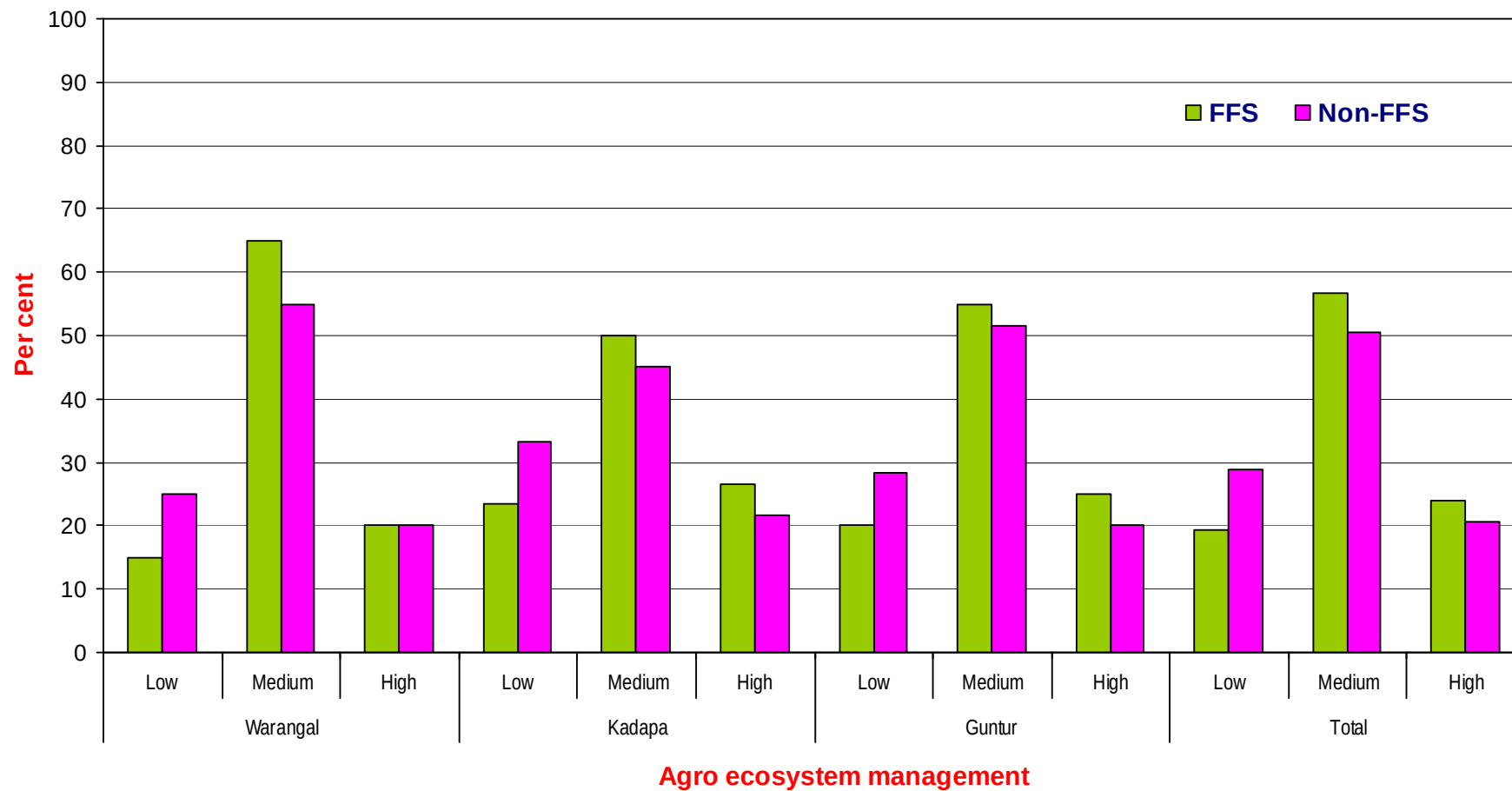


Fig. 6 : Distribution of FFS and Non FFS farmers based on their Agro-Ecosystem Management of ICM Cotton practices

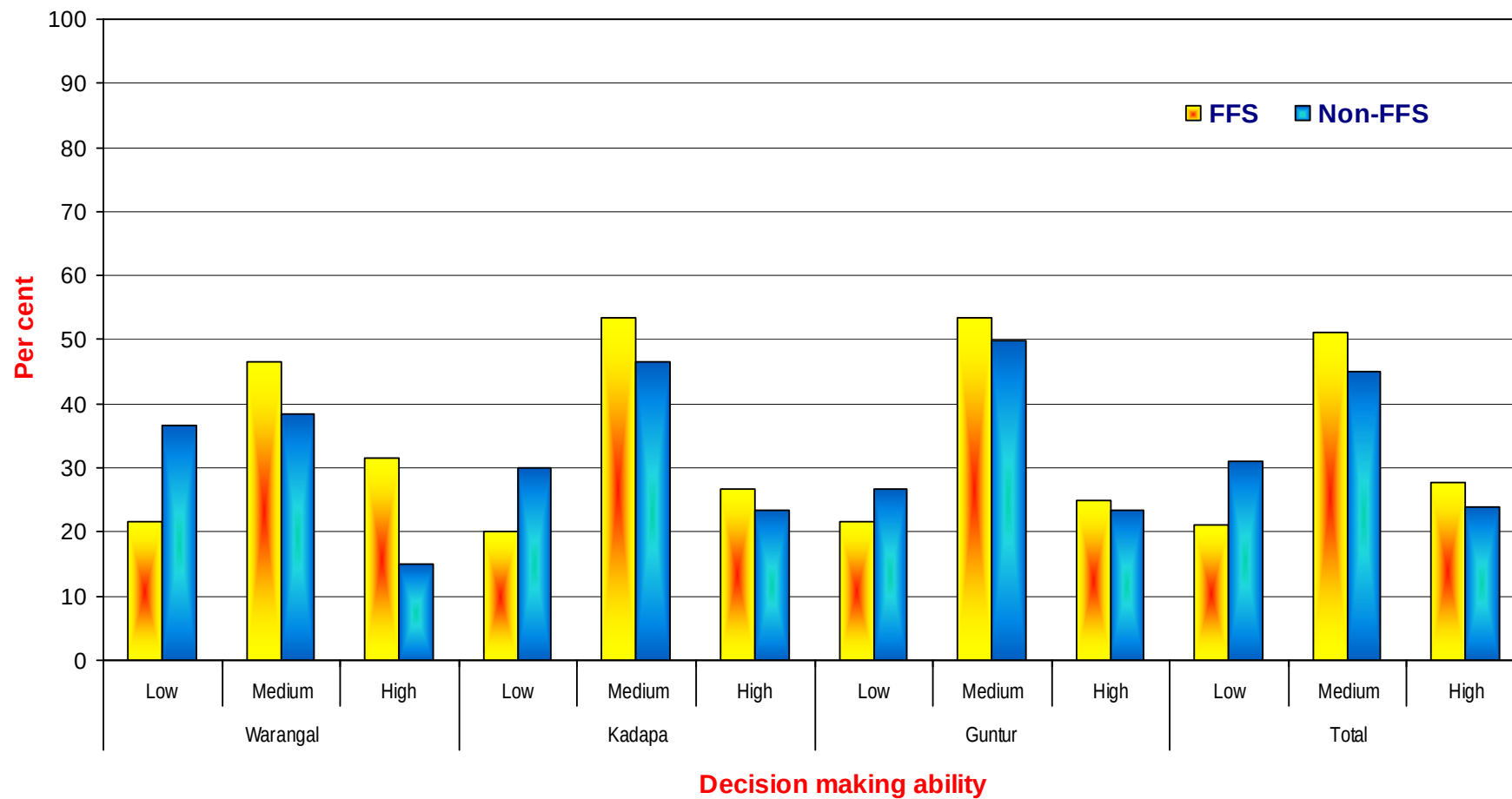


Fig. 7: Distribution of FFS and Non FFS farmers based on their Decision making ability ICM Cotton practices

CHAPTER V

SUMMARY AND CONCLUSIONS

The agriculture services in the country is in the process of reorientation of their development strategies towards supporting farmer empowerment. One method of empowering farmers and their capacity building is through Farmers Field School (FFS). FFS is a participatory approach to adult education adopted by Indian government since 1990 towards the achievement of ecologically sound, profitable and socially sustainable small scale farming. FFS is based on the assumption that farming communities have a vast body of knowledge, skills and experience on which they can build their future. Participatory extension approaches such as farmer to farmer extension and FFS encourage farmers to utilize their resources, own knowledge, skills while integrating new expertise; enhance farmers position as manager of their own land and resources. FFS empowered to build up their self- confidence and self- reliance.

The Farmer Field School (FFS) has one of the most impressive track records in participatory community approaches with 2–3 million farmers graduated on the agricultural subject of Integrated Pest Management (IPM) during the past 15 years, mainly in Asia, but more recently in Africa, the Middle East and Latin America also. A review study indicated a range of positive outcomes of IPM Farmer Field Schools such as drastic reductions in agro-pesticide use, economic benefits and empowerment effects. The FFS approach evolved from the need to strengthen the ecological basis of Integrated Pest Management (IPM) to deal with the variability and complexity of agro-ecosystems whilst reducing reliance on pesticides. The ecology of opportunist insects (which include mosquitoes) is highly localized and dynamic, with populations

fluctuating manifold both spatially and temporally. Accordingly, most tropical smallholder agro-ecosystems require management decisions that are tailored to local and contemporary conditions. This implies the need to decentralize expertise to the field level by educating local people to analyze field situations and to make appropriate management decisions. Thus, the Field School was a school without walls that taught basic agro-ecology and management skills.

In India the FAO Inter country programme for rice started in 1994 followed by the FAO_EU IPM Programme for Cotton in Asia between 2000-2004 and since then more than 8700 FFS were conducted in 28 states of India. From 2004 onwards, the state governments modified the existing extension approach from demonstration to FFS so as to enable farmers to evaluate technologies by themselves. In India realizing the effectiveness of FFS and economic and social benefits to resource poor farmers the states of A.P, Karnataka and Maharastra have taken steps to institutionalize the IPM-FFS model for cotton and other crops in their main stream extension.

Agriculture education has moved from farmer training centres to villages by establishing a state wide network of Polambadi (Farm Schools). Polambadi offers practical demos and training on field for 14 weeks. The Department of Agriculture Government of A.P has taken up promotion of FFS in large scale since Rabi-2004 to reduce cost of cultivation, increase the productivity, and reduce pesticide usage by adopting eco friendly alternatives to pesticides and also creating awareness among farmers about the pesticides hazards. It also ensures empowering the farmers to take up economic decisions in adopting practices of integrated crop management (ICM). In A.P about 20,000 FFS s were conducted from 2001 to 2007 (Kharif) on Maize, Rice, Cotton, Oilseed crops.

Farmer field school consists of group of people with a common interest, who get together on a regular basis to study the “how and why” of a particular topic. The topic covered can vary considerably from ICM (INM+ IPM), Organic agriculture, Farm mechanization, Soil husbandry, Income generating activities such as bio-agents production. The vow of FFS would be to produce a healthy crop in eco-friendly approach duly considering the fundamentals of eco-system. FFS are comparable to programmes such as study circles, religious studies at church, mosque or temple or specialized study programmes for any skill.

The effects of FFS go beyond a reduction in input use and increase in yield. The FFS curriculum emphasizes the development of critical analytic and communication skills. This has triggered the further development of field experimentation by farmers, collective action, leadership, planning and organization. Reports from Indonesia have described how the FFS assisted by post FFS activities, have resulted in local initiatives which have produced new structures, networks and policy change. In A.P also, the Dept. of Agriculture has started the concept of facilitator among the group of farmers. Facilitator will conduct one FFS by following the guidelines. It is enviable and worth to study the empowerment of farmers through FFS as it gives clear picture of attitude of the farmers towards FFS programme, but also give proper direction and the vision to trainers and policy makers.

This study was mainly intended to find out the empowerment in terms of Knowledge, Skills, Adoption, Agro ecosystem management and Decision making ability of cotton integrated crop management practices by farmers after FFS programme. An attempt is also made to study the agro ecosystem management and utilization of ITKs farmers while practicing cotton FFS. The findings of the study

would help for further refinement of FFS programme for reaching more no. of farmers with adoptable low cost technologies in Cotton. Keeping in view the importance of farmer to farmer extension as means of empowerment, the present study is aimed to study the empowerment of farmers through Farmer Field School in Andhra Pradesh with the following objectives.

1.2 OBJECTIVES OF THE STUDY

General objective

To assess the empowerment of farmers on ICM Cotton through Farmer Field School (FFS) in Andhra Pradesh.

Specific objectives

1. To study the personal, socio-economic, psychological characteristics of FFS farmers and non FFS farmers.
2. To measure the attitude of FFS Farmers and non FFS farmers towards FFS.
3. To study the extent of knowledge and adoption of FFS practices by FFS farmers and non FFS farmers.
4. To study the Agro-ecosystem management by FFS farmers and Non Farmers , (groups and communities)
5. To find out the exploration and utilization of ITKs by FFS farmers and Non FFS farmers.
6. To study the relationship between the selected personal, socio-economic, psychological characteristics and empowerment in terms of Attitude, Knowledge, Skill, Extent of adoption, Agro ecosystem management and Decision making.
7. To elicit the constraints and suggestions from FFS farmers and Extension officials to formulate appropriate strategies for effective functioning.

RESEARCH DESIGN

Ex-post- facto research design was used in the study.

SAMPLING PROCEDURE

The study was conducted in Andhra Pradesh. Three districts one each from Telangana, Rayalaseema and Andhra region i.e., Warangal, Kadapa and Gunturu were selected purposively based on highest number of FFSs on Cotton crop during 2006-2007. Two mandals from each district namely Hasanparthy and Nekkonda (Warangal district), Porumamilla and Kalasapadu (Kadapa district) and Tadikonda, Amravathi (Guntur) were selected purposively based on highest number of Cotton Farmers Field schools organized during 2006-2007. One Farmer Field School was selected from each mandal, thus six FFSs were selected for the study. The villages selected were Seethampeta (Hasanparthy), Deekshakunta (Nekkonda) of Warangal district, Rajasahebpeta (Porumamilla), Rajupalem (Kalasapadu) of Kadapa district and Ponnekallu (Tadikonda) Daranikota (Amaravathi) were selected for the study. 180 FFS farmers (30 from one FFS) and 180 Non FFS farmers (30 from each village) and 18 Extension officers (6 from each district) were selected randomly for the study. Thus, a total of 360 farmers (180 FFS farmers and 180 Non FFS farmers) and 18 Extension officers from three districts of A.P formed the sample of the study.

VARIABLES SELECTED FOR THE STUDY

Dependent variables

Attitude, Knowledge, Skill, Adoption, Agro ecosystem management and Decision making were selected as Dependent variables

Independent variables

Age, Education, Farming experience, Farm size, Mass media exposure, Extension contact, Group orientation, Market intelligence, Risk orientation, Innovativeness and Management Orientation were selected for the study.

Collection of data

The data collected by using interview schedule developed for the study. The data collected coded, tabulated and analyzed statistically and results were interpreted accordingly.

Findings of study

Distribution of respondents based on their profile characteristics

Majority of FFS farmers belonged to middle age 70.00 with high school education (38.33%), had 3-13 years of experience in farming (51.11%), small farmers (61.66%), medium level of mass media exposure (59.44%), medium extension contact (63.88 %), medium group orientation (53.33%), medium market intelligence (54.44%), medium level of risk orientation (56.11%), medium innovativeness (50.00%) and medium level of management orientation(60.55%).

In case of Non FFS farmers, majority belonged to middle age (67.77%) with primary school education (40.00%), had 3-13 years of experience in farming (50.55%), small farmers (52.77%), medium level of mass media exposure (37.77%), medium extension contact (52.22%), medium group orientation (46.66%), medium market intelligence (49.44%), medium level of risk orientation (45.55%), medium innovativeness (43.88%) and medium level of management orientation (56.11%).

Attitude of FFS and Non FFS Farmers on Cotton FFS programme

Majority(58.88%) of FFS farmers had moderate favourable attitude followed by high, whereas incase of Non FFS farmers had medium followed by low attitude towards FFS programme. Further 'Z' test results indicated that there was a significant difference in the attitude level of FFS and Non FFS farmers.

Knowledge level of FFS and Non FFS Farmers on Cotton ICM

Majority of the FFS farmers(57.77%) had medium knowledge level about cotton I.C.M practices followed by 24.44 percent high, whereas majority Non FFS farmers (46.66%) had medium knowledge followed by low . The 'Z' test results confirmed that there was significance difference between FFS and Non FFS farmers knowledge level.

Skill level of FFS and Non FFS farmers on Cotton FFS programme

Majority of the (57.77%) of FFS farmers belonged to medium skill learnt category about cotton I.C.M practices followed by 25.00 percent high, whereas majority Non FFS farmers (47.22%) had medium skilled followed by low(25.55%) .The 'Z' test results also stated that there was significance difference between FFS and Non FFS farmer's skills level.

Adoption level of FFS and Non FFS farmers on Cotton FFS programme

Majority of the (55.55%) of FFS farmers had medium adoption level about cotton I.C.M practices followed by 23.88 percent high, where as majority Non FFS farmers (46.11%) had medium adoption level followed by low .The 'Z' test results confirmed that there was significance difference between FFS and Non FFS farmers adoption level.

Agro ecosystem management of FFS and Non FFS farmers on Cotton FFS programme

Majority of the (56.66%) of FFS farmers had medium agro ecosystem management level about cotton I.C.M practices followed by 23.88 percent high, whereas majority Non FFS farmers (50.55%) had medium agro ecosystem management level followed by low. The 'Z' test results stated that there was significant difference between FFS and Non FFS farmers Agro ecosystem management level.

Decision making ability of FFS and Non FFS farmers on Cotton FFS programme

Majority of the (51.11%) of FFS farmers had medium decision making ability about cotton I.C.M practices followed by 27.77 percent high, whereas majority Non FFS farmers (45.00%) had medium decision making followed by low. Further 'Z' test results stated that there was significant difference between FFS and Non FFS farmers decision making level.

Relationship between selected profile characteristics of the FFS and Non FFS farmers and their Attitude towards Cotton FFS

Education, Mass media exposure, Market intelligence, Risk orientation, Innovativeness and management orientation were positively significant whereas Age and Experience in farming were found to be negatively significant with Attitude level of FFS farmers on Cotton ICM practices. Whereas in case of non FFS farmers all the variables were non-significant.

Combined effect of all selected independent variables on Attitude of FFS and Non FFS farmers towards Cotton FFS

All the 11 independent variables put together explained for about 76.66 percent variation in the attitude of FFS farmers and 48.33 percent in Non FFS farmers about

Cotton FFS programme. Education, Farm size, Extension contact, Group orientation, Risk orientation, Innovativeness and Management orientation had positively and significantly contributed towards variation about attitude of FFS farmers. Whereas in Non FFS farmers all the variables were non- significant.

Relationship between selected profile characteristics of the FFS and Non FFS farmers and their Knowledge towards Cotton FFS

Education, Mass media exposure and Innovativeness were positively significant whereas Age and Experience in farming were found be negatively significant with Knowledge level of FFS farmers on Cotton ICM practices. Whereas in Non FFS farmers all the variables were non- significant.

Combined effect of all selected independent variables on knowledge of FFS and Non FFS farmers towards Cotton FFS

All the 11 independent variables put together explained for about 80.00 percent variation in the Knowledge of FFS farmers and 44.33 percent in Non FFS farmers about Cotton FFS programme. Age, Education, Risk orientation and Innovativeness had positively and significantly contributed towards variation about Knowledge of FFS farmers. Where as in Non FFS farmers Education contributed significantly towards Knowledge.

Relationship between selected profile characteristics of the FFS and Non FFS farmers and their Skill towards Cotton FFS

Education, Mass media exposure and Innovativeness were significant with Skill of FFS farmers on Cotton ICM practices, whereas all the variables were found to be non-significant with skills of non FFS farmers.

Combined effect of all selected independent variables on Skill of FFS and Non FFS farmers towards Cotton FFS

All the 11 independent variables put together explained for about 77.00 percent variation in the Skill of FFS farmers and 42.00 percent in Non FFS farmers about Cotton FFS programme. Education, Experience and Extension contact had positively and significantly contributed towards variation about Skill of FFS farmers. Whereas in Non FFS farmers Education and Experience contributed significantly towards Skill.

Relationship between selected profile characteristics of the FFS and Non FFS farmers and their Adoption towards Cotton FFS

Education, Mass media exposure and Innovativeness were positively significant, whereas Age and Experience in farming were found be negatively significant with Adoption level of FFS farmers on Cotton ICM practices. Whereas incase of non FFS farmers age, education and experience were found to be positively significant relationship with Adoption of Cotton ICM practices.

Combined effect of all selected independent variables on Adoption of FFS and Non FFS farmers towards Cotton FFS

All the 11 independent variables put together explained for about 74.00 percent variation in the Adoption of FFS farmers and 46.66 percent in Non FFS farmers about Cotton FFS programme. Age, Education and Extension contact had positively and significantly contributed towards variation about Adoption of FFS farmers. Whereas in Non FFS farmers Education contributed significantly towards Adoption.

Relationship between selected profile characteristics of the FFS and Non FFS farmers and their Agro ecosystem management towards Cotton FFS

Education, Mass media exposure and Innovativeness were positively significant whereas Age and Experience in farming were found be negatively significant with agro

ecosystem management of FFS farmers on Cotton ICM practices. Whereas in case of non FFS farmers all the variables were found to be non-significant relationship with agro ecosystem management of Cotton ICM practices.

Combined effect of all selected independent variables on Agro ecosystem management of FFS and Non FFS farmers towards Cotton FFS

All the 11 independent variables put together explained for about 55.33 percent variation in the Agro ecosystem management of FFS farmers and 37.33 percent in Non FFS farmers about Cotton FFS programme. Education, experience and risk orientation had positively and significantly contributed towards variation about Agro ecosystem management of FFS farmers. Whereas in case of untrained farmers Group orientation, Market intelligence and Management orientation Education significantly contributed in Agro ecosystem management.

Relationship between selected profile characteristics of the FFS and Non FFS farmers and their Decision towards Cotton FFS

Education, Innovativeness were positively significant whereas Age and Experience in farming were found to be negatively significant with decision of FFS farmers on Cotton ICM practices. Whereas in case of non FFS farmers Education and management orientation were found to be positively significant relationship with decision of Cotton ICM practices.

Combined effect of all selected independent variables on Decision of FFS and Non FFS farmers towards Cotton FFS

All the 11 independent variables put together explained for about 70.33 percent variation in the decision of FFS farmers and 43.00 percent in Non FFS farmers about Cotton FFS programme. Age, Education, Risk orientation and Innovativeness had

positively and significantly contributed towards variation about Decision of FFS farmers. Whereas in Non FFS farmers Extension contact, Market intelligence significantly towards Decision.

ITKs used by FFS and non FFS farmers

Except Neem based products no other ITKS were used in FFS programme. But in case of non FFS farmers ITKs like Putting light in Pot acts as light trap in Cotton crop, Apply Inguva 30g/plant and then irrigate to reduce wilt incidence, Puttamannu 50g+ Cow urine 50ml+Cow dung 50 gused for treatment (acts as anti- biotic and improves germination percentage)

Constraints faced by Farmers and Officials

Majority of FFS farmers indicated that Non supply of required Quality inputs on time, Delay in soil test reports drawn for FFS programme , Short term and long term experiments are not planned and conducted regularly , Wide Publicity is lacking , Women participation is less , Effective linkages should be provided to market their produce at higher price , Conducting department meetings on FFS days disrupting FFS , Amount allotted per week is not sufficient , Non- involvement of experts in FFS sessions and Awards and incentives for best FFS is not there for motivating farmers were the constraints in FFS programme implementation.

The officials expressed that No Mobility or vehicle facility to visit FFS sessions punctually , Budget and funds/ inputs are not released in time , FFS should not be purely target oriented, Insufficient funds for weekly classes, No motivation for good FFS programme to farmers and Officers, Lack experience to field staff in FFS, Lack of buyback facilities for quality produce, There is no scope to bring experts in sessions, Other meetings are conducted on FFS days and There is no revolving fund for

conducting FFS at agril officer level were constraints in implementing the FFS programme.

Suggestions made by Farmers and officials

The FFS farmers suggested that All FFS Inputs should be supplied well in advance, Soil sample analysis and results should be communicated immediately , Short term and long term experiments should be planned and conducted regularly , Better market facilities or linkages should be created for getting remunerative returns, Wide publicity to FFS , Experts should be involved in sessions, No other meetings should be conducted on FFS days, More Women should be involved, Low cost technologies should be popularized, Upscaling of FFS should be done based on results of good FFS and Awards and incentives for best FFS should be initiated.

The officials suggested that Mobility / Vehicle should be provided to Officers for punctual work, Target and crop should be decided by Agril Officers , Funds should be released well in advance , Timely supply of critical inputs , No other Meetings should be conducted on FFS days and Season long technical training programme to newly recruited staff on FFS ,then only the FFS programme can be implemented successfully.

Implications of research study

1. Results indicated that majority of old age farmers had negative feeling about FFS, therefore during selection of Farmers young to middle age (below 45 years) farmers should be considered.
2. Education is a catalyst for development process. Majority of FFS farmers had primary to high school education.. Therefore the educated farmers can be utilized

for conducting the FFS programme even in other villages also, as farmer to farmer knowledge spread is quicker than conventional TOT.

3. Farming experience is negatively correlated with all dependent variables hence, during the selection process of FFS, low to medium experience of farmers should be given importance.
4. From the study it was observed that majority of FFS farmers and non FFS farmers were not using ITKs in cotton crop management. Therefore in the curriculum of FFS, locally identified ITKS must be included and popularized.
5. The study indicated that for successful implementation of FFS programme, the staff meant for FFS should not be given additional duties like Civil supplies grain procurement, Housing scheme evaluation etc. during the FFS period.
6. Majority of FFS farmers did not have command on preparation and use of Trichoderma. Therefore Dept of Agriculture in collaboration with ANGRAU should conduct skill oriented trainings to FFS farmers for obtaining required knowledge and skill. After training, organizations like NABARD, ATMA etc; should encourage the production of Trichoderma at farmer level by providing the required financial support.
7. It was observed that there was significant impact of FFS on beneficiary farmers with respect to knowledge, skills, adoption ,Agro ecosystem management and decision making ability. Therefore wide publicity should be given through mass media about success of FFS programme and non FFS farmers should also be involved in future programmes.

8. The findings revealed that majority of FFS farmers had medium level adoption; hence Dept.of agriculture should provide some incentives to FFS farmers who adopt all the FFS practices.
9. More awareness need to be created on agro ecosystem management by means of imparting knowledge through trainings and arranging visits to successful farms.

Suggestions for future research

1. A similar research should be conducted on Agro ecosystem management and its impact in farming.
2. FFS empowerment in terms of socio-economic development of farmers to be standardized.
3. Exclusive study on documentation of technologies popularized through FFS in major crops may be taken up.

LITERATURE CITED

- Allport, G.W. 1935 Attitudes in C.M. Murchinson [Ed] Hand book of social psychology, Clark University Press Massachussettes.
- Atchuta Raju Kappala 2002 An Analysis of Sustainability of Agriculture in Watershed Environment in Mahaboobnagar District of Andhra Pradesh. Ph.D thesis submitted to Acharya N.G. Ranga Agricultural University, Hyderabad.
- Avanish Kumar Singh, Gajendra Pratap Singh and Baldeo Singh 2003 Correlates of Adoption of Improved Chickpea Technology. Indian Journal of Extension Education XXXIX 1&2.
- Balappa Shivaraya and Hugar L B 2002 A Study of integration of markets for onion and potato in Karnataka State .Agril.marketing 45(2) : 30-32 3 ref.
- Balasubramani N, Govindagowda V, Lalitha K C, Ranganatha A D and Lakshminarayan M T 2000 Knowledge of rubber growers about improved cultivation practices, Land Bank Journal 39:10;7-12.
- Baswarajaiah V 2001 Impact of Edira Watershed development programme on farm families in Mahaboobnagar district of Andhra Pradesh. M.Sc.(Ag.) Thesis submitted to Acharya N.G. Ranga Agricultural University, Hyderabad.
- Bhagyalakshmi K 2002. A critical study on micro enterprise management by rural women in Ranga Reddy district of Andhra Pradesh. Ph.D Thesis submitted to Acharya N.G. Ranga Agricultural University, Hyderabad.
- Bhairamkar M S, Kadam J R and Mehta P G 1998 Knowledge level of farmers about Integrated Pest Management Programme. Maharashtra Journal of Extension Education 17 : 373-376.
- Bhople R S and Lakhdive B A 1998 Use of neem seed extract for control of crop pests by farmers .Agricultural Extension Review 109(3):29-30
- Borkar M M, Chothe G D and Lenjewer A D 2000 Characteristics of farmers influencing their knowledge about use of bio-fertilizers. Maharashtra Journal of Extension Education 19:130-131.
- Byra Reddy H N 1971 A study of differential characteristics of adopters and non-adopters of fertilisers to rainfed ragi in Bangalore North Taluk. M.Sc(Ag) Thesis submitted to University of Agricultural Sciences, Bangalore.

- Chandra J, Subhash, Lalitha K C, Prasanna Kumar G T and Ranganath A D 2000 Attitude of farmers watershed management practices. Land Bank Journal 39(4) : 31-36.
- Chandravathi, Ch V S S N 1997 Training of Women in Agriculture in Andhra Pradesh – An economic evaluation in Visakhapatnam district M.Sc (Ag) Thesis submitted to Acharya N.G.Ranga Agricultural University, Hyderabad.
- Chatterjee R K 2000 A study on the impact of National Watershed Development Project for rainfed areas (NWDPA) in Burdwan district of West Bengal. M.Sc.(Ag.) Thesis submitted to Acharya N.G. Ranga Agricultural University, Hyderabad.
- Dayanidhi 1997 A study on managerial attributes of sericulture farmers in relation to their sericulture farming performance in Ananthapur district of Andhra Pradesh M.Sc (Ag) Thesis submitted to Acharya N.G.Ranga Agricultural University, Hyderabad.
- Devi M. Nirmala and Manoharana M 1999 Contributing characteristics of guava cultivators, Journal of Extension Education 10(20):2431-2433.
- Devi R V 2000 A critical study on ANTWA project in Prakasam district of Andhra Pradesh, M.Sc (Ag) thesis submitted to Acharya N.G. Ranga Agricultural University, Hyderabad.
- Dinesh Agarwal and Mahaveer Chowdhary 2003. Adoption of Improved Goat Keeping Practices. Indian Journal of Extension Education 39 (1&2).
- Edwards A L 1957 Techniques of attitude scale construction, Application Century Crafts Incorporation, New York.
- Feaston J.G. 1968 Measurement and Determination of Innovativeness among primitive agriculturists. Rural Sociology 33:339-348.
- Gattu K C 2001 Production constraints of turmeric cultivation in Karimnagar district of Andhra Pradesh M.Sc.(Ag.) Thesis submitted to Acharya N.G. Ranga Agricultural University, Hyderabad.
- Ghosh P K and Pandey K N 2003 Impact of Training on Knowledge of Farmers about Improved Rice Cultivation Technologies. Indian Journal of Extension Education 39(1&2).
- Gupta A K 1999 Use of Extension Methods in Dissemination of Farm Information. Maharashtra Journal of Extension 18.
- Halakatti S V, SAJJAN C M, Gowda D S M and Vijayalakshmi Kamaradi Empowerment of Women Through Dairy Training Karnataka Journal of Agricultural Sciences, 20[1]:89-92:2007.

- Hemanth Kumar B 2002 A study on attitude , knowledge and adoption of recommended practices by Oriental tobacco farmers in Chittor district of Andhra Pradesh M.Sc., (Ag) Thesis submitted to Acharya N.G. Ranga Agricultural University, Hyderabad.
- Jain R K and Battacharya P 2000 Farmer's involvement in bio-fertilizers demonstration and promotion campaign, Maharashtra Journal of Extension, vol.19:264-268,
- Jaswinder Singh and Kuldip Kumar 2006. Knowledge level of farmers of rainfed area of Punjab state regarding soil and water management practices Annals of Biology 22(2) :197-200,4 ref.
- Jayalakshmi M and Santha Govind 2008 Knowledge level of Farm Women on Sustainable Plant Protection Technologies in Paddy Cultivation. Mysore Journal of Agricultural Sciences 42[1]:116-120,2008.
- Kalaskar A P, Chowdhary A A, Ahire R D and Bansod R S 1999 Correlates of adoption of integrated pest management in cotton. Journal of Soils and Crops 9(2):192-194.
- Kalsaskar A P, Shinde P S and Bhople R S 1999 Correlates of Adoption of Integrated Pest Management Technology by Cotton Growers. Maharashtra Journal of Extension, vol.18:45-48
- Kalsaskar A P, Shinde P S , Bhople R S and Geete M H 2001 Factors influencing knowledge of cotton growers about integrated pest management practices in Cotton, Maharashtra Journal of Extension, vol.20:117-119
- Kappala A R 2002 An analysis of sustainability of agriculture in watershed environment in Mahaboobnagar district of Andhra Pradesh. Ph.D Thesis submitted to Acharya N.G. Ranga Agricultural University, Hyderabad.
- Karthikeyan C and Chandrakandan K 2000 Strategy for Capacity Building of the Potential growers of Export Oriented Cutflovers, pp. 225-228.
- Karthikeyan C, Veeraragavathatham D, Karpagam D and Firdouse S A 2006 Cow based indigenous technologies in dry farming (Special issue on traditional agricultural practices). Indian Journal of Traditional Knowledge 5(1) : 47-50.
- Khan M S 1999 Critical analysis of ecofriendly technologies in rice cultivation. A study in an adopted village - Kondubhotlapalem. M.Sc.(Ag.) Thesis submitted to Acharya N.G. Ranga Agricultural University, Hyderabad.
- Kiran S and Sudershan Rao B V 1999 Knowledge and Attitude of Farmers Towards Cyclone Disaster Management, Maharashtra J.Extn. Educ. XVIII,
- Kiran S 1996 A study on disaster preparedness and mitigation mechanisms adopted by farmers of Nellore district in Andhra Pradesh. M.Sc.(Ag.) Thesis submitted to Acharya N.G. Ranga Agricultural University, Hyderabad.

- Krishna Murthy B, Veerabhadraiah V and Rajanna N 2005 Impact of Farmer Field Schools on Knowledge and Attitude of Rice Farmers and Extension Personnel towards Integrated Pest Management in Rice Cultivation. Mysore Journal of Agricultural Sciences 39[1]:122-128,2005.
- Kubbe V R, Tekale V S and Bhope R S 1999 Knowledge and Adoption of Soyabean Production Technology by Farmers Maharashtra Journal of Extension Education 28 : 185-188.
- Kumar S D 1996 A critical analysis of the training programmes conducted by Krishi Vigyan Kendras ,Ph.D. Thesis submitted to UAS ,Bangalore.
- Kumar A A, Babu B and Ramachandran U 1999 Attitude of farmers towards agroforestry programme in Kerala. Indian Journal of Forestry 22(1&2): 155-159.
- Lakshmana Kella 2003 Indigenous Technical Knowledge in Agriculture in High Altitude and Tribal Area Zone of Andhra Pradesh Ph.D thesis submitted to Acharya N.G. Ranga Agricultural University, Hyderabad.
- Likert R 1932 A technique for the management of Attitude , Psychol.Stud,(592): 106-107.
- Likert R 1932 A technique for the measurement of Attitude ,Arch-Psychology No.140
- Lipi Das, Sanjoy Saha, Mishra S K, Rath N C and Dani R C 2005 Impact assessment of OFTs on Integrated Crop Management Techniques : a holistic approach with upland rice growers Oryza,42(4) : 301-305, 7 ref.
- Madhavi Latha 2002 A study on knowledge and adoption of Integrated Pest Management practices in cotton farmers by Farmers Training Centre trained farmers in Kurnool district of Andhra Pradesh. M.Sc.(Ag.)Thesis, Acharya N.G. Ranga Agricultural University, Hyderabad.
- Mahitha Kiran S 2000 A study on the participation of farm women in Agriculture and allied activities in Chittoor district of Andhra Pradesh. M.Sc.(Ag.) Thesis submitted to Acharya N.G. Ranga Agricultural University, Hyderabad.
- Mancini F, 2006 Impact of farmer field schools on cotton growers in Asia-Presentation for the ICAC plenary meeting -11-15 September 2006.
- Mancini F, Termorshuizen AJ, Jiggins J L S, Brugeen A H C van 2006 Increasing the environmental and social sustainability of cotton farming through farmer education in Andhra Pradesh, India. Agricultural systems ,2008,96:1/3 ,16-25,44 ref.
- Manjunatha B N, Lakshminarayan M T Anand T N and Prasanna Kumar G T 1999 Factors effecting adoption of sustainable sugarcane farming practices-A

Discriminant function analysis, Mysore Journal of Agricultural Sciences 33:375-378

- Maraddi G N, Hirevenkanagoudar L V, Angadi J G and Kunnal L B 2007 Analysis of Framers Knowledge about Selected Sustainable Cultivation Practices in Sugarcane Karnataka Journal of Agricultural Sciences 20[3] : 555-559.
- Meti S K and Sundaraswamy B 1998 Attitude of farmers towards improved farm implements and their associated characteristics. Karnakata Journal of Agricultural Sciences 11(4) : 975-979.
- Motamed M K and Baldeo Singh 2003 Correlates of adoption of improved sericulture practices. . Indian Journal of Extension Education Vol.XXXIX No 1&2
- Murthy B K and Veerabhadraiah V 1999 Impact of IPM farmer field schools training programme on knowledge level of rice farmers 28 (9/10) : 125-127.
- Murthy V S 2000 a study on Janmabhoomi programme in Chittoor district of Andhra Pradesh. M.Sc.(Ag.) Thesis submitted to Acharya N.G. Ranga Agricultural University, Hyderabad.
- Nadre, K. R 2000 A study on constraints in adoption of recommended practices of cotton in Aurangabad and Jalna district. Manage Extension Research Review 1(2) : 66-76.
- Nagadeve D P 1999 Plant protection status of IPM - trained dry paddy farmers in Vidarbha region of Maharashtra State. Ph.D Thesis submitted to Acharya N.G. Ranga Agricultural University, Hyderabad.
- Natarajan N 2004 Impact of Farmers Field Schools on Rice in Pondichery Region of Union Territory of Pondicherry. M.Sc.(Ag). Thesis submitted to Acharya N.G. Ranga Agricultural University, Hyderabad.
- Neela Rani R 1999 Analytical study of decision making pattern of tribal women in farm and home activities in Khammam district of Andhra Pradesh. M.Sc.(Ag.) Thesis submitted to Acharya N.G. Ranga Agricultural University, Hyderabad.
- Nisha Aravind and Rakesh D 2006 Study on effectiveness of farmers field school (FFS) approach in rice ecosystem for integrated pest management. International Journal of Agricultural Sciences 2:2,621-625 8 ref.
- Obaiah M C 2004 A study on capacity building of rice growing farmers of Farmers Field Schools (FFS) in Krishna Godavari Zone of Andhra Pradesh. Ph.D. Thesis submitted to Acharya N.G. Ranga Agricultural University, Hyderabad.
- Obaiah M C and Atchuta Raju K 2008 Attitude of Participant and Non-Participant Farmers Towards Farmers Field Schools. Mysore Journal of Agricultural Sciences 42(2) : 316-322.

- Patel M C, Chauhan N B and Korat D M, Consequences of Farmers' Attributes on their Attitude towards Integrated Pest Management Strategy. *Karnataka Journal of Agricultural Sciences* 20[4] : 797-799.
- Patil E R, Desai B D and Gandhi R D 2000. Constraints in Adoption of Rice Technology in Kai Irrigation Project of Raigad District (M.S.). *Indian Journal of Extension Education* 36(1&2).
- Prasad M S and Sundaraswamy B 2000 Attitude of farmers towards dryland agricultural technologies. *Journal of Extension Education* 11(1) : 2666-2671.
- Promila Sharma 2004 Status of marketing of organic products in mountain region of Uttaranchal, India. 6th IFOAM-Asia scientific conference, Yangpyung, Korea pp. 423-435 4 ref.
- Purnima K S 2004 Women Self Help Group Dynamics in the North Coastal Zone of Andhra Pradesh. Ph.D Thesis submitted to Acharya N.G. Ranga Agricultural University, Hyderabad.
- Radha Krishna S G, Eswarappa G and Manjunatha B N 2008 Personal and Socio-Economic Characteristics of Members of Self Help Groups of Sujala Watershed Programme and their Association with Levels of Empowerment and Decision Making with Respect to Capacity Building. *Mysore Journal of Agricultural Sciences* 42(2):337-339.
- Raju, S 1999 A study on the impact of Andhra Pradesh training of women in Agriculture (ANTWA) in Kurnool of Andhra Pradesh. M.Sc.(Ag.) Thesis submitted to Acharya N.G. Ranga Agricultural University, Hyderabad.
- Ramakrishna Rao L and Sethu Rao M K 2007 Contribution of Socio-Psychological and Innovation Attributes in Adoption of Sunflower Cultivation Technologies. *Mysore Journal of Agricultural Sciences* 41(1) : 127-132.
- Ramakrishnan K 1999 Impact of Tamilnadu Women in Agriculture (TANWA) in Madurai district of Tamilnadu. M.Sc.(Ag.) Thesis, Acharya N.G. Ranga Agricultural University, Hyderabad.
- Ramamurthy, V. S 2000 A study on Janmabhoomi programme in Chittoor district of Andhra Pradesh. M.Sc.(Ag.) Thesis submitted to Acharya N.G. Ranga Agricultural University, Hyderabad.
- Rambabu Puli, 1997 Indigenous Technologies in Cropping Systems - An Analytical Study in Guntur District of Andhra Pradesh - Ph.D thesis submitted to Acharya N.G. Ranga Agricultural University.
- Ramprasad D 2004 Participation of farmers in Agricultural Research, Extension and farmer linkage mechanisms in Krishna Godavari Zone of Andhra Pradesh. Ph.D thesis submitted to Acharya N.G. Ranga Agricultural University.

- Rani N R 1999 Analytical study of decision making patterns among rural families and types of participation by rural women in the selected areas of decision making M.Sc.(Ag.) Thesis, Acharya N.G. Ranga Agricultural University, Hyderabad.
- Ravichandra Prasad 2002 A study on the impact of On Farm Extension Demonstrations (OFFDs) in rice in Nellore district of Andhra Pradesh. M.Sc.(Ag.) Thesis, Acharya N.G. Ranga Agricultural University, Hyderabad.
- Ravishankar 2000 A comparative study of Krishi Vigyan Kendras (KVKs) of Governmental Organizations and Non Governmental Organizations in Kurnool district of Andhra Pradesh. M.Sc.(Ag.) Thesis submitted to Acharya N.G. Ranga Agricultural University, Hyderabad.
- Ravishankar K 2005 Agricultural Weather Forecasting, Impact and Analysis in Andhra Pradesh. Ph.D. Thesis submitted to Acharya N.G. Ranga Agricultural University, Hyderabad.
- Reddy S S 2003b A study on the entrepreneurial behaviour of sericulture farmers in Chittoor district of Andhra Pradesh. M.Sc.(Ag.) Thesis submitted to Acharya N.G. Ranga Agricultural University, Hyderabad.
- Reddy T S P 2003a Differential innovation, decision and attitude of rice growing farmers towards eco-friendly technologies in Andhra Pradesh - A critical Analysis. Ph.D. Thesis submitted to Acharya N.G. Ranga Agricultural University, Hyderabad.
- Samantha R.K. 1977 A study of some agro-economic and communication variable associated with repayment behavior of agricultural credit users of Nationalised banks .Ph.D Thesis ,Bidan Chandra Krishi Vidyalaya,Nadia.
- Sarada O 2004 Perception of communication and feed back effectiveness among researches extensionist and farmers. Ph.D thesis submitted to Acharya N.G. Ranga Agricultural University.
- Sarita Vaish ,Prakash Singh and Mishra B 2003 Correlates of Knowledge of rural women about rice production technology. Indian Journal of Extension Education Vol.XXXIX No 1&2
- Satish Rahul M 2003 A study on risk perception and adoption of risk management practices by the papaya growers in Kadapa district of Andhra Pradesh M.Sc(Ag). Thesis submitted to Acharya N.G. Ranga Agricultural University, Hyderabad.
- Satpal Singh, Makhija V K, Joginder S, Malik and Subhash Chander 2003. Farmer's Knowledge and Correlates of Sunflower Production Technology. Indian Journal of Extension Education 39 (1&2).
- Sengupta T 1967 A simple adoption score for selection of farmers for high yielding varieties programmes in rice. Indian Journal of Extension Education 3:109

- Shinde P S, Sasane G K and Valekar R B 1999 Adoption Behaviour of Rabi Jowar Growers. Maharashtra Journal of Extension, 18.
- Shinde P S, Vaidya V R and Satpute S K 2000 Identification and adoption of indigenous agricultural practices by dryland farmers. Maharashtra Journal of Extension Education 19:259-263.
- Singh D R R 2000. Study of adoption of new technologies for furthering biodiversity conservation commerce and trade of medicinal and aromatic plants of India. 131 (3) : 308-315.
- Singh M P, Chauhan K N K and Amtul Warris Correlates of Knowledge, Attitude and Risk Preference of Farmers towards Dry Farming Technologies Maharastra Journal of Extension Education XVIII : 145-149:1999.
- Singh R K, Sureja A K and Dheeraj Singh 2006 Cultural and Agricultural dynamic of agro-biodiversity conservation, 51 : 151-157.
- Sivanandan S 2002 A study on listening behaviour of the farmers towards selected farm broadcasts in Theni district of Tamil Nadu. M.Sc.(Ag.) Thesis submitted to Acharya N.G. Ranga Agricultural University, Hyderabad.
- Sivasubramanian 2003 Impact of coconut development schemes among coconut farmers. M.Sc.(Ag.) Thesis submitted to Acharya N.G. Ranga Agricultural University, Hyderabad.
- Sridhar K 2001 Opinion of rose cultivators towards privatization of extension services in Ranga Reddy district of Andhra Pradesh. M.Sc.(Ag.) Thesis submitted to Acharya N.G. Ranga Agricultural University, Hyderabad.
- Srinivasan G 1996 Group approach to empowerment of rural women - IFAD experience in Tamil Nadu State, working paper - 5 bankers institute of rural development, Lucknow, December, 1996.
- Srinu A V 1997 Attitude of farmers towards short term loans financed by Primary Agricultural Co-operative Societies (PACS) in Vizianagaram district of Andhra Pradesh. M.Sc.(Ag.). Thesis submitted to Acharya N.G. Ranga Agricultural University, Hyderabad.
- Subrahmanyam I 2002 A study on the impact of agricultural market yard committee level training programmes in Nellore district of Andhra Pradesh. M.Sc.(Ag.) Thesis submitted to Acharya N.G. Ranga Agricultural University, Hyderabad.
- Sumana A 1996 Participation of farm women in watershed development project in Prakasam district of Andhra Pradesh. M.Sc.(Ag.) Thesis submitted to Acharya N.G. Ranga Agricultural University, Hyderabad.

- Sundar A and Raju S K 2005 Production and marketing constraints in Tamil Nadu, Agril.marketing 48(2) : 12-14.
- Sunil Arya, Singh G P and Poonam Sharma 2003 Knowledge of Farmers Regarding Improved Sugarcane Production Technology. Indian Journal of Extension Education 39(1&2).
- Supe S V 1969 Factors to different degrees of rationality in decision making among farmrs .Ph.D Thesis submitted to IARI,New Delhi
- Thaygarajan S and Vasanthakumar J 2000 Characteristics of Rice Framers and Adoption Pattern of Recommended Rice Technologies. Indian Journal of Extension Education Vol No.XXXIV1&2
- Thurstone L L 1946 Comment, American Journal of Sociology ,52:39
- Vasantha R 2002 Critical analysis of Integrated Pest Management practices [IPM] in relation to innovation- decision process among cotton growing farmers of Guntur district of Andhra Pradesh, . Ph.D Thesis submitted to Acharya N.G. Ranga Agricultural University, Hyderabad.
- Veeraiah A, Daivadeenam P and Pandey R N 1998 Knowledge and Adoption level of farmers trained in KVK about groundnut cultivation. Indian Journal of Extension Education 33(1&2):58-63.
- Veerendranath G 2000 A critical study on flow, utilization and source credibility of agricultural information among rainfed castor growing farmers of Nalgonda district of Andhra Pradesh. Ph.D Thesis submitted to Acharya N.G. Ranga Agricultural University, Hyderabad.
- Venkatesh G Prasad and Siddaramaiah B S 2000 Correlates of Plant Protection Measures. Indian Journal of Extension Education 36 (3&4).
- Venkataramaiah P 1983 revised 1990 Development of a socio-economic status scale for farm families . Ph.D Thesis, University of Agricultural Sciences Bangalore
- Vijayalan R 2001 A study on awareness ,knowledge and adoption of ecofriendly agricultural practices in rice .M.Sc thesis submitted to Tamil Nadu Agricultural University, Coimbatore.
- Vijaya Chandrika K 1998 A study on dissemination of agricultural technology by farm women under Andhra Pradesh Training of Women in Agriculture (ANTWA) Project in Nalgonda district of Andhra Pradesh M.Sc.(Ag.) Thesis submitted to Acharya N.G. Ranga Agricultural University, Hyderabad.
- Vijayalakshmi P 1995 Role of farm women in turmeric cultivation of Guntur district in Andhra Pradesh , M.Sc.(Ag.) Thesis submitted to Acharya N.G. Ranga Agricultural University, Hyderabad

Vipin Kumar V P 1994 Inter personal communication behaviour of member of group farming committees in the adoption of rice production technology. M.Sc.(Ag.) Thesis submitted to (Kerala Agricultural University). Tiruchoor.

Waman G K, Girase K A and Wagh B R 2006 Knowledge and adoption of integrated pest management practices by irrigated cotton growers. International Journal of Agricultural Sciences 2:1,1,100-103 5 ref.

Wasnik S M 2003 Impact of Technology Transfer on Sugarcane Productivity in Sugar Factory Command Area, U.P. Indian Journal of Extension Education, 39(3&4) : 2003

Appendix II

Development of Scale on attitude of farmers towards FFS

The following are the statements intended to test the attitude of farmers on Farmers Field School [FFS]. Against each statement there are five categories i.e. Strongly agree, Agree, Undecided, Disagree and Strongly disagree. You are requested to give extent of agreement on each statement [by putting tick mark] for inclusion in the final Attitude scale. Based on your responses the scale is constructed in order to select the statements for inclusion in the final Attitude scale.

S.No	Statement	Strongly agree	Agree	Undecided	Disagree	Strongly Disagree
1	FFS is an innovative school of learning for farmers at field level.					
2	Farmers learn latest technology in FFS.					
3	Farmers need basic education to participate in FFS					
4	Learning skills is not possible through FFS					
5	FFS is not suitable for illiterate farmers due to more technicality					
6	FFS makes farmer an expert					
7	FFS can alone teach /train research based knowledge / skills to farmers to get higher yields					
8	FFS also spread the knowledge to others					
9	FFS makes decision making ability of farmers on adoption					
10	FFS changes attitude of farmers towards adoption of latest technology					
11	FFS enhances the managerial ability of farmers in use of inputs					
12	FFS increases the self-confidence to take rational decisions					

S.No	Statement	Strongly agree	Agree	Undecided	Disagree	Strongly Disagree
13	FFS farmers meant for safeguarding the natural resources					
14	FFS is to reduce the use of chemical inputs in crop production					
15	FFS is the platform of teaching of complex skills to farmers					
16	FFS encourages group cohesion among the farmers					
17	FFS improves the rate of adoption of latest technology					
18	FFS farmers can evaluate new technology before adoption					
19	FFS facilitates in increasing the crop yields					
20	FFS promotes the low cost technology					
21	Farmers feel difficulty to learn skill oriented knowledge through FFS					
22	FFS facilitate information access by farmers to different sources					
23	I have learnt record keeping of the expenditure and management practices					
24	FFS improves the collective decision making process of farmers					
25	FFS discourage farmers for large scale adoption of new technology					
26	Impart knowledge about how to reduce the cost of production					
27	FFS facilitates to overcome adverse climatic conditions					
28	Standard recommendations are not available to farmers through FFS					

S.No	Statement	Strongly agree	Agree	Undecided	Disagree	Strongly Disagree
29	Farmers are not interested in FFS					
30	Adoption of all recommended practices by FFS is not possible.					
31	All pests/disease can not be controlled with knowledge /skill provided by FFS					
32	FFS provides information not based on farmers needs and expectations.					
33	Facilitator is not capable of providing necessary knowledge and skill					
34	FFS enhances overall efficiency of farmers					
35	FFS enable farmers to upgrade their knowledge from time to time					
36	FFS provide solutions to all agriculture problems					
37	FFS are participatory in nature					
38	FFS establishes close rapport with other farmers					
39	FFS helped members to be good leaders					
40	Training is must for FFS farmers to encourage social participation.					
41	Participation in FFS is not worth sparing valuable time of mine.					
42	Group conflict influence the user of knowledge /skill given by FFS					
43	RMG/SHG can also be utilize for FFS					
44	Publicity is needed to popularize					

S.No	Statement	Strongly agree	Agree	Undecided	Disagree	Strongly Disagree
45	Field days encourage membership by other farmers					
46	FFS promote group cohesion in the village					
47	Member farmers are crucial for success or failure of FFS					
48	FFS encourage farmers to take up income generation activities also					
49	FFS makes the group of farmers self sufficient					
50	FFS encourage spread of information to non FFS farmers					
51	Spread of information is mostly restricted to products only					
52	Gender balance is not maintained in enrolling the farmers to FFS					
53	Women participation is prerequisite in FFS					
54	FFS is likely to increase disputes among farmers					
55	FFS also improves the leadership qualities among farmers					
56	Good facilitator is must for success of FFS.					
57	FFS farmers must select the facilitator					
58	FFA can also be used for creating awareness on nonagricultural activities like HIV/AIDS environmental issues					
59	FFS encourages team building among public private organizations					
60	Enhances social recognition to					

S.No	Statement	Strongly agree	Agree	Undecided	Disagree	Strongly Disagree
	FFS farmers					
61	Feed back mechanism is not available in FFS					
62	FFS will increase the income due to higher adoption					
63	FFS is boon for farmers in generating income to improve their standard of living					
64	FFS is one method of reducing the cost of cultivation					
65	FFS can be popularized for commercial purpose					
66	FFS can get economic returns even during the drought season					
67	Bankers are ready to provide loans to FFS farmers					
68	Farmers are free from money lender clutches due to awareness on bank loan provided to FFS					
69	Banks increased no.of loans to FFS farmer due to assured returns					
70	Repayment of loans also high in FFS farmers					
71	FFS farmers consults their spouses with regard to financial matters					
72	FFS farmers have significant improvement in standard of living					
73	Sometimes yield is reduced by following FFS recommendations.					
74	Reduced cost of cultivation allows for recovery from debt					
75	FFS allows farmers for the building of physical assets					
76	FFS encourage locally					

S.No	Statement	Strongly agree	Agree	Undecided	Disagree	Strongly Disagree
	identified ITKs					
77	FFS promote eco-friendly technologies					
78	FFS has no relevancy to field situation					
79	FFS caters to the seasonal needs of farmers					
80	Sustainability in terms of production is motto of FFS					
81	FFS prepares farmers to cope up with climatic risks					
82	FFS minimize the use of hazardous chemicals					
83	FFS can be practiced during drought conditions.					
84	FFS cannot improve the soil fertility and microbial activity					
85	FFS is not suitable for dry land crops					

Attitude statements with t-values

S.No	Statement	
*1	FFS is an innovative school of learning for farmers at field level.	3.175
*2	Farmers learn latest technology in FFS.	2.756
3	Farmers need basic education to participate in FFS	1.414
4	Learning skills is not possible through FFS	1.325
*5	FFS is not suitable for illiterate farmers due to more technicality	1.955
6	FFS makes farmer an expert	1.461
7	FFS can alone teach /train research based knowledge /skills to farmers to get higher yields	1.699
*8	FFS also spread the knowledge to others	1.809
9	FFS makes decision making ability of farmers on adoption	1.495
*10	FFS changes attitude of farmers towards adoption of latest technology	1.95
11	FFS enhances the managerial ability of farmers in use of inputs	1.256
*12	FFS increases the self-confidence to take rational decisions	2.648
13	FFS farmers meant for safeguarding the natural resources	1.3

S.No	Statement	
*14	FFS is to reduce the use of chemical inputs in crop production	2.081
15	FFS is the platform of teaching of complex skills to farmers	1.133
*16	FFS encourages group cohesion among the farmers	3.109
17	FFS improves the rate of adoption of latest technology	0.983
*18	FFS farmers can evaluate new technology before adoption	2.326
19	FFS facilitates in increasing the crop yields	1.343
20	FFS promotes the low cost technology	1.256
21	Farmers feel difficulty to learn skill oriented knowledge through FFS	1.268
22	FFS facilitate information access by farmers to different sources	1.655
23	I have learnt record keeping of the expenditure and management practices	1.317
24	FFS improves the collective decision making process of farmers	1.223
25	FFS discourage farmers for large scale adoption of new technology	1.414
26	Impart knowledge about how to reduce the cost of production	1.194
27	FFS facilitates to overcome adverse climatic conditions	1.279
28	Standard recommendations are not available to farmers through FFS	1.159
29	Farmers are not interested in FFS	0.824
30	Adoption of all recommended practices by FFS is not possible.	1.159
*31	All pests/disease can not be controlled with knowledge /skill provided by FFS	3.005
*32	FFS provides information not based on farmers needs and expectations.	2.38
33	Facilitator is not capable of providing necessary knowledge and skill	1.464
34	FFS enhances overall efficiency of farmers	1.11
*35	FFS enable farmers to upgrade their knowledge from time to time	2.592
36	FFS provide solutions to all agriculture problems	1.224
*37	FFS are participatory in nature	2.179
38	FFS establishes close rapport with other farmers	1.013
39	FFS helped members to be good leaders	1.622
40	Training is must for FFS farmers to encourage social participation.	1.702
*41	Participation in FFS is not worth sparing valuable time of mine.	2.494
42	Group conflict influence the user of knowledge /skill given by FFS	1.538
43	RMG/SHG can also be utilize for FFS	1.648
44	Publicity is needed to popularise	0.928

S.No	Statement	
*45	Field days encourage membership by other farmers	3.161
46	FFS promote group cohesion in the village	0.966
*47	Member farmers are crucial for success or failure of FFS	2.816
48	FFS encourage farmers to take up income generation activities also	1.229
49	FFS makes the group of farmers self sufficient	0.951
50	FFS encourage spread of information to non FFS farmers	1.655
51	Spread of information is mostly restricted to products only	0.966
*52	Gender balance is not maintained in enrolling the farmers to FFS	2.941
53	Women participation is prerequisite in FFS	1.013
54	FFS is likely to increase disputes among farmers	1.362
55	FFS also improves the leadership qualities among farmers	1.417
*56	Good facilitator is must for success of FFS.	2.967
57	FFS farmers must select the facilitator	1.101
58	FFA can also be used for creating awareness on nonagricultural activities like HIV/AIDS environmental issues	1.688
59	FFS encourages team building among public private organizations	1.213
60	Enhances social recognition to FFS farmers	1.166
*61	Feed back mechanism is not available in FFS	3.499
62	FFS will increase the income due to higher adoption	1.132
63	FFS is boon for farmers in generating income to improve their standard of living	1.296
64	FFS is one method of reducing the cost of cultivation	1.587
65	FFS can be popularized for commercial purpose	1.337
66	FFS can get economic returns even during the drought season	1.223
67	Bankers are ready to provide loans to FFS farmers	1.411
68	Farmers are free from money lender clutches due to awareness on bank loan provided to FFS	1.445
69	Banks increased no. of loans to FFS farmer due to assured returns	1.644
70	Repayment of loans also high in FFS farmers	1.384
71	FFS farmers consults their spouses with regard to financial matters	1.427
72	FFS farmers have significant improvement in standard of living	1.575
*73	Sometimes yield is reduced by following FFS recommendations.	4.85
74	Reduced cost of cultivation allows for recovery from debt	0.652
75	FFS allows farmers for the building of physical assets	1.06

S.No	Statement	
76	FFS encourage locally identified ITKs	1.195
*77	FFS promote eco-friendly technologies	4.684
*78	FFS has no relevancy to field situation	2.987
79	FFS caters to the seasonal needs of farmers	1.245
*80	Sustainability in terms of production is motto of FFS	3.381
81	FFS prepares farmers to cope up with climatic risks	1.195
82	FFS minimize the use of hazardous chemicals	1.147
*83	FFS can be practiced during drought conditions.	4.559
*84	FFS can not improve the soil fertility and microbial activity	4.157
85	FFS is not suitable for dry land crops	1.239

Scale to measure the attitude of Farmers towards FFS

S.No	Statements	SA	A	UD	DA	SDA
1	FFS is an innovative school of learning for farmers at field level.					
2	Farmers learn latest technology in FFS.					
*3	FFS is not suitable for illiterate farmers due to more technicality					
4	FFS also spread the knowledge to others					
5	FFS changes the attitude of farmers towards adoption of latest technology.					
6	FFS increases the self confidence to take rational decisions					
7	FFS is to reduce the use of chemical inputs in crop production					
8	FFS encourages group cohesion among the farmers					
9	FFS farmers can evaluate new technology before adoption					
*10	All pests/disease can not be controlled with knowledge /skill provided by FFS					
*11	FFS provides information not based on farmers needs and expectations.					
12	FFS enable farmers to upgrade their knowledge					

S.No	Statements	SA	A	UD	DA	SDA
	from time to time					
13	FFS are participatory in nature					
*14	Participation in FFS is not worth sparing valuable time of mine.					
15	Field days encourage membership by other farmers					
16	Member farmers are crucial for success or failure of FFS					
*17	Gender balance is not maintained in enrolling the farmers to FFS					
18	Good facilitator is must for success of FFS.					
*19	Feed back mechanism is not available in FFS					
*20	Sometimes yield is reduced by following FFS recommendations.					
21	FFS promote eco friendly technologies					
*22	FFS has no relevancy to field situation					
23	Sustainability in terms of production is motto of FFS					
*24	FFS can be practiced during drought conditions.					
*25	FFS can not improve the soil fertility and microbial activity					

* Negative statements, SA –Strongly agree, DA-Disagree, A-Agree, SDA –Strongly Disagree, UD-Uncecided.

Appendix I

Interview Schedule

Acharya N.G.Ranga Agricultural University
Extension Education Institute
Rajendranagar, Hyderabad-30

Title of the Research Problem: Empowerment of Cotton farmers through Farmer Field School in Andhra Pradesh.

General Information:

Respondent number:

Name of the respondent:

Village:

Mandal:

District:

Part: A

Please indicate the answer by using [] for the statement with which you agree:

Personal characters

1.Age: [In completed years]

2. Education :

- a. Illiterate [1]
- b. Primary school [2]
- c. High school [3]
- d. Intermediate [4]
- e. Graduate [5]
- f. Post Graduate [6]

3. Experience [Completed years]

Farming :

Polambadi:

Socio-Economic Variables

4. Farm size:

- Small [Up to 2.5 acres]
- Medium [2.5 to 5.0 acres]
- Large [Above 5 acres]

5. Mass media exposure

Please state the mass media utilized by you for getting farm information and the frequency of use.

S. No	Source	Frequency of contact					
		Daily	Weekly	Fort nightly	Once in month	Rarely	Never
1	Radio						
2	T.V						
3	News paper						
4	Agril.Magazines						
5	C.D.s/ DVD on Agriculture and allied sectors						
6	Internet						
7	Any others						

6. Extension Contact

Please indicate contacts with the following personnel.

S.No	Official /personal contact	Frequency of contact				
		Weekly	Fortnightly	Once in month	Rarely	Never
1	A.E.O					
2	A.O/HO/VAS					
3	ANGRAU scientists					
4	N.G.Os					
5	Polambadi members/ Master trainers					
6	Adarsha rythu					
7	Input dealers					
8	Any others					

7. Group orientation

Please your opinion on the following aspects

S.No	Components of FFS group	True	Some what true	Not true
1	Working in groups will not be useful for self development			
2	Individual farmer has no identity in FFS			
3	Facilitator plays major role in group, ignoring others			
4	Willing to take responsibility but could not get chance due to many members in FFS			
5	Ready to adopt all FFS practices but could not involved due to risk factor /financial problem			
6	When working in groups one should try to excel than others in similar tasks			
7	As individual one must work for achieving group goal			
8	I am satisfied with FFS group approach.			

8. Market intelligence

S.No	Statements	Response categories		
		Agree	Undecided	Disagree
1	Farmer need not watch sale prices of Cotton in different Markets before selling the produce			
2	The most successful farmer is one who makes best use of market intelligence.			
3	It is difficult for every farmer to watch daily market prices on the net			
4	A farmer should grow commercial crops which have more market demand			
5	Though it takes time for farmer to acquaint with market intelligence but worthy			
6	Farmer should use ware house facility for better market price			
7	Farmer should be aware of FAQs of cotton crop for better returns			
8	Standard system of quoting prices is essential.			

Psychological Variables

9. Risk orientation

S.No	Statements	SA	A	UD	DA	SDA
1	A farmer should practice integrated farming to overcome risks of mono cropping					
2	It is good to take risks when he knows his chance of success is fairly high					
3	It is better for not to try new methods unless most of the farmers have used them with success					
4	Trying entirely new technology in FFS involves risk but it is worth					
5	A farmer who is willing to take greater risks than the average, success is fairly high.					

10. Innovativeness

Please state your degree of Agreement or Disagreement with each statements pertaining to innovativeness:

S.No	Statements	Response categories		
		Agree	Undecided	Disagree
1	I try to keep myself up to date with information on new farm practices but that does not mean. I tryout all new methods on my farm			
2	I feel restless till I try a new farm practice that I have heard about			
3	They talk of many ICM practices these days but who knows if they are better than the old ones			
4	From time to time I have heard of several new farm practices and I have tried out most of them in the last few years			
5	I usually wait to see that the results my neighbors obtain before I try out the new farm practice			
6	Somehow, I believe that [ITKs] the traditional ways of farming are the best			
7	I am cautious about trying new practices			
8	After all our fore fathers were wise in their			

S.No	Statements	Response categories		
		Agree	Undecided	Disagree
	farming practices and I don't see any reason for changing these old methods			
9	Often new practices are not successful, however if they are promising I would surely like to adopt them			

11. Management orientation

A set of statements representing planning, production , marketing orientation of farmer is given below. Please state the degree of your Agreement [A] or Undecided [UD] or Disagreement [DA] with each statement.

A. Planning orientation

S.No	Statements	Response categories		
		Agree	Undecided	Disagree
1	Every year one should think about Cotton hybrid to be cultivated in each type of land			
2	It is not necessary to make prior decision about the variety/Hybrid to be cultivated			
3	The amount of inputs such as resistant hybrids, chemical fertilizers, pesticides, NPV, pheromone traps, tricho-cards, neem oil etc needed for management of Cotton pests should be assessed before cultivation			
4	It is not necessary to think ahead of the cost involved in raising the Cotton crop.			
5	One need not consult technical experts for recommendations about cotton cultivation			
6	One should prepare an advance plan for labour requirement			
7	It is possible to increase returns through production plans.			

B. Marketing orientation

S.No	Statements	Response categories		
		Agree	Undecided	Disagree
1	Market news is not so useful to farmers			
2	A farmer can get good price by grading his produce			

S.No	Statements	Response categories		
		Agree	Undecided	Disagree
3	Warehouses can help the farmer to get better price for his produce			
4	One should sell his produce to the nearest market irrespective of price			
5	One should purchase inputs from nearest shop where his friends and other relatives purchase			
6	One should grow cotton with good fibre quality which has more market demand			
7	MSP announcement prior to beginning of season will be essential.			

C. Production orientation

S.No	Statements	Response categories		
		Agree	Undecided	Disagree
1	Timely sowing ensures good yields			
2	One should use as much fertilizers as he like			
3	Determining the fertilizer dose by soil test testing saves money			
4	Inter cropping should be adopted as recommended by scientists			
5	One should use Bio pesticides for timely plant protection			
6	One should adopt ICM practices for better yields.			
7	For timely weed control one should use suitable herbicides			
8	Post harvest technology is must for high profits			
9	With use of less quantity of quality inputs high production is possible			
10	With less expenditure one can produce sustainable yields in cotton by following ICM practices			

Attitude of Farmers towards FFS

S.No	Statements	SA	A	UD	DA	SDA
1	FFS is an innovative school of learning for farmers at field level.					
2	Farmers learn latest technology in FFS.					
*3	FFS is not suitable for illiterate farmers due to more technicality					
4	FFS also spread the knowledge to others					
5	FFS changes the attitude of farmers towards adoption of latest technology.					
6	FFS increases the self confidence to take rational decisions					
7	FFS is to reduce the use of chemical inputs in crop production					
8	FFS encourages group cohesion among the farmers					
9	FFS farmers can evaluate new technology before adoption					
*10	All pests/disease can not be controlled with knowledge /skill provided by FFS					
*11	FFS provides information not based on farmers needs and expectations.					
12	FFS enable farmers to upgrade their knowledge from time to time					
13	FFS are participatory in nature					
*14	Participation in FFS is not worth sparing valuable time of mine.					
15	Field days encourage membership by other farmers					
16	Member farmers are crucial for success or failure of FFS					
*17	Gender balance is not maintained in enrolling the farmers to FFS					
18	Good facilitator is must for success of FFS.					
*19	Feed back mechanism is not available in FFS					
*20	Sometimes yield is reduced by following FFS recommendations.					
21	FFS promote eco friendly technologies					
*22	FFS has no relevancy to field situation					
23	Sustainability in terms of production is motto of FFS					

S.No	Statements	SA	A	UD	DA	SDA
*24	FFS can be practiced during drought conditions.					
*25	FFS can not improve the soil fertility and microbial activity					

* Negative statements, SA –Strongly agree, DA-Disagree, A-Agree, SDA –Strongly Disagree, UD-Undecided.

Knowledge

A set of statements representing Knowledge on Cotton ICM are given below, kindly indicate your agreement or disagreement with each statement

a] Select correct answers from the given options

- Cotton+ Greengram intercropping ratio is
a]. 1: 3 b] 1: 6 c] 2:6 d] 1: 8
- Neem oil is
a] Insecticide b]Repellent c] Anti feedent d] All
- Reddening of leaves from boarder is symptom of
a] Zn deficiency b] Mg Deficiency c] Jassids d] Boran deficiency
- Insecticide used for Stem application
a] Endosulfan b] Chlorpyrifos c] Monocrotophos d] all the chemicals
- Cotton should only be grown on -----soils for better yields.
a] Black soils b] Red light soils c] Sandy soils d]Any soil
- Pest and defender ratio in FFS is
a] 4:1 b] 1:2 c] 3:1 d] 5:1
- NPV Virus solution is sprayed against
a] Heliothis b] Pink boll worm c] Stem borer c] None
- Bt formulation should be sprayed during
a] Morning b] Noon time c] Evening d] Any time
- Stem application is done up to ----days
a] 90 b] 30 c] 60 d] any time
- Latest concept of FFS is
a] ICM b] IPM c] INM d] None

B] Fill in the blanks

11. Refuge Bt is sown in ---- rows around Bt Cotton.
12. Trap crop for Spodoptera is -----
13. Potassium fertilizer is applied for better ----- quality.
14. Dose of Zinc sulphate per acre is-----
15. Boll cracking is due to deficiency of -----.
16. Sticky traps are used against -----
17. No. of Bird perches per acre of cotton-----

C] True or False

18. Deep summer ploughing and destruction of crop residue help to reduce pest/diseases. T/F
19. Selection of suitable hybrid will give good yields. T/F
20. Indiscriminate spray of insecticides is prime reason for increase in cost of cultivation T/F
21. Timely sowing helps in overcoming pest problem T/F
22. Sowing of Cotton in light soils is risk taking T/F
23. Better drainage is required for Cotton cultivation T/F
24. Crop rotation helps in maintaining soil fertility T/F
25. Stem application conserves natural predators T/F

d. Please indicate Yes or No

26. Do you know the inter crops of cotton Yes/No
If Yes please mention a few
27. Do you know the seed treatment chemical for wilt disease Yes/No
If Yes name one chemical
28. Do you know about pheromone trap action Yes/No
If Yes what is the use
29. Do you know the boarder crops grown in Cotton Yes/No
If Yes mention few
30. Do you know about soil testing Yes/No
If Yes mention the weight of Soil sample to be sent to STL

Skills

Please put tick mark [/] against each item to indicate the skills learnt by you during Cotton FFS.

S.No	Skill	Skilled	Partially Skilled	unskilled
1	Collection of soil samples			
2	Seed treatment			
3	Stem application with Pesticide			
4	Poison bait preparation			
5	Seed germination test			
6	Cage study			
7	Water holding capacity of different soils			
8	Cotton Eco System Analysis : Identification of a. Crop condition [Age of the crop, No.of Bolls etc] b. Field condition [Moisture condition] c. Pests d. Natural enemies of Pests [Spiders , Parasites, Wasps] e. Weeds			
9	Tricho cards preparation			
10	Identification of deficiency of micro nutrients			
11	Identification infestation of sucking pests.			
12	Preparation of NPV			
13	Identification of dead larvae due to Bt spray.			
14	Preparation of NSKE			
15	Preparation of spray fluid			
16	Preparation of Green chilli and Garlic extract			
17	Pit fall trap method			
18	Group dynamics Nine dot game [Broad thinking] Longest line [Resource utilization]			

	Building towers [Team work]			
19	Communication skills			
20	Facilitation skills			

Extent of adoption

S.No	Management Practice	Fully adopted	Not adopted	Reasons for non adoption
1	Experiments adopted Short term a. Soil test b. Seed treatment c. Seed germination test d. Sowing time e. Pit fall trap method f. Establishment of delta sticky for white fly g. Cage study [Defender exclusion] h. Effect of pesticide spray on defenders Long term experiments i. No. of plants / hole j. New Hybrids k. Defoliation trial l. De topping m. Removal of fruiting bodies			
2	Adoption of principles of IPM package a. Use of Pheromone traps b. Installation of yellow sticky traps c. Installation of bird perches d. Release of Verticillium lachani e. Seed treatment with Trichoderma viridae f. Use of NSKE g. Use of NPV h. De topping of plants i. Collection and destruction of larvae j. Crop residue destruction k. Destroying fallen squares to reduce pink boll worm incidence l. Use of bio pesticides [Bt]			

S.No	Management Practice	Fully adopted	Not adopted	Reasons for non adoption
	m. Trap cropping			
3	General management practices a. Method of cultivation [Mono/Inter cropping] b. Deep summer ploughing c. Recommended seed rate d. Optimum plant density e. Time of sowing f. Type of soil g. Adoption of soil test based fertilizer application h. Soil testing i. Kind of fertilizers applied			
4	Farmer expert a. Agro ecosystem analysis b. Daily monitoring c. Pest/disease identification d. Participation in meetings e. Analysis of crop condition f. Participation in group discussion g. PTD h. Peer group communication i. Participation in field day j. Active role in field day k. Risk management l. Developing linkages with extension functionaries m. Sharing experiences with others n. Documentation of experiences			

4. Agro ecosystem management :

Adopted/ not adopted

a] Pest and defender management:

1. Spray of botanical pesticides will develop natural predators
2. Growing Greengram as inter crop in Cotton for developing predators population.
3. Adoption of IPM package for better micro climate
4. Adoption of soil test based fertilizer application for decrease of pest incidence.

6. Use of NPV and Bt solution when used against pests will result in building natural predators population
7. Sowing of Border crops like Maize /Bajra/Jowar for reducing sucking pest incidence.
8. Trap crop for diverting pest from main crop

b] Input management

Adopted/ not adopted

1. Use of organic manures like FYM / Vermicompost improves overall fertility of soil.
2. Application of soil test based NPK fertilizers to reduce pest and diseases.
3. Use of PSB bio fertilizer for solubilising insoluble P fertilizers in the soil.
4. Use of bio control agents like Tricho cards, NPV, .Bt. will reduce pest incidence
5. Use of botanicals like NSKE will help in developing predators population.
6. Intercropping with Greengram will improve soil fertility
7. Use of quality seed will result in better yields

c] Use of ITKs

[Documentation]

List out different ITKs / Traditional practices you follow in cotton cultivation.

- 1
- 2
- 3

d] Bio diversity conservation:

Adopted/ not adopted

1. Use of ICM technology under FFS has resulted in biodiversity conservation like Spiders, Coccinellid beetle [Akshinatala purugu], Dragon flies.
2. Decomposition of applied FYM in the soil leads to increased microbial activity
3. Water holding capacity of soil will increase due to increase of microbial activity.
4. Parasites and predators conservation will result in Bio diversity conservation
5. Insect Zoo/ Cage study will help in identification of Predators/ Parasites to enable Bio diversity conservation.
6. Conservation of native plant species
7. Diversification of crop varieties will help in Bio diversity conservation.

8. Reduction of inorganic fertilizers usage will result in improved soil microbial activity.
9. Conservation of bird species
10. Conservation of animals
11. Use of micro irrigation system will lead to conservation of irrigation water and improves micro climate.

5] Decision making ability

S.No	Area of decision	Self decision / Individual decision	Decision making along with Spouse / family members	Group decision
1	Collection of Soil sample			
2	Time of sowing			
3	Maintain optimum plant density			
4	Use of fertilisers Type /quantity			
5	Use of Bio pesticides			
6	Time of application of fertilizers			
7	Adoption of IPM			
8	Sowing of inter crop like Greengram			
9	Source of credit			
10	Sale of produce			
11	Adoption of Short term experiments			
12	Long term experiments			
13	Maintenance of farm records			
14	Purchase of inputs			
15	Selection of crops			

16	Selection of variety /hybrid			
17	Irrigation schedule			
18	Investment on crop production			
19	Sowing of boarder crop			
20	Use ITKs			

ACHARYA N.G.RANGA AGRICULTURAL UNIVERSITY

Extension Education Institute
Rajendranagar: Hyderabad

Dr.R.Ratnakar
Professor
Extension Education Institute

Dear Sir /Madam

I am glad to inform that Sri.M.Sreenivasulu Inservice ,Ph.D.student of this institute has undertaken a research study en titled “ Empowerment of farmers through FFS in Andhra Pradesh “ under my guidance.

In this connection he is attempting to develop the following:

1. A test on Knowledge gained by Cotton FFS farmers
2. Index for Skill gained by Cotton FFS farmers
3. Index for Agro-Ecosystem management

Keeping in view of the your vast experience and expertise you have been selected as one of the experts to judge aforesaid items. You are requested to kindly go through the judgments sheets enclosed and give your valuable assessment with regard to their Knowledge, Skill and Agro-ecosystem management for inclusion in the final scale. You are free to add or delete any items listed in the judgment sheets.

Sri.M.Sreenivasulu Scientist [TOT] DAATTC Mahabubnagar will personally collect the judgment sheets from you. I request your kind cooperation in this regard.

Yours sincerely

Encl: 1. Judgment sheets on Knowledge
2. Judgment sheets on Skill
3. Judgment sheets on Agro-Eco system management

Appendix III

Knowledge of farmers on Cotton ICM Technologies

The following are the statements intended to test the knowledge gained by the Cotton growing farmers of Farmers Field School [FFS] .Against each statements there are three response categories i.e Most relevant ,Relevant and Not relevant. You are requested to give extent of agreement on each statement [by putting tick mark] for inclusion in the final Knowledge test. Based on your responses the knowledge score will be calculated in order to select the statements for inclusion in the final knowledge test.

S.No	Statement	Most relevant	Relevant	Not relevant
1.	Deep summer ploughing and destruction of crop residue help to reduce pest / diseases			
2	Selection of suitable variety/Hybrid will give good yields			
3	Timely sowing helps in overcoming pest problem			
4	Seed treatment reduce soil borne diseases			
5	Crop rotation helps in maintaining soil fertility			
6	Intercropping of Cotton with pulses is beneficial			
7	Soil test based fertilizers application reduce yield			
8	Trichoderma viridae soil application best for wilt disease			
9	Stem application reduces sucking pest problem			
10	Soil test helps in correction of nutritional deficiencies			
11	Stem application conserve natural predators and avoid environment pollution			
12	Reddening of leaves from boarder is symptom of Jassids			
13	Cotton can only be grown in Black soils under irrigated soils			
14	Neem oil spray acts as antifeedent			
15	Bt solution can be sprayed at evening hours only			
16	Pest defender ratio for IPM is 2:1			
17	Zinc sulphate application is must for cotton			
18	Adequate drainage is required for cotton			
19	NPV solution is common for all type of pests			

S.No	Statement	Most relevant	Relevant	Not relevant
20	Pre emergence herbicide application is compulsory for better weed management			
21	ICM helps for better returns to farmer			
22	Refugee Bt is sown 4 rows around Bt Crop			
23	Latest concept of FFS is ICM			
24	Potash fertilizers helps for better fibre quality			
25	Bhendi is trap crop for Spodoptera			
26	Stem application can be done through crop period			
27	Indiscriminate use of pesticides is prime cause for increase in cost of cultivation			
28	Boll cracking is due to Boron deficiency			
29	Zinc sulphate dose per acre is 10 Kg			
30	Monocrotophos is used for stem application			
31	Sticky traps are used for Spodoptera			
32	Stem application more effective than spraying			
33	Imidachloprid is used for Seed treatment			
34	Bird perches is one of the component ICM			
35	Marigold is trap crop for Heliothis			
36	Optimum spacing should be followed for easy inter cultivation operations			
37	Cotton + Greengram intercropping ratio is 1:6			
38	Pesticide usage cause Pollution of Air, Water, Soil .			
39	Keeping farm record is very essential			
40	Growing Cotton in light soils is risky			
41	Pheromone trap for monitoring pest population			
42	Boarder crops like Maize, Jowar is must.			

**DIFFICULTY INDEX, DISCRIMINATIN INDEX AND POINT BISERIAL
CORRELATION FOR KNOWLEDGE TEST ITEMS**

Item No.	Frequencies of correct answers				Difficulty Index (P)	Discrimination Index (E1/3)	Point biserial correlation (rpbis)
	S1	S2	S3	S4			
*1	5	4	2	3	65	0.4	0.456
*2	5	4	2	1	78	0.6	0.4817
*3	5	5	3	2	72	0.5	0.5431
4	5	5	5	4	85	0.1	N.C
*5	4	5	2	2	60	0.5	0.3683
*6	5	5	2	2	64	0.6	0.3683
7	3	3	2	1	18	0.3	N.C
*8	5	5	3	2	76	0.5	0.4190
9	5	5	5	5	92	0.0	NC
*10	4	4	2	1	48	0.5	0.3617
*11	4	5	2	1	54	0.6	0.5323
*12	4	4	2	2	45	0.4	0.3348
*13	5	5	2	1	50	0.7	0.5724
*14	4	5	2	2	48	0.5	0.4083
*15	5	2	3	3	80	0.4	0.4385
*16	5	5	2	3	69	0.5	0.4556
17	2	1	2	0	18	0.1	NC
*18	5	5	3	3	75	0.4	0.4116
*19	4	5	2	1	65	0.6	0.5323
20	2	1	2	0	19	0.1	NC
21	2	1	1	0	14	0.2	NC
*22	5	5	3	2	68	0.5	0.4190

*23	5	4	4	2	80	0.3	0.425
*24	5	5	2	3	72	0.5	0.5276
*25	4	5	2	2	69	0.5	0.4083
*26	5	5	3	1	60	0.6	0.5429
*27	5	5	3	3	80	0.4	0.4385
*28	4	5	2	1	60	0.6	0.4817
*29	5	5	2	2	73	0.6	0.5076
*30	5	5	3	2	75	0.5	0.4190
*31	4	4	2	2	58	0.4	0.3617
32	5	2	4	2	88	0.1	NC
33	5	5	4	5	95	0.1	NC
*34	5	4	3	2	62	0.4	0.5025
35	5	5	5	5	92	0.0	NC
36	5	5	3	3	85	0.4	NC
*37	4	5	2	1	68	0.6	0.4817
38	4	5	5	5	90	0.0	NC
39	5	4	4	3	73	0.2	NC
*40	5	5	2	3	70	0.5	0.5276
*41	5	4	4	2	62	0.3	0.4251
*42	5	5	3	2	66	0.5	0.4190