ADOPTION OF COTTON PRODUCTION TECHNOLOGY AMONG FARMERS OF FARMER FIELD SCHOOL

BY

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B.Sc. (Agri.)

MASTER OF SCIENCE
(Agriculture)
IN
EXTENSION EDUCATION

DEPARTMENT OF EXTENSION EDUCATION,
COLLEGE OF AGRICULTURE, LATUR
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DISSERTATION

Submitted to

Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani

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VASANTRAO NAIK MARATHWADA KRISHI VIDYAPEETH,

PARBHANI-431 402 (M.S.), INDIA.

2014

Affectionately

Dedicated to

My Beloved

Parents,

Friends

and Research

Guide

CANDIDATE'S DECLARATION

I hereby declare that the dissertation

or part thereof has not been

previously submitted by me

for a degree of any

University or

Institute

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CERTIFICATE – I

This is to certify that the dissertation entitled **"ADOPTION OF COTTON PRODUCTION TECHNOLOGY AMONG FARMERS OF FARMER FIELD SCHOOL"** submitted by **MR. HARNE BHASKAR PRABHAKAR** to the Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani in partial fulfilment of the requirements for the degree of **MASTER OF SCIENCE (Agriculture)** in the subject of **EXTENSION EDUCATION** is record of original and bonafide research work carried out by her under my guidance and supervision. It is of sufficiently high standard to warrant its presentation for the award of the said degree.

I also certify that the dissertation or part thereof has not been previously submitted by her for a degree of any university.

Place: **LATUR**
Date: 31 / 05 /2014

(Dr. V. B. Kamble)
Research Guide
&
Chairman
Advisory committee

CERTIFICATE – II

This is to certify that the dissertation entitled **"ADOPTION OF COTTON PRODUCTION TECHNOLOGY AMONG FARMERS OF FARMER FIELD SCHOOL"** submitted by **MR. HARNE BHASKAR PRABHAKAR** to the Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani in partial fulfilment of the requirements for the degree of **MASTER OF SCIENCE (Agriculture)** in the subject of **EXTENSION EDUCATION** has been approved by the student's advisory committee after viva-voce examination in collaboration with the external examiner.

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Place: Latur

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INTRODUCTION

In 1965-66, the Green Revolution was launched with the aim of improving the productivity of small farmers. By improving access to water, improved varieties and other inputs, the Green Revolution helped to double average rice yields between the 1960's and the 1990's. During the 1970's it became increasingly apparent that pest resistance and resurgence caused by the in discriminate use of insecticides posed an immediate threat to the gains of the Green revolution. At the same time, research was being conducted that demonstrated the viability of biological control of major crop pests. However, gaps still existed between the science generated in research institutions and common farmer practice conditioned by years of aggressive promotion of pesticide use. Over the ensuing years, a number of approaches were tried to bring Integrated Pest Management (IPM) to small farmers with mixed results. Some experts claimed that the principles of IPM were too complex for small farmers to change their practices.

At the end of 1980's a new approach to farmer training emerged in Indonesia called the 'Farmer Field School' (FFS). The broad problem which these field schools were designed to address was a lack of knowledge among Asian farmers relating to agro ecology, particularly the relationship between insect pests and beneficial insects.

The Farmer Field School (FFS) has become an innovative, participatory and interactive model approach for farmer's education. "The aim of Farmer Field School is to build farmers capacity to analyze their production systems, identify problems, test possible situations and eventually adapt the practices most suitable to their farming system." The knowledge acquired during the learning process enables farmers to adopt their technologies to be more productive, profitable and responsive to changing conditions or to test and adopt new technologies.

Farmer Field School is a unique way to educate farmers and is an effective platform for sharing of experiences and collectively solving agriculture related problems. The first FFS established in 1989 in Indonesia by plant protection officers in order to test and develop field training methods as a part of an Integrated Pest Management (IPM) programme under the Food and Agriculture Organization (FAO) – assisted Indonesia National IPM programme. Field schools proved to be an effective means of reaching farmers and helping them to gain knowledge and acquire skills required for crop production and pest management. Globally, field schools are now actively promoted by more than 50 national and local Integrated Pest Management (IPM)/Plant Protection Measures (PPM) programmers, including both Government and Non-Government Organization (NGOs). Field schools have been integrated in modified forms within at least five Soil Productivity and Fertility Status (SPFS) projects for learning improved water management, rice and vegetable culture, livestock management and even aquaculture.

Farmer Field School (FFS) provide people centered learning experience that promote the empowerment of farmer through education weekly training sessions are conducted in the villages for a group of 25-30 farmers by expert facilitators during the cropping season. In FFS the curriculum is developed in collaboration with locate-specific solutions.

Broadly speaking the FFS approach can be viewed as a capacity building investment in the sector "education, information and training."

Cotton is one of the important cash crops for India, grown by four million farmers on an estimated nine million hectares. Besides, the cotton farmers who are dependent on the fortunes of this crop, nearly 60 million people are employed along the cotton value chain, from weaving to textile and garment exports. Directly and indirectly, it accounts for 33 per cent of our export earnings and cotton farming contributes (29.80 per cent) of India's Agricultural Gross Domestic product.

India ranks third among the world's cotton producing countries, accounting for a more than 12.3 per cent of global cotton production. Indian cotton fields have the lowest yields around 300 kg per hectare against the world average of 580 kg per hectare over half of all insecticides used in Indian agriculture are used for the cotton crop alone. It is estimated that of the 30 billion worth of insecticide used in Indian agriculture, almost Rs. 18 billion are used for controlling cotton pests, such indiscriminate use of pesticides, besides aggravating pest problem has created serious environmental and health problems and increased the cost of cultivation. Due to low productivity and abnormal increase in the cost of cultivation, the area under cotton cultivation has been coming down drastically.

The specific objectives of this study are

1. To study the profile of farmers.
2. To study adoption of cotton production technology.
3. To delineate relationship between profile of farmers with adoption of cotton production technology by farmers of Farmer Field School.
4. To study the constraints faced by farmers in adoption of cotton production technology.

Scope of the study

The approach and brief statement of objective given earlier would indicate the practical utility of the research. The study will show "Adoption of cotton production technology among farmers of farmer field school." The findings will reflect upon the factors affecting the adoption of cotton production technology by farmer's field school measures at the farmer's level. Finding of the study will be applicable to farmers in similar setting elsewhere.

Finally, the study would probe into the constraints in adoption of cotton production technology by FFS. The result would help in taking appropriate

measures to enhance the adoption level of agriculture taken care of Farmer Field School leading to increase the farm productivity.

Limitations of the study

The present investigation has major limitations of time, study area and other research facilities usually faced by single investigator. However, considerable efforts were made by the researcher to make the investigation more meaningful and useful. Since investigation was conducted in three talukas of Jalna district under a particular social and environmental settings.

The general conclusions arrived at may be of value in the similar situation subject to local adjustments.

Organization of the dissertation

This dissertation has been divided into seven chapters. The first chapter deals with a brief Introduction and objective of the study. The second chapter is devoted to Review of literature related to research problem. The third chapter is concerned with methodology. Results and Discussion are given in fourth and fifth chapters respectively. Sixth chapter is devoted to Summary and Conclusion. Implications are given in seventh chapter.

REVIEW OF LITERATURE

Chapter II

REVIEW OF LITERATURE

A review of literature is necessary for any scientific investigation. It is a guideline to researcher for his research. Review of literature is useful to compare the findings of the study with the studies undertaken by previous research workers. There are references relating directly as well as indirectly to present research problem, which are received from research papers, previous theses, journals, surveys and committee reports and books.

Considering the objectives, the review of literature of the present investigation has been present under the followed.

2.1 Profile of farmers.

2.2 Adoption of cotton production technology.

2.3 Relationship between profile of farmers with adoption of cotton production technology by farmers of Farmer Field School.

2.4 Constraints faced by farmers in adoption of cotton production technology.

2.1 Profile of farmers

2.1.1 Age

Satyanarayana *et al.* (2002) revealed that 60.00 per cent of the beneficiaries of Swarnjayanti Gram Swarozgar Yojana were middle aged while, 25.71 per cent were young and 14.29 per cent were old.

Deshmukh *et al.* (2003) observed that majority of trainees were from young age group, followed by middle age group, while majority of non-trainees were middle aged.

Sawant (2006) revealed that 60.83 per cent of respondents were between age group of 27 to 44 years i.e. middle age group. There were 23.32 per cent of the respondents from young age group (up to 26 years). About 15.84 per cent of the respondents were from old age group (above 44 years).

Athawale (2008) found that majority of the Farmer Field School beneficiaries 70.84 per cent were from middle age group category.

Deokar (2008) noticed that most of both the beneficiaries 56.67 per cent and non- beneficiaries 48.33 per cent of cotton FFS were young and followed by middle aged in case of beneficiaries 40.00 per cent. Very few of beneficiaries 3.33 per cent and non beneficiaries 11.67 per cent were from old age category.

Sewatkar (2008) observed that most of the IPM trainees in KVK 60.00 per cent were middle aged followed by young 26.67 per cent and old 13.33 per cent aged, respectively. In case of non trainee farmers, most of them 46.67 per cent were middle aged followed by old 34.67 per cent and young 18.67 per cent age category, respectively.

Shendage (2010) revealed that most of the KVK programme beneficiaries 41.67 per cent were from young age group followed by middle age 32.50 per cent and old age group 25.83 per cent.

2.1.2 Education

More *et al.* (2000) observed that most of the cotton growing KVK trainees 62.15 per cent had medium level of education.

Chikhale (2002) concluded that majority of the trainees of KVK training programme about dryland agricultural techniques had education up to secondary school whereas, majority of non trainees were with primary school level education.

Deshmukh *et al.* (2003) found that majority of trainees were educated up to high school level and majority of non-trainee were having education up to primary school.

Patil (2004) revealed that most of the trained farmers were having education up to primary school level, followed by 30.00 percent of farmers having education up to middle school level, about 16.66 per cent of the respondents were having education up to high school level.

Athawale (2008) found that most of the Farmer Field School beneficiaries 33.33 per cent were educated to middle school level.

Deokar (2008) noted that significant and same amount of FFS beneficiaries 46.67 per cent were educated to the high school and college level and 3.34 per cent of them illiterate. Very meager and equal beneficiaries 1.66 per cent were educated to primary and middle school level. In case of non beneficiary farmers, most of them were educated to the high school level 36.67 per cent followed by middle school

26.66 per cent and college level 16.67 per cent. Only 13.33 per cent and very few 6.67 per cent non beneficiaries were from primary education and illiterate category.

Sewatkar (2008) pointed out that near about half of the IPM trainees in KVK 48.00 per cent were educated to the SSC level followed by middle school 22.67 per cent and HSC 13.33 per cent level, respectively. Very few of them 9.33 per cent educated to the college level and no one observed in illiterate category of education. On the other hand 34.67 per cent of the non trainee farmers were having education to the SSC level and near about equal amount of them observed in all education categories i.e. illiterate 12.00 per cent, primary school 13.33 per cent, middle school 13.33 per cent, HSC 14.67 per cent and college 12.00 per cent education category.

Shendage (2010) revealed that most of the KVK programme beneficiaries 36.66 per cent were educated to higher secondary school level followed by college level 21.67 per cent.

2.1.3 Size of land holding

Sonsale (2000) revealed that majority of the non-beneficiaries 61.35 per cent were small farmers followed by 26.66 per cent medium farmers. It was also observed that marginal farmers were found to be 9.33 per cent, whereas 2.66 per cent of the respondents were big farmers. While in beneficiaries 10.67, 52.00, 28.00 and 9.33 per cent of the farmers were from marginal, small, medium and big farmers category, respectively.

Chikhale (2002) observed that majority of KVK trainees belonged to bog farmers category.

Patil (2004) observed that higher percentage i.e. both trained and untrained respondents (60.00 per cent) were found to have medium sized land holding. In case of trained farmers, equal percentages (20.00 per cent) of respondents were having small and large size of land holding. In case of untrained farmers, 21.66 per cent of respondents were belonging to small size land category and 18.34 per cent were having large size land holding.

Sawant (2006) observed that 50.00 per cent of respondent were medium farmers, 30.00 percent of the respondent were small farmers (1.1 to 4 ha) followed by

large farmers (15.84 per cent). While 4.16 per cent of the respondents were marginal farmers i.e. having land holding up to 1 ha only.

Athawale (2008) found that near about half of the Farmer Field School beneficiaries 45.00 per cent were medium farmers having land between 4.01 to 10.00 ha.

Deokar (2008) showed that most of the same amount of beneficiaries and non beneficiaries of cotton FFS were possessed small land holdings 43.34 per cent followed by equal amount of them having semi medium 38.33 per cent and medium 13.33 per cent land holding. Very meager and both the respondents 5.00 per cent were marginal farmers and none from both the categories was observed in big land holding category.

Sewatkar (2008) pointed out that more than half of the IPM trainees in KVK 56.00 per cent were the medium farmers followed by semi medium farmers 36.00 per cent. Very few of them 5.33 per cent were from small land holding category and meager and equal percentage of them 1.33 per cent observed in marginal and big land holding capacity. As the non trainees is concerned, more than half of them 56.00 per cent and exact one third of them 33.33 per cent were belonged to medium and semi medium land holding category, respectively. Only 6.67 per cent non trainees were small farmers and very few of them were from marginal 2.67 per cent and big 1.33 per cent land holding category.

Shendage (2010) revealed that most of the KVK programme beneficiaries 41.68 per cent were from the semi medium land holding category followed by small 38.33 per cent and medium 18.33 per cent land holding category. Equal and meager respondents were marginal and big farmers 0.83 per cent.

2.1.4 Annual income

Bonde (2002) reported that most of the vegetable trainees and non trainees of KVK were in the annual income group of Rs. 100000 to 200000.

Chikhale (2002) observed that majority of KVK trainees were having annual income above Rs. 115000.

Pandhare (2005) reported that majority (72.00 per cent) of the KVK beneficiaries and 60.67 per cent non-beneficiaries had medium annual income, i.e. in

between Rs. 52000 to 110000, whereas 12.66 per cent beneficiaries and 29.33 per cent non-beneficiaries had low annual income, i.e. less than Rs. 52000.

Deokar (2008) showed that most of the cotton FFS beneficiaries (48.33 per cent) were having annual income in between Rs. 50,001 to 1,00,000 followed by Rs. 1,00,000 to 1,50,000 (26.67 per cent). Annual income of 21.67 per cent beneficiaries was up to Rs. 50,000 and only 3.33 per cent of them earn more than Rs. 1,50,000. In case of non beneficiaries of cotton FFS, more than half of them (55.00 per cent) had annual income up to Rs. 50,000 followed by Rs. 50,000 to 1,00,000 (41.67 per cent). Meager non beneficiaries (3.33 per cent) earn Rs. 1,00,000 to 1,50,000 annually and none of them observed in above Rs. 1,50,000 annual income category.

Sewatkar (2008) found that annual income of more than half of the IPM trainees in KVK 62.67 per cent was in between Rs. 40,001 to 80,000 followed by above Rs. 80,000 (25.34 per cent) and up to Rs. 40,000 (12.00 per cent), respectively. On the other hands, the annual income of more than half of the non trainees 54.67 per cent was Rs. 40,001 to 80,000 followed by up to Rs. 40,000 (40.00 per cent) and above Rs. 80,000 (5.33 per cent), respectively.

Katkar (2009) concluded that most of the National Horticultural Mission beneficiaries 44.66 per cent having annual income in between Rs. 50,00, to 1,00,000 followed by Rs. 1,00,000 to 2,00,000. Equal percentage of them 6.67 per cent belonged to annual income categories of up to Rs. 50,000 and Rs. 50,00a to 1,00,000.

2.1.5 Type of family

Hegade (2001) found that a majority (81.50 per cent) of the respondents had joint type of family whereas, rest were found having nuclear type of families.

Gavhane (2005) found that more than half (59.67 per cent) of the respondents had joint type of family while, rest (40.33 per cent) were found having nuclear type of family.

Chipade (2010) found that majority of the respondents were belonged to joint family (61.67 per cent) while, remaining (38.33 per cent) were from nuclear type family.

Tamboli (2012) observed that 54.00 per cent farmers from nuclear family while, 46.00 per cent farmers had joint family.

2.1.6 Size of family

Sonsale (2000) found that majority of the respondents 60.00 per cent were having small family and 34.66 per cent of the respondents had nuclear family and negligible per cent i.e. 2.66 per cent of the respondents had medium and joint family, respectively.

Kadam (2004) stated in his study that majority of goat keepers of self help group (67.50 per cent) has medium family size consisting 4 to 6 members.

Kore (2005) reported that majority of the respondent (83.33 per cent) had medium family size consisting 4 to 6 members.

Sawant (2006) indicated that 45.83 per cent of respondents were from medium family size (4 to 6 members). 33.33 per cent were from large family size (7 to 9 members). While 4.16 per cent of respondents were from very large family (9 and above members) and 16.66 per cent of respondents were from small family i.e. having 3 members in the family.

Nichal (2010) majority of the respondents 52.50 per cent had medium size of family, followed by 42.50 per cent of respondents having big size of family and only 5.00 per cent of respondents with small size of family.

2.1.7 Socio-economic status

Deshmukh *et al.* (2003) found that majority of trained farmers were belonging to upper middle level of socio-economic status so that of untrained farmers who belonged to middle level of socio-economic status.

Patil (2004) revealed that majority if the respondents from both the categories of trained 63.33 per cent and untrained 66.66 per cent farmers were found in medium socio-economic status. Whereas, 16.66 per cent of trained farmers were belonging to higher socio-economic status level and 20.00 per cent were belonging to low socio-economic status level.

Sawant (2006) found that 55.00 per cent of respondents had middle socio-economic status, followed by 20.00 per cent of respondents with lower middle socio-economic status. The data further showed that 15.00 per cent and 10.00 per cent of respondents were in upper middle socio-economic status and upper socio-economic status.

2.1.8 Mass media exposure

Patil (2004) observed that majority of respondents (60.00 per cent and 61.66 per cent respectively) from both the categories of trained and untrained farmers were having medium mass media exposure. Whereas, 23.33 per cent of trained and 21.66 per cent of untrained farmers were having higher mass media exposure an equal (16.66 per cent) of both trained and untrained farmers were having low mass media exposure.

Deshmukh (2005) revealed that most of the frontline demonstrator farmers (53.42 per cent) read the news papers regularly while, in case of non demonstrator farmers most of them (47.17 per cent) regularly watching television for gaining information about soybean production technology.

Athawale (2008) found that majority of the Farmer Field School beneficiaries 77.50 per cent were having medium level of mass media exposure.

2.1.9 Extension contact

More *et al.* (2000) revealed that most of the cotton growing KVK trainees 62.86 per cent had medium level of extension contact.

Borkar (2000) showed that majority of bio fertilizer using farmers were having high extension contact with personnel of State Department of Agriculture.

Khandare (2002) observed that near about half of the respondents 47.50 per cent had medium extension contact while 34.17 per cent of the respondent had low level of extension contact followed by 18.33 per cent of the respondents had high extension contact.

Patil (2004) revealed that majority of both trained and untrained farmers (i.e. 66.60 per cent and 65.00 per cent respectively) were having medium extension contact, followed by 5.00 per cent in trained and 20.00 per cent untrained farmers, having high and low level of extension contact respectively.

Athawale (2008) observed that most of the respondents 46.68 per cent were having medium extension contact, followed by 34.16 per cent of respondents having high extension contact and 19.16 per cent of respondents having low extension contact.

Shendage (2010) mentioned that the great majority of the KVK programme beneficiaries 75.83 per cent had medium extension contact followed by low 16.67 per cent and high 7.50 per cent extension contact, respectively.

2.1.10 Cosmopoliteness

Banger (2001) found that the majority of the respondents 56.66 per cent had higher level of cosmopoliteness, whereas 31.34 per cent of them were found to be in the medium level of cosmopoliteness and 12.00 per cent had low level of cosmopoliteness.

Borse (2002) revealed that majority 62.73 per cent of the respondents were found to have medium cosmopoliteness. A very less percentage 20.00 and 17.27 per cent respectively had high and low cosmopoliteness.

Lad (2009) revealed that majority of the respondents 56.67 per cent were having medium cosmopoliteness, whereas 23.33 per cent and 20.00 per cent of the respondent were having low and high cosmopoliteness, respectively.

Sable (2012) revealed that majority 80.01 per cent of the respondents were found to have medium cosmopoliteness. A very less percentage 10.83 and 9.16 per cent respectively had low and high cosmopoliteness.

2.1.11 Scientific orientation

Athawale (2008) revealed that majority of the Farmer Field School beneficiaries 72.50 per cent were having medium scientific orientation, 14.17 per cent of them were having low while, 13.33 per cent having high scientific orientation.

Deokar (2008) pointed out that majority of the cotton FFS beneficiaries 68.33 per cent had middle scientific orientation followed by low 16.67 per cent and only 5.00 per cent of them were from high scientific orientation category. On the other hand majority of the non beneficiaries 70.00 per cent belonged to middle scientific orientation category followed by high category 23.33 per cent and only 6.67 per cent of them were from low scientific orientation category.

Shendage (2010) found that majority of the KVK programme beneficiaries 70.83 per cent were from medium scientific orientation category while, 21.67 per cent and 7.50 per cent of them belonged to low and high scientific orientation category, respectively.

2.1.12 Risk preference

Sawant (2006) indicated that 41.67 per cent of the respondents were having high level of risk preference followed by 36.33 per cent were having medium level of risk preference and 21.67 per cent of respondents had low risk preference.

Athawale (2008) manifested that 80.00 per cent of the respondents had medium risk preference whereas 14.16 per cent of respondents had low risk preference followed by 5.84 per cent of the respondents having high risk preference.

Bondarwad (2009) revealed that majority of respondents 73.33 per cent were having medium risk preference followed by 23.33 per cent of respondents were having low risk preference and 3.33 per cent of the respondents having high level of risk preference.

Katke (2011) found that most of the respondents had medium level of risk preference 39.17 per cent and 30.83 per cent of the respondents had low risk preference followed by 30.00 per cent of the respondents having high risk preference.

Zunjar (2011) indicated that 70.00 per cent of respondents had medium risk preference, whereas, 16.66 per cent of respondents had low risk preference followed by 13.34 per cent of the respondents having high risk preference.

Sable (2012) noticed that 85.83 per cent of respondents had medium risk preference, followed by 8.34 per cent of the respondents were having high risk preference. Whereas, 5.83 per cent of respondents had low risk preference.

2.1.13 Knowledge of farmers regarding cotton technology.

Gogoi *et al.* (2000) reported that the level of knowledge of the trained framers on recommended practices of rice was significantly higher than non-trained farmers.

Sonsale (2000) reported that 68.33 per cent had low category low knowledge and 27.67 per cent had medium level of knowledge and 12.00 per cent had high level of knowledge in non beneficiaries growers, while in beneficiaries had 16.00, 26.67 and 57.33 knowledge low, medium and high respectively.

Bhople (2001) found that majority of respondents 77.33 per cent were having low level of knowledge whereas, 22.00 and 4.67 per cent of the respondents had medium and high level of knowledge, respectively.

Borse (2002) revealed that nearly half 50.91 per cent of the respondents had medium level of knowledge, about 27.27 per cent high level of knowledge about 21.82 per cent respondents had low level knowledge about IPM technology.

Chavai (2004) observed that 56.00 per cent of the respondents had medium level of knowledge, while 12.66 and 31.34 per cent respondents had low and high knowledge level about IPM technology.

Raghunandan (2004) reported that about 17.50 per cent of respondents had the complete knowledge of contour cultivation purpose. Majority of respondents possessed the knowledge of reduces soil erosion and conserves soil moisture (62.50 per cent), followed by reduced cost of cultivation (50.00 per cent) and directly improves soil fertility (26.25 per cent).

Sawant (2006) found that 61.67 per cent of the respondents were possessing medium level of knowledge followed by 25.00 per cent of the respondents possessing high level of knowledge and 13.33 per cent of the respondents possessing low level of knowledge.

Athawale (2008) observed that majority 70.84 per cent of the respondents had possessed medium level of knowledge followed by 17.50 per cent had low and 11.66 per cent had high level of knowledge about cotton production technology.

Nichal (2010) observed that 70.84 per cent majority of respondents had medium level of knowledge. Whereas, 14.16 per cent and 15.00 per cent of respondents had low and high level of knowledge about recommended package of practices of Jasmine

Deshmukh *et al.* (2011) noticed that majority of the respondents 60.00 per cent had medium level of knowledge, whereas, 20.84 and 19.16 per cent of respondents had high and low level of knowledge respectively regarding soybean cultivation practices.

Kumar *et al.* (2011) concluded that 51.25 per cent of farmers had medium of knowledge about improved groundnut cultivation practices. Whereas, 20.41 and 28.34 per cent of farmers had low and high level of knowledge about improved groundnut cultivation practices, respectively.

Sorate (2011) observed that majority of the respondents 96.00 per cent were having high level of knowledge of Grape cultivation while, 4.00 per cent of the respondents were having medium level of knowledge. It is surprisingly to note that none of the respondents were observed in low level of knowledge category.

Zunjar (2011) observed that majority 59.16 per cent of respondents had possessed medium level of knowledge followed by 26.66 per cent had low and 14.18 per cent had high level of knowledge about IPM technology of cotton growers.

2.2 Adoption of cotton production technology attending Farmer Field School.

Chapke (2000) revealed that 85.40 per cent respondents had moderate adoption level about bio control measures and negligible percentage of the respondents had low 6.50 per cent and high 8.04 per cent adoption level about bio control measure, respectively.

Bhople (2001) revealed that majority 81.33 per cent of the respondents had low level of knowledge whereas, 16.67 per cent of the respondents had medium level of knowledge and negligible 3 per cent of the respondents had high level of adoption.

Borse (2002) observed that 52.73 per cent of the respondents belonged to the category having medium level of adoption, 32.73 per cent had low level of adoption and only 14.54 per cent had high level of adoption of IPM technology in hybrid cotton.

Bhagwat (2003) revealed that 53.33 per cent majority of respondents had medium level of knowledge whereas, 26.00 per cent of the respondents had low level of knowledge and 20.66 per cent of the respondents had high level of knowledge.

Deshmukh *et al.* (2003) reported that trainee respondents differed significantly over non trainee respondents in adoption of trained practices.

Chavai (2004) reported that 70.67 per cent of the respondents had adopted different practices of IPM to medium level. The proportion of respondents appearing in both low and high categories was relatively low i.e. 9.33 per cent and 20.00 per cent, respectively.

Patil (2004) revealed that the use of Rhizobium culture was adopted by 43.33 per cent of trained farmers and only 15.00 per cent of untrained farmers were adopting it. The percentage of *Azatobacter* culture using farmers was comparatively more

in both trained and untrained farmers i.e. 56.66 per cent and 26.66 per cent, respectively. In case of phosphate solubelizing bacteria's, the adoption was very meager i.e. only 8.33 per cent of trained and 3.33 per cent of untrained farmers had adopted the practice. Use of composting bio-fertilizers was followed by higher number of trained respondents 28.33 per cent over untrained respondents i.e. 3.33 per cent.

Sawant (2006) revealed that 65.00 per cent of respondents were having medium level of adoption of biological pest control practices in cotton followed by 22.5 per cent of respondents having high level of adoption were as 12.50 per cent of respondents were having low adoption level of biological pest control practices in cotton.

Athawale (2008) revealed that 64.17 per cent of the respondents had medium level of adoption, 20.00 per cent respondents had high level of adoption and 15.83 per cent respondents were from low level of adoption.

Bondarwad (2009) reported that 71.67 per cent of respondents had medium level of adoption. 15.00 per cent respondents were from high level of adoption and 13.33 per cent respondents were from low level of adoption.

Zunjar (2011) reported that 70.83 per cent of respondents had medium level of adoption followed by 16.66 per cent respondents were from low level of adoption and 12.51 per respondents were from high level of adoption.

2.3 Relationship between profile of farmers with adoption of cotton production technology among farmers of Farmer Field School.

2.3.1 Age and adoption

Borkar (2000) stated that age was found to be non-significant in relation with adoption of bio fertilizers by farmers.

Kadam (2000) stated that age of the respondents was having non-significant relation with age of respondents about improved soybean technology by the farmers.

Sonsale (2000) observed that age of the respondents was non-significant with age of respondents about IPM technology by cotton growers.

Bhagwat (2003) found that age of the respondents had non-significant relationship with the adoption of cotton cultivation technologies.

Athawale (2008) stated that age of the respondent had negative but non-significant relationship with impact of cotton farmer field school on adoption of cotton technology among trained farmers.

2.3.2 Education and adoption

Kadam (2000) indicated positive and significant relationship of education with the adoption of improved soybean technology.

Sonsale (2000) reported that education had positive and significant relationship with adoption of cotton cultivation technologies.

Sawant (2006) pointed out education and adoption level had positive and significant relationship of biological pest control in cotton.

Athawale (2008) noted that education and adoption level possessing positive and significant relationship.

Bondarwad (2009) concluded that significant and positive relationship between education and knowledge level.

Zunjar (2011) reported that education had positive but non-significant relationship with adoption of cotton growers regarding IPM technology in cotton.

2.3.3 Land holding and adoption

Borkar (2000) found that land holding was having positive and significant relationship with adoption behavior of farmers about bio fertilizers.

Jondhale (2000) found significant and positive relationship of land holding and adoption of improved technologies in groundnut amongst trained and untrained farmers.

Sonsale (2000) informed that land holding had positively related for beneficiaries and non-significant for non beneficiaries with adoption level.

Borse (2002) revealed that land holding significantly related with adoption level.

Chavai (2004) observed that land holding positive and significantly related with adoption level of IPM technology in cotton growers.

Athawale (2008) informed that land holding and adoption level positive but non-significantly related.

2.3.4 Annual income and adoption

Sonsale (2000) showed that annual income and adoption had positive and significant relationship.

Borse (2002) revealed that annual gross income possessed positive and significantly relationship with adoption of IPM technology in hybrid cotton.

Shrivastava and Lakhera (2003) depicted that before attaining training only 33.33 per cent of the trainees were found in medium adoption category, which was significantly increase to the 61.67 per cent after attaining the training programme on mushroom production technology.

Chavai (2004) observed that annual income and adoption had positive and significant relationship.

Sawant (2006) pointed out significantly and positive relationship between annual income and adoption of biological pest control.

2.3.5 Type of family and adoption

Singh and Bhagwat (2004) observed that family type had negatively significant relationship with adoption of sesame production technology.

Chandranna *et al* (2008) observed that family type had significant relationship with adoption of IPM practice for red headed caterpillar in groundnut.

Tamboli (2012) observed that positive and highly significant relationship between the family type and level of adoption of soil and water conservation practices by farmers.

2.3.6 Size of family and adoption

Sujata (1994) reported that family size had negative co-relationship with adoption of IPM practices by respondents.

Sonsale (2000) reported that family size had significant relationship but in negative direction in cotton with adoption of IPM technology.

Dhapke (2004) found that family size had positive and significant relationship with adoption of soil and water conservation practices.

Sawant (2006) reported that family size had positive and significant relationship with adoption of biological pest control in cotton by the respondents.

2.3.7 Socio-economic status and adoption

Borkar (2000) found that socio-economic status of farmer showing positive and significant relationship with adoption behavior of biofertilizers.

Jadhav (2000) reported that there was positive and significant relationship between socio-economic status of respondents and adoption of vermicompost technology.

Kadam (2000) concluded that socio-economic status of the respondents was positively and significantly related with adoption.

Bhagwat (2003) reported that socio-economic status had positive and significant relationship with adoption of cotton cultivation technology.

Sawant (2006) found that socio-economic status had positive and significant relationship with adoption of biological pest control in cotton by the respondents.

Athawale (2008) observed that socio-economic status had positive and significant relationship with adoption of cotton production technology.

Bondarwad (2009) observed that socio-economic status had positive and significant relationship with adoption of Bt. cotton technology by the respondents.

2.3.8 Mass media exposure and adoption

Athawale (2008) observed that positive and highly significant relationship between mass media exposure and extent of adoption of cotton production technology among farmers of FFS.

2.3.9 Extension contact and adoption

Chothe (1999) reported that there was significant relationship between extension contact of farmers with their adoption of bio fertilizers.

Sonsale (2000) concluded that extension contact and adoption had positive and significant relationship.

Athawale (2008) reported that impact of FFS on adoption level of cotton technology among trained farmers with extension contact had significant and positive relationship.

Bedre (2009) observed that extension contact had positive and significant relationship with adoption of recommended cultivation practices of okra by okra growers.

Sasane (2010) observed that extension contact had positive and significant relationship with adoption of respondents about recommended production technology of cauliflower.

2.3.10 Cosmopoliteness and adoption

Padmavati *et al.* (1998) reveled that cosmopoliteness of the respondents showed non- significant relationship with adoption.

2.3.11 Scientific orientation and adoption

Deshmukh (2005) observed that the scientific orientation of frontline demonstrator and non-demonstrator farmers do not establish any relationship with the adoption of demonstrated soybean production technology.

Athawale (2008) found that the scientific orientation of farmer field school beneficiaries was significantly associated with the adoption of cotton production technology.

Deokar (2008) revealed that there was no relationship between the scientific orientation of FFS beneficiary farmers and their adoption of cotton cultivation practices through FFS.

Shendage (2010) pointed out that there was no relationship between the scientific orientation of KVK programme beneficiaries and their adoption about crop production technology.

2.3.12 Risk preference and adoption

Sonsale (2000) reported that risk preference had positively and significant relationship with the adoption of IPM technology in cotton.

Borse (2002) reported that risk preference and adoption of IPM technology of cotton grower had positive and significant relationship.

Bhagwat (2003) reported that risk preference had positively and significant relationship with adoption of cotton cultivation technologies.

Chavai (2004) reported that risk preference and adoption had positive and significant relationship.

Sawant (2006) found that risk preference had positive and significant relationship with adoption of biological pest control in cotton by the respondents.

Athawale (2008) noted that risk preference among the cotton technology trained farmers had positive and significant relationship.

2.3.13 Knowledge and adoption

Mane (2001) reported that knowledge of respondents was positively and significantly related with adoption of recommended practices of Bengal gram cultivation.

Mane (2001) reported that knowledge of respondents was positively and significantly related with adoption of recommended practices of Green gram cultivation.

Deshmukh (2006) observed that knowledge of respondents was positively and significantly related with adoption.

Dandnaik (2009) observed that knowledge of respondent is positively and significantly associated with the adoption of recommended package of practices of pigeon pea.

Godale (2013) noticed that knowledge of the respondents had positive and significant relationship with adoption.

2.4 Constraints faced by farmers in adoption of cotton production technology

Chothe (2000) reported that lack of knowledge about biofertilizers was major constraint encountered by 61.33 percent of respondents, low income was constraints express by one fourth respondents, 42.00 per cent of the respondents stated that due to lack of demonstration facility stated that due to non-availability of extension literature like agricultural magazine was one of the constraints for adoption of biofertilizers.

Bhople *et al.* (2001) observed that lack of knowledge about HaNPV (46.00 per cent), *Bacilus subsilis* (97.33 per cent), Trichocards (64.00 per cent) and Chrysopa (91.33 per cent) was the major constraints to the farmer in adoption of bio-pest control practices. The other constraints were high cost of bio-agents and bio-control practices (40.00 per cent), non-availability and inadequate supply of bio-agents (20.00 per cent).

Kumar *et al.* (2001) constraints related to inputs reported that 92.50 per cent respondents was found high price of weedicides, fungicides, pesticides and fertilizers. Inadequate credit facilities for purchase input (90.00 per cent). Adulteration of pesticides, weedicides, fungicides and seeds (83.75 per cent) constraints related to technical guidance for seed treatment (58.75 per cent), lack of knowledge of current advance in cotton production technology (81.25 per cent).

Borse (2002) revealed that 50.00 per cent of the cotton grower faced moderate level of constraints while, 27.27 per cent had high level and 22.73 per cent had faced low level of low level of constraints in adoption of IPM technology.

Girase (2004) reported that among the constraints in adoption of recommended high yielding varieties, the most important constraint expressed by 94 per cent cotton growers had inadequate irrigation facilities while 53.33 per cent cotton growers reported high cost of inputs. About 91.33 per cent cotton growers had given the reason of low price of farm produce, whereas, 47.33 per cent had expressed non-availability of advance technical information in time and only 21.00 per cent reported constraints of non-availability and inadequate supply of bio agent.

Athawale (2008) reported that 90 per cent respondents expressed lack of money for purchase of seed at proper time and 85.00 per cent of respondents had expressed problems of non-availability of good quality seed at proper time and meager (1.66 per cent) of the respondents had problem of non-availability of vermicompost.

Zunjar (2011) revealed that in crop rotation 16.66 per cent respondents had lack of knowledge and 18.33 per cent had non-availability of irrigation water. For inter cropping 20.83 per cent respondents had lack of knowledge.

METHODOLOGY

Chapter III

METHODOLOGY

This chapter deal with the description of procedure followed for carrying out the investigation. It contains the tool and techniques employed for data collection. The sampling procedure adopted as well as devices used for analysis of data are also explained.

This chapter also incorporates the explication process for measurement of dependent and independent variables under study. The methodology adopted for achieving the objective is described in this chapter under the following heads.

3.1 Locale of study

3.2 Research design

3.3 Selection of villages and respondents

3.4 Tools used in data collection

3.5 The variable and their measurement

3.6 Statistical tests used

3.1 Locale of study

The present study was conducted in Jalna district of Marathwada region of Maharashtra State. The Marathwada region comprises of eight districts. The geographical area of the region is 64.52 thousand sq. kms. The general climate is dry except during southwest monsoon season. Rainy season starts from June and lasts up to the end of September. The average rainfall of the region is 827 mm. The temperature ranges between 9.2^{0}C (min.) to 46.5^{0}C (max.).

3.1.1 Physiography

The geographical area of the district is 7788 sq. kms. Jalna district, which is one of the district of Marathwada Region, lies between 19^{0}01' to 21^{0}03' North latitude and 75^{0}04' to 76^{0}04' East longitude. According to 2011 census population of Jalna district is of 19.59 lacks. The majority of the people are dependent on Agriculture. It is one of the eighth district of Marathwada region and lies in Godavari basin. There are 971 villages in district.

3.1.2 Soil

The soils of Jalna district is black cotton soil. The soil varies both in textures and depth.

3.1.3 Climate and Rainfall

The climate of the district can be divided into three seasons as

a) Moderately warm wet season during June to September

b) Cool dry season from October to February and

c) Hot dry season from March to May.

The average temperature of the district is ranging from 20^0C during winter to 41^0C during summer. It receives rainfall mostly from South-West monsoon. Rainfall is not uniform in all parts of the district. The average rainfall ranges between 600 mm to 700 mm.

3.1.4 Cropping pattern

The cropping pattern followed in this area consists of predominant such as jawar, cotton, arhar, soyabean, green gram, black gram and groundnut in kharif season and wheat, rabi jawar, gram and sunflower in rabi season. In summer, sunflower and groundnut are the main crops where irrigation water is available. The Horticulture crops like citrus, pomegranate and vegetable are also cultivated in some part of district.

3.1.5 Cultural activities

The Hindus observe a variety of fasts, feasts and festivals throughout the year. The most important festivals common to all castes and sects in this district are Hanuman Jayanti, Ram Navami, Gudi Padva, Rakhi Pornima, Pola, Ganesh Chaturthi, Holi, Diwali etc.

Amongst Buddhas, Jayanties of Gautam Buddha and Dr. Babasaheb Ambedkar are celebrated, Muslim different Ids are celebrated which includes Ramzan Id, Bakri Id, Moharum and amongst Christen, Christmas and Good Friday are celebrated.

3.2 Research Design

The Ex-post facto social research design was used in the present study.

3.3 Selection of villages and respondents

Present study was conducted in Jalna district because cotton is one of the important cash crops in Jalna district. The district consists of eight talukas namely Jalna, Badnapur, Ambad, Ghansavangi, Partur, Mantha, Bhokardan and Jafrabad. Out of these Jalna, Badnapur and Bhokardan talukas were selected randomly. Out of them four villages were selected randomly from each talukas. A list of respondents obtained from the Superintendent of Agriculture Office, Jalna. From each village ten respondents were selected randomly by n^{th} method of random sampling. In this way 120 respondents were selected randomly from three talukas of Jalna district for the study.

Table1 Village wise selection of the respondents

District	Talukas	Villages	Respondents
Jalna	Jalna	Londhewadi	10
		Solgavan	10
		Golapangari	10
		Ner	10
	Badnapur	Dhoksal	10
		Dev Pimpalgaon	10
		Hiwra (Rala)	10
		Matrewadi	10
	Bhokardan	Umarkhed	10
		Bhivpur	10
		Tandulwadi	10
		Talni	10
Total			120

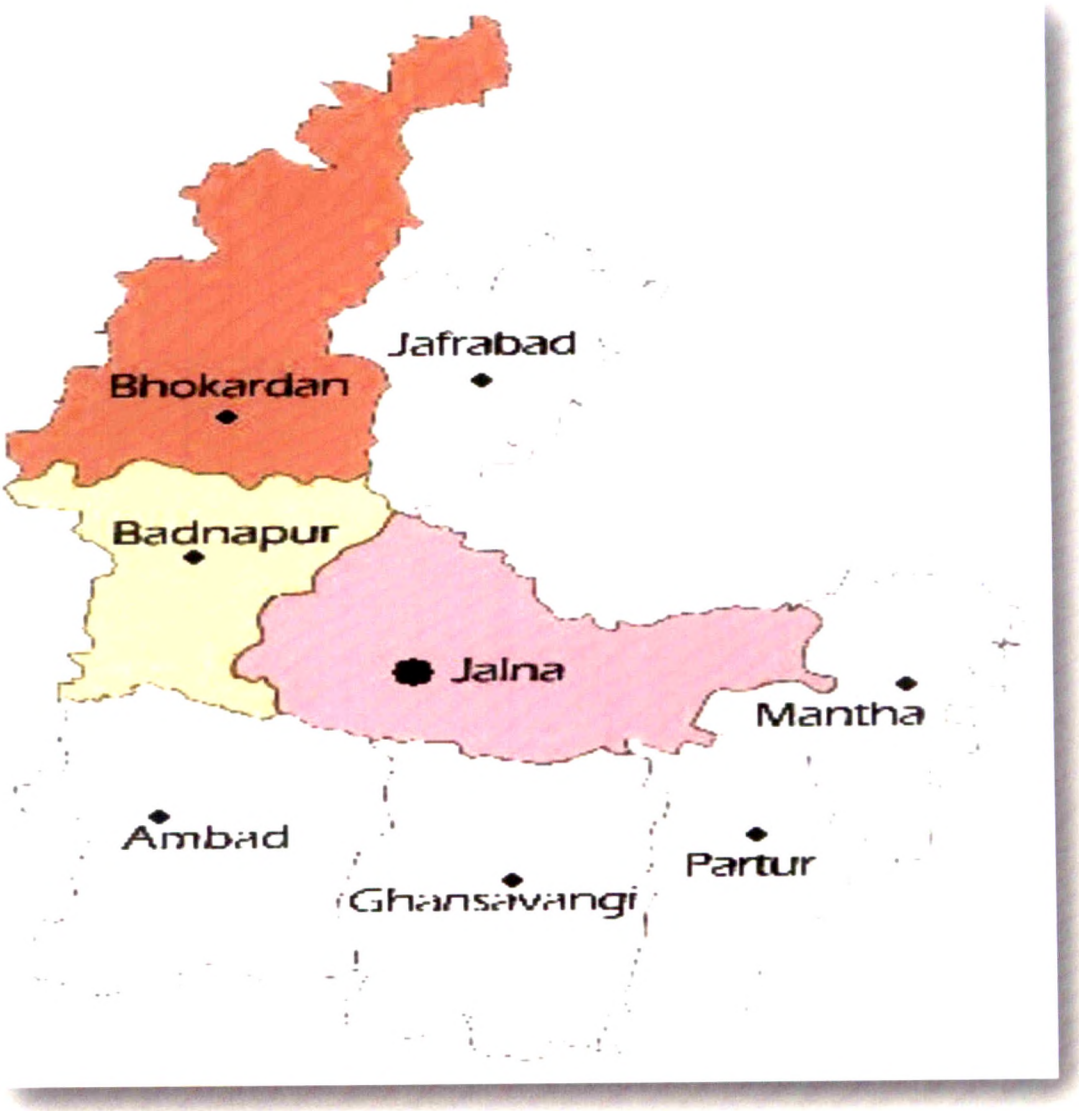


Fig 1: Map of Jalna district

3.4 Tools used in data collection

3.4.1 Methods of data collection

The data was collected through personal interview method with the help of pre-tested structured schedule consisting of various items concern with the objective of study. The farmer was contacted personally at their home when they have leisure time.

3.4.2 Preparation of interview schedule

Keeping in the view of the objective of study a structured interview schedule was prepared. The interview schedule constituted the information about independent variable namely age, education, size of land holding, annual income, type of family, size of family, socio-economic status, mass media exposure, extension contact, cosmopoliteness, scientific orientation, risk preference and knowledge. Along with the information about dependent variable namely adoption of cotton production technology among FFS. The constraints faced by the respondents were also identify.

3.4.3 Tabulation and analysis of data

The data was carefully examined before tabulation. All the entries in the schedule were checked for its accuracy and completeness. The data was tabulated and subjected to statistical analysis and interpretation.

3.5 The variable and their measurement

The measurement of independent and dependent variable is given below

Table 2 Variables and their empirical measurements

Sr. No.	Variables	Empirical measurements
A	**Independent variables**	
1	Age	Chronological age of respondents in completed years at the time of interview.
2	Education	Formal education obtained by respondent at the time of interview.
3	Size of land holding	Number of hectares of land possessed by respondent.
4	Annual income	Total earned income in rupees from all the sources by members of family.
5	Type of family	Whether the respondent belongs to nuclear family or joint family.
6	Size of family	The total number of members in the family.
7	Socio-economic status	It was measured by using the scale developed by Venketrammya (1983).
8	Mass media exposure	Structured schedule developed for the study.
9	Extension contact	Structured schedule developed for the study.
10	Cosmopoliteness	Measured with the help of teacher made schedule and scoring pattern.
11	Scientific orientation	It was measured with the help of scale developed by Supe (1969).
12	Risk preference	It was measured with the help of scale developed by Supe and Singh (1969).
13	Knowledge	Teachers made test was used.
B	**Dependent Variables**	
1	Adoption	Adoption index was calculated.

3.5.1 The measurement of independent variable

3.5.1.1 Age

It is operationally defined as the chronological age of the respondents in completed years at the time of interview. Score of one was assigned to each year of age for analysis.

The respondents were categorized on the basis of Mean ± S.D. as below.

n=120

Sr. No.	Categories	Age (years)
1.	Young	Up to 28 years
2.	Middle	Between 29 to 50 years
3.	Old	51 years and above

Mean = 39.58 **S.D. = 11.69**

3.5.1.2 Education

Education is operationally defined as the formal schooling undergone by the respondents. It refers to the formal education of respondents. The following score was given to each category.

n=120

Sr. No.	Category	Score
1.	Illiterate	0
2.	Can read and write only	1
3.	Primary school (1st to 4th Std.)	2
4.	Middle school (5th to 10th Std.)	3
5.	High school (11th to 12th Std.)	4
6.	College level (Above 12th Std.)	5

3.5.1.3 Size of land holding

In the present study the land holding was defined as the number of hectares of land possessed by the respondents. The following categories were formed

with respect to size of holding of respondents for analysis. Thus, the respondents were divided into four categories as per the classification given by Maharashtra government.

n=120

Sr. No.	Categories	Land holding
1.	Marginal farmers	Up to 1.00 ha
2.	Small farmers	1.01 ha to 2.00 ha
3.	Semi medium farmers	2.01 ha to 4.00 ha
4.	Medium farmers	4.01 ha to 10.00 ha
5.	Large farmers	10.1 ha and above

3.5.1.4 Annual income

It refers to the total earnings of respondent's family from all sources in the year. The respondents were categorized on the basis of Mean ± S.D. as below.

n=120

Sr. No.	Category	Annual income (Rs.)
1	Low	Up to 18441
2	Medium	Between 18442 to 645941
3	High	645942 and Above

Mean = 332191.7 **S.D. = 313750.5**

3.5.1.5 Type of family

Type of family referred as, whether the respondents belongs to nuclear family or joint family. It was measured by using one score for nuclear and two score for joint family. The respondents were categorized as under.

n=120

Sr. No.	Category	Score
1	Nuclear family	1
2	Joint family	2

3.5.1.6 Size of family

The size of family refers to the total number of members in the family. On the basis of number of members in the family, size of family was measured as follows.

n=120

Sr. No.	Category	Score
1.	Low (1-5 members)	1
2.	Medium (6-9 members)	2
3.	High (10 and above members)	3

3.5.1.7 Socio-economic status

Socio-economic status was measured on the basis of scoring system followed by Venketrammya (1983) in his socio-economic status scale.

n=120

Sr. No.	Categories	Score
1.	Upper Socio-economic status	30-40
2.	Upper middle Socio-economic status	26-29
3.	Middle Socio-economic status	19-25
4.	Lower middle Socio-economic status	12-18
5.	Low Socio-economic status	03-11

3.5.1.8 Mass media exposure

It was measured on the basis of the frequency of exposure to the mass media. The scores were assigned as under

	Categories	Score
1.	Never	1
2.	Sometimes	2
3.	Always	3

The total score obtained by the respondents was calculated and they were grouped into three categories as under by using Mean ± S.D.

n=120

Sr. No.	Categories	Score
1.	Low	Up to 13
2.	Medium	Between 14 to 17
3.	High	18 and above

Mean = 15.57 **S.D. = 2.31**

3.5.1.9 Extension contact

Extension contact was operationalised as the number of times a respondent meet and talked with various extension agencies and the respondents were asked to check each of agency they meet during the last six months and score were assigned as under.

Sr. No.	Categories	Score
1.	Never	1
2.	Once in a month	2
3.	Once in a fortnight	3
4.	Once in a week	4
5.	Daily	5

The total score obtained by the respondent was calculated and they were grouped into three categories using Mean ± S.D.

n=120

Sr. No.	Categories	Score
1.	Low	Up to 17
2.	Medium	Between 18 to 22
3.	High	23 and above

Mean = 20.09 **S.D. = 3.34**

3.5.1.10 Cosmopoliteness

It referred to the degree of contact of respondents with the outside social systems. In this study, visits of respondents to the places such as talukas and district head quarters, agricultural exhibition, agricultural research stations, progressive farmer's field were considered. Score two, one and zero were assigned respectively to the respondent who had frequent, seldom and no visits to the places. The total score was calculated for each respondent and then the respondents were grouped into three categories by using Mean $\pm$ S.D. The categories thus formed were as below.

n=120

Sr. No.	Categories	Score
1.	Low	Up to 6
2.	Medium	Between 7 to 9
3.	High	10 and above

Mean =7.90 **S.D. = 2.01**

3.5.1.11 Scientific orientation

In the present study, the scientific orientation is operationally defined as the degree to which a respondent is oriented to use scientific methods in farming and decision making. It was measured by developed scale of Supe (1969). The scale was consist of six items, of which item number one and five were negative and rest were positive. These items were rated in five points response categories raising from strongly agree to strongly disagree. The scoring procedure was as follows.

	Response				
Score	**Strongly agree**	**Agree**	**Neutral**	**Disagree**	**Strongly disagree**
Positive item	5	4	3	2	1
Negative item	1	2	3	4	5

The final score was calculated by simple addition of all the score, the respondents were categorized as followed by keeping Mean ±S.D.

n=120

Sr. No.	Categories	Score
1.	Low	Up to 15
2.	Medium	Between 16 to 21
3.	High	22 and above

Mean = 18.34 **S.D. = 3.47**

3.5.1.12 Risk preference

In the present study, the risk preference was operationalised as the degree to which a farmer is oriented towards risk and uncertainly and has courage to face the problem in day to day farming life. It was measured by the scale developed by Supe and Singh (1969). This scale consisted of six items, of which item number one and five were negative and rest was positive. These items were rated in five points response categories raising in five points response categories raising from strongly agree to strongly disagree. The scoring procedure was as follows.

	Response				
Score	**Strongly agree**	**Agree**	**Neutral**	**Disagree**	**Strongly disagree**
Positive item	5	4	3	2	1
Negative item	1	2	3	4	5

The final score was calculated by simple addition of all the score, the respondents were categorized as followed by keeping Mean ± S.D.

n=120

Sr. No.	Categories	Score
1.	Low	Up to 12
2.	Medium	Between 13 to 18
3.	High	19 and above

Mean = 15.58 **S.D. = 3.78**

3.5.1.13 Knowledge

English and English (1961) defined knowledge as a body of understood information possessed by an individual.

They further emphasized that knowledge is the part of person information, which is in accordance with an established fact. An individual gains or increases his knowledge through communication.

For the purpose of this study, it was defined as an awareness of farmers field school of cotton production technology.

There were 24 items included in knowledge test. If the respondents answered the question correctly, one score was given. If the respondent did not answer the question correctly zero score was given.

The total score, scored by each respondent was worked out. The respondents were categorized into following three group by using Mean ± S.D.

n=120

Sr. No.	Categories	Score
1.	Low	Up to 17
2.	Medium	Between 18 to 21
3.	High	22 and above

Mean = 19.30 **S.D. = 2.63**

3.5.2 Measurement of dependent variable

3.5.2.1 Adoption

Adoption is mental process which an individual passes from fixed hearing about an innovation to final adoption. It is operationalized as the degree of the use recommended practices.

To measure three categories of adoption recommended important practices were listed and responses for the adoption of each practice were listed and responses for the adoption of each practice were obtained into three point continuum as under.

Sr. No.	Categories	Score
1.	Full adoption	2
2.	Partial adoption	1
3.	No adoption	0

The categorization of adoption of cotton production technology among FFS was done, on the basis of Mean ± S.D.

n=120

Sr. No.	Categories	Score
1.	Low	Up to 21
2.	Medium	Between 22 to 28
3.	High	29 and above

Mean = 25.28 **S.D. = 3.80**

3.6 Constraints of farmers in adoption of cotton production technology among FFS

The constraint faced by the farmers in adoption of cotton production technology among FFS was assessed through a structured schedule. The respondents were asked to indicate the constraints which they were facing.

3.7 Statistical test used for analysis of data

3.7.1 Frequency and percentage

Frequency and percentage were used for making simple comparisons. The frequency of the particular category was multiplied by hundred and divided by total number of respondents in the particular category to get percentage.

3.7.2 Mean

Mean of sample was calculated by summing all the individual score and dividing it by number of cases. The formula is

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

Where,

$\overline{X}$ = Arithmetic mean.

$\sum X$ = Sum of respondent's score.

N = Total No. of Respondents.

3.7.3 Standard deviation

Standard deviation is calculated by taking the difference of each item in the series from the arithmetic mean(X), squaring these differences (X^2), summing all the square differences ($\sum X^2$) and dividing by the number of items (N) and lastly calculating the square root of product by using the following formula.

The formula is,

$$S.D. = \sqrt{\frac{\sum X^2}{N}}$$

Where,

S.D. = Standard deviation.

$\sum X^2$ = Sum of square of the deviation from the mean.

N = Total No. of Respondents.

3.7.4 Correlation coefficient

To find out the relation between the selected independent and dependent variables "Karl Pearson's coefficient of correlation" 'r' was worked out by using the following formula.

$$r = \frac{\Sigma XY - (\Sigma X \Sigma Y)/N}{\sqrt{[\Sigma X^2 - \frac{(\Sigma X)^2}{N}][\Sigma Y^2 - \frac{(\Sigma Y)^2}{N}]}}$$

Where,

r = Coefficient of correlation

N = Number of observations

X = Value of independent variables

Y = Value of dependent variables

RESULTS

Chapter IV

RESULTS

Present investigation entitled "Adoption of cotton production technology among farmers of Farmer Field School" was undertaken.

The data collected for study have been analyzed and results are presented under following major heads.

4.1 Profile of farmers.

4.2 Adoption of cotton production technology.

4.3 Relationship between profile of farmers with adoption of cotton production technology by farmers of Farmer Field School.

4.4 Constraints faced by farmers in adoption of cotton production technology.

4.1 Profile of farmers

4.1.1 Age

Table 3: Distribution of respondents according to their age

n=120

Sr. No.	Categories	Frequency	Percentage
1.	Young (Up to 28 years)	22	18.33
2.	Middle (29 to 50 years)	80	66.67
3.	Old (51 years and above)	18	15.00
	Total	120	100.00

It is revealed from Table 3 that about 66.67 per cent of respondents was from middle age group (29 to 50 years). There were 18.33 per cent of the respondents from young age group (Up to 28 years). As much as 15.00 per cent of the respondents were from old age group (51 years and above).

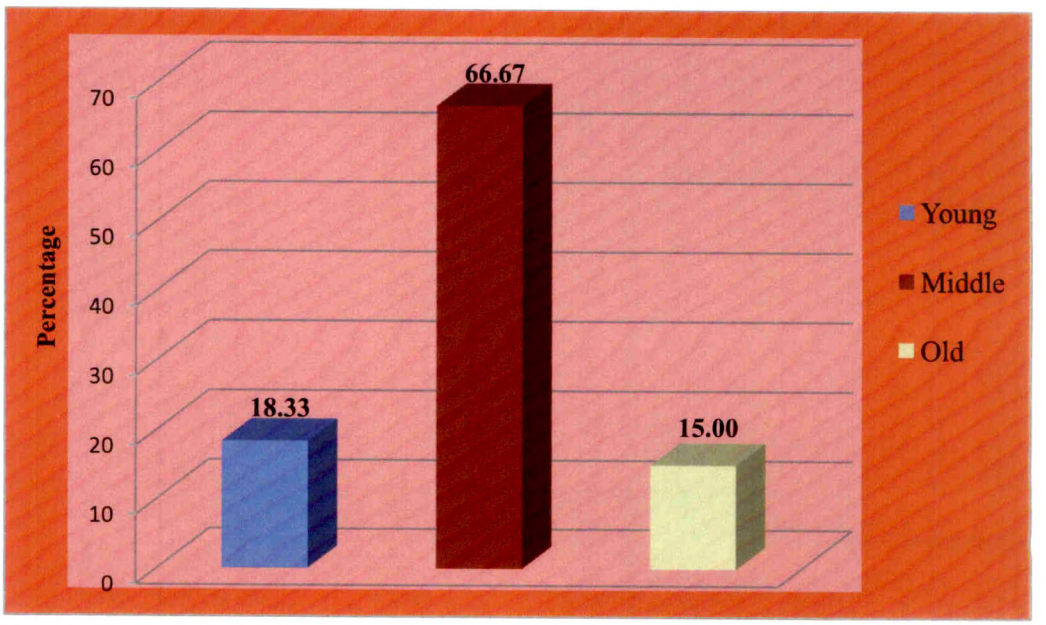


Fig 2: Distribution of respondents according to their age

4.1.2 Education

Table 4 Distribution of respondents according to their education

n=120

Sr. No.	Category	Frequency	Percentage
1.	Illiterate	0	0
2.	Can read and write only	20	16.67
3.	Primary school	24	20.00
4.	Middle school	45	37.50
5.	High school	24	20.00
6.	College level	07	5.83
	Total	120	100.00

With regard to educational qualification it is evident from Table 4 that 37.50 per cent of the respondents were educated up to middle school level (5^{th} to 10^{th} Std.), 20.00 per cent of respondents were educated up to primary school level (1^{st} to 4^{th} Std.), 20.00 per cent of the respondents were educated up to high school level (11^{th} to 12^{th} Std.), 16.67 per cent of respondents were literate (can read and write only), 5.83 per cent of respondents were educated up to college level. While zero per cent of the respondents were illiterate.

4.1.3 Size of land holding

Table 5 Distribution of respondents according to their land holding

n=120

Sr. No.	Categories	Frequency	Percentage
1.	Marginal farmers (Up to 1.00 ha)	16	13.33
2.	Small farmers (1.01 ha to 2.00 ha)	23	19.17
3.	Semi medium farmers (2.01 ha to 4.00 ha)	58	48.34
4.	Medium farmers (4.01 ha to 10.00 ha)	19	15.83
4.	Large farmers (10.01 ha and above)	04	3.33
	Total	120	100.00

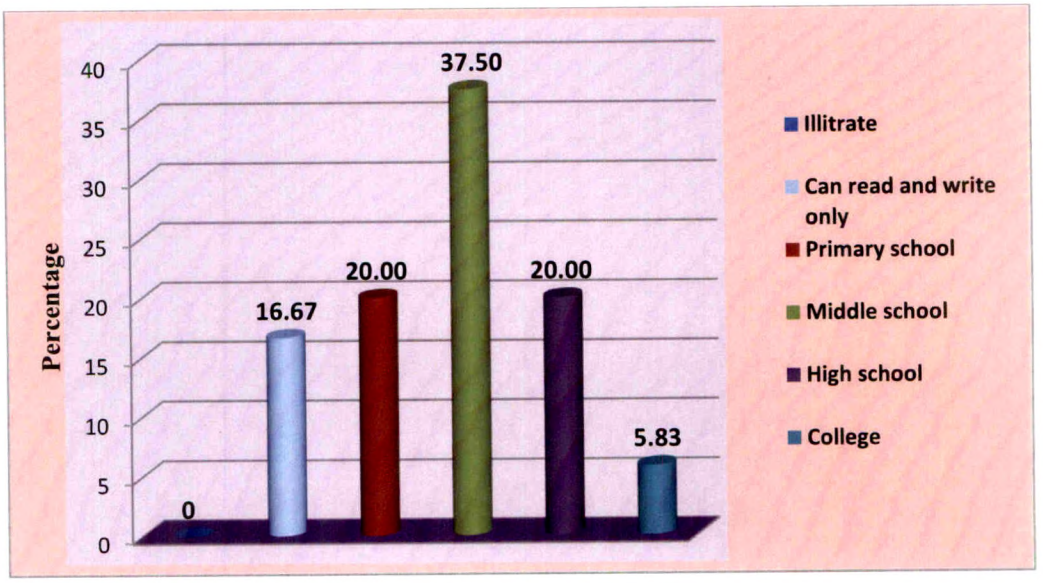


Fig 3: Distribution of respondents according to their education

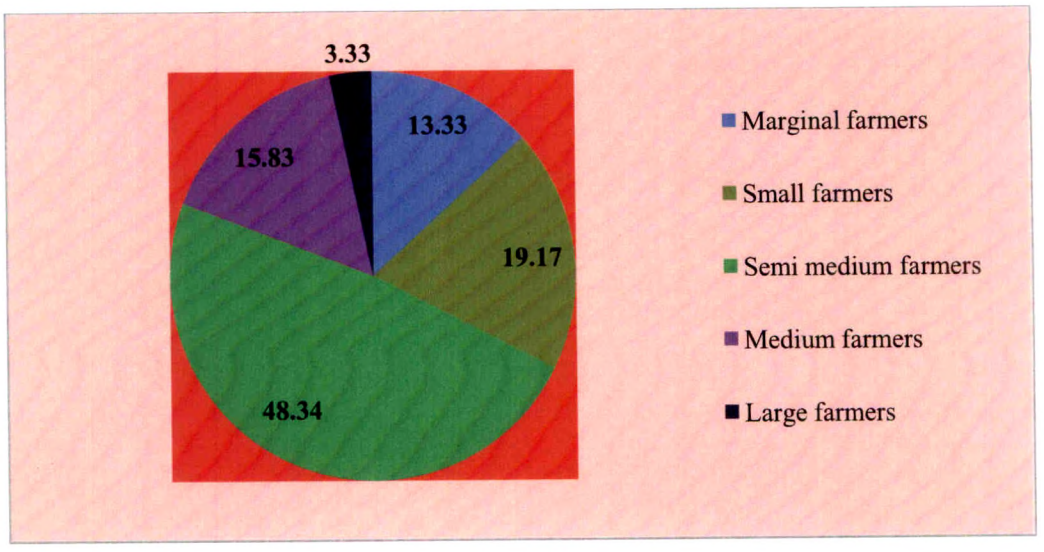


Fig 4: Distribution of respondents according to their land holding

As regard size of land holding of the respondents, it is observed from Table 5 that 48.34 per cent of respondents were semi medium farmers (2.01 ha to 4.00 ha), 19.17 per cent of respondents were small farmers (1.01 ha to 2.00 ha), 15.83 per cent of respondents were medium farmers (4.01 ha to 10.00 ha), 13.33 per cent of the respondents were marginal farmers (Up to 1.00 ha). While 3.33 per cent of respondents were large farmers (10.01 ha and above).

4.1.4 Annual income

Table 6 Distribution of respondents according to their annual income

n=120

Sr. No.	Category	Frequency	Percentage
1	Low (Up to 18441)	0	0.00
2	Medium (Between 18442 to 645941)	111	92.50
3	High (645942 and above)	09	7.50
	Total	120	100.00

It is visible from Table 6 that 92.50 per cent of the respondents had medium level of annual income i.e. Rs. 18442 to 645941, while 7.50 per cent of respondents had high level of annual income i.e. above Rs. 645942 and zero per cent of respondents had low annual income.

4.1.5 Type of family

Table 7 Distribution of respondents according to their family type

n=120

Sr. No.	Category	Frequency	Percentage
1.	Nuclear family	27	22.50
2.	Joint family	93	77.50
	Total	120	100.00

As regards family type of the respondents, it is observed from Table 7 indicates that a most of the respondents (77.50 per cent) were having joint family, while 22.50 per cent of the respondents were nuclear family.

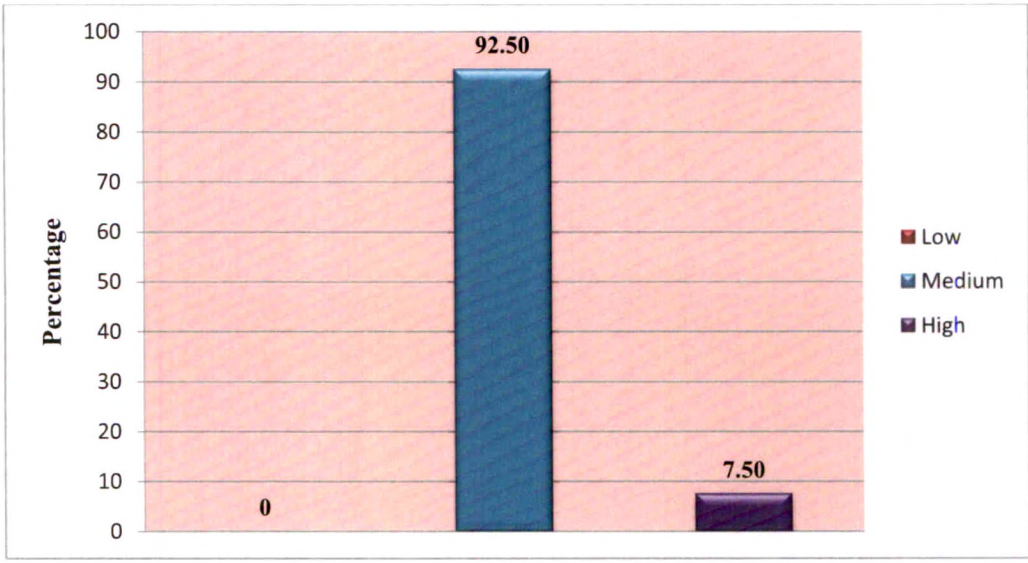


Fig 5: Distribution of respondents according to their annual income

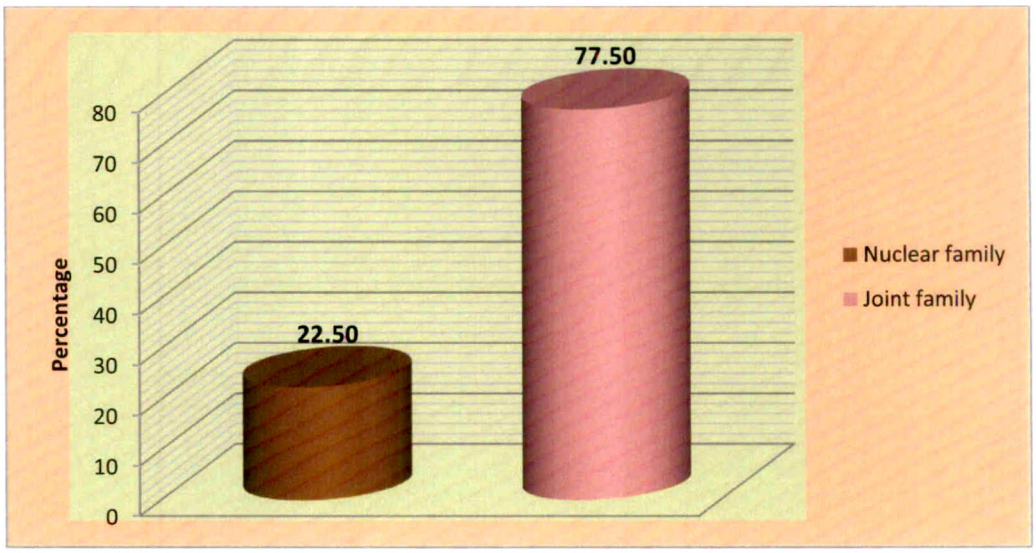


Fig 6: Distribution of respondents according to their family type

4.1.6 Size of family

Table 8 Distribution of respondents according to their size of family

n=120

Sr. No.	Category	Frequency	Percentage
1.	Low (1-5 members)	47	39.17
2.	Medium (6-9 members)	56	46.66
3.	High (10 and above members)	17	14.17
	Total	120	100.00

From the Table 8 it is evident that 46.66 per cent of respondents had medium family size whereas, 39.17 per cent of respondents had low family size and 14.17 per cent of respondents had high family size.

4.1.7 Socio-economic status

Table 9 Distribution of respondents according to their socio-economic status

n=120

Sr. No.	Category	Frequency	Percentage
1.	Upper socio-economic status	04	3.33
2.	Upper middle socio-economic status	06	5.00
3.	Middle socio-economic status	55	45.83
4.	Lower middle socio-economic status	46	38.34
5.	Lower socio-economic status	09	7.50
	Total	120	100.00

From the Table 9 it is evident that 45.83 per cent of respondents had middle socio-economic status, followed by 38.34 per cent of respondents in lower middle socio-economic status. The data shows that 7.50 per cent of respondents were having lower socio-economic status, 5.00 per cent of respondents were having upper middle socio-economic status and 3.33 per cent of respondents were having upper socio-economic status.

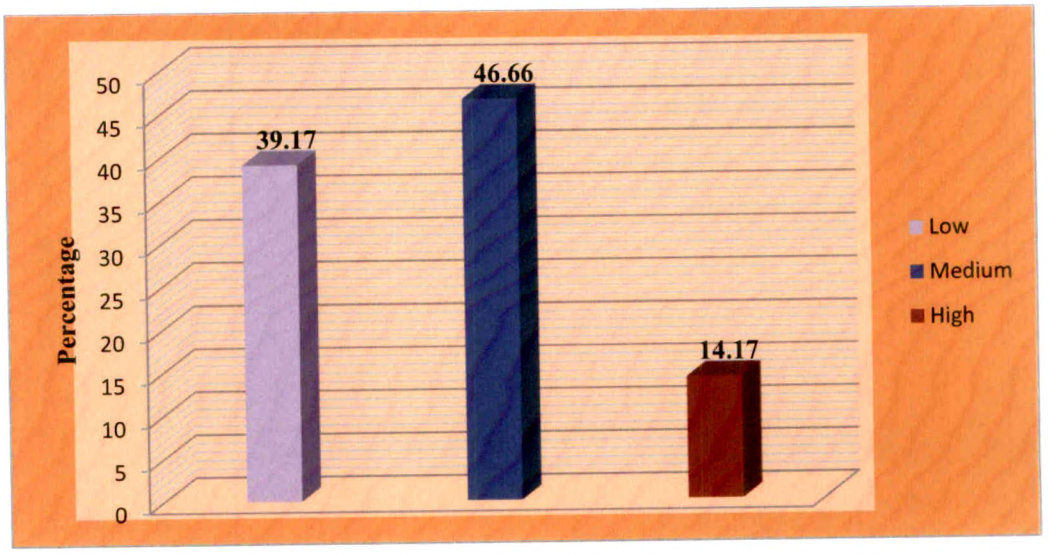


Fig 7: Distribution of respondents according to their size of family

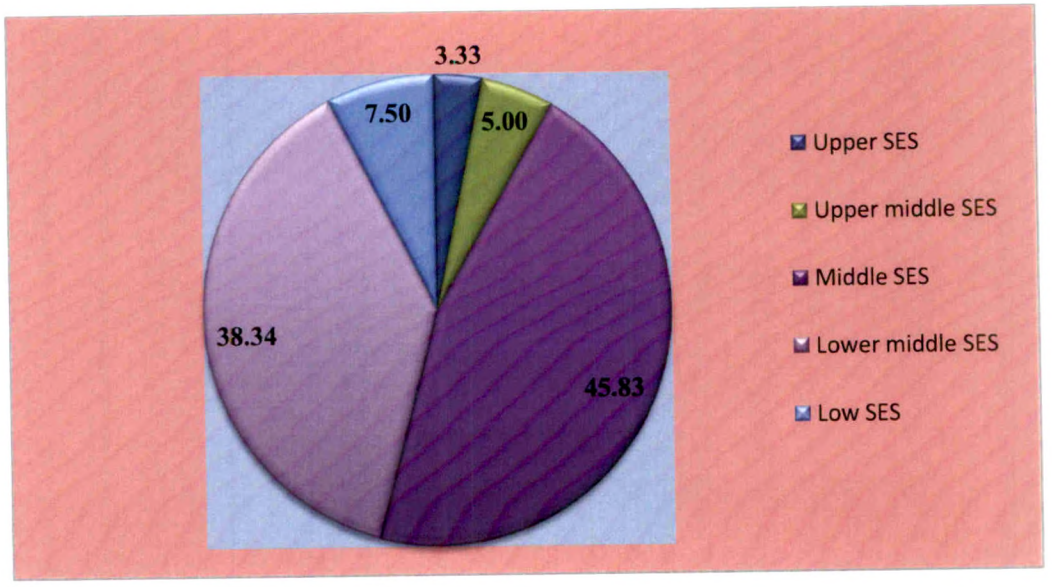


Fig 8: Distribution of respondents according to their socio-economic status

4.1.8 Mass media exposure

Table 10 Distribution of respondents according to their mass media exposure

n=120

Sr. No.	Categories	Frequency	Percentage
1.	Low (Up to 13)	29	24.17
2.	Medium (Between 14 to 17)	65	54.16
3.	High (18 and above)	26	21.67
	Total	120	100.00

From the Table 10 it is evident that 54.16 per cent of respondents had medium mass media exposure, whereas, 24.17 per cent of respondents had low mass media exposure and 21.67 per cent of respondents had high mass media exposure.

4.1.9 Extension contact

Table 11 Distribution of respondents according to their extension contact

n=120

Sr. No.	Categories	Frequency	Percentage
1.	Low (Up to 17)	30	25.00
2.	Medium (Between 18 to 22)	65	54.17
3.	High (23 and above)	25	20.83
	Total	120	100.00

It is observed from Table 11 that 54.17 per cent of the respondents had medium extension contact, 25.00 per cent of the respondents had low extension contact followed by 20.83 per cent of the respondents had high extension contact.

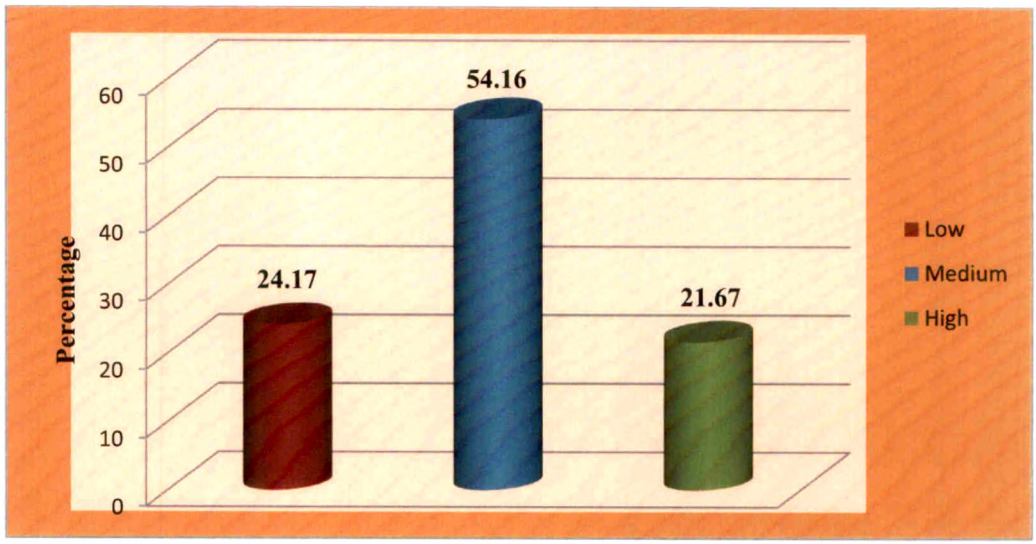


Fig 9: Distribution of respondents according to their mass media exposure

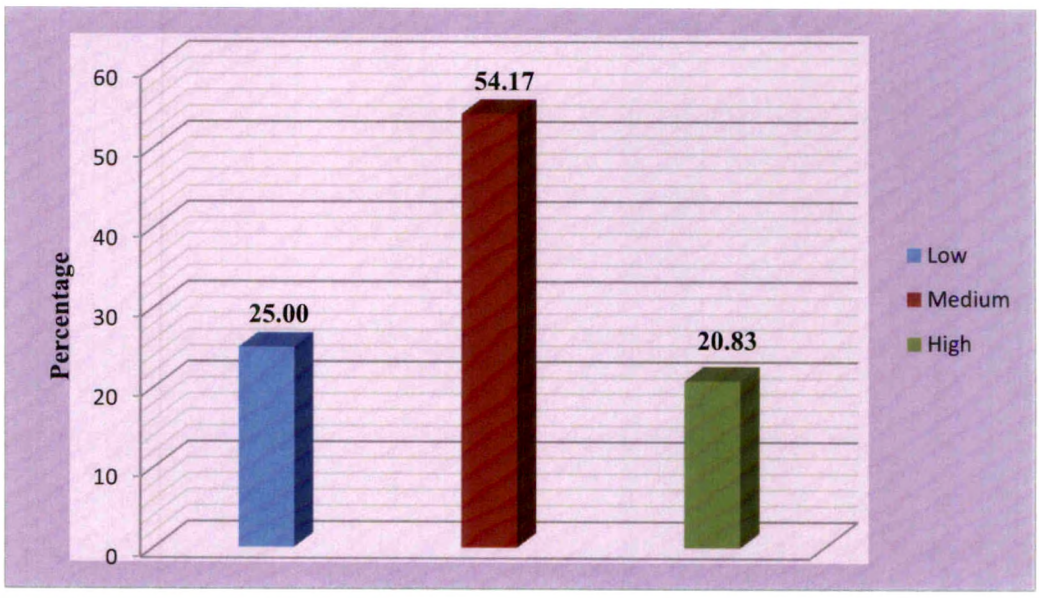


Fig 10: Distribution of respondents according to their extension contact

4.1.10 Cosmopoliteness

Table 12 Distribution of respondents according to their cosmopoliteness

n=120

Sr. No.	Categories	Frequency	Percentage
1.	Low (Up to 6)	28	23.33
2.	Medium (7 to 9)	68	56.67
3.	High (10 and above)	24	20.00
	Total	120	100.00

It is observed from Table 12 that 56.67 per cent of the respondents had medium cosmopoliteness, 23.33 per cent of the respondents had low cosmopoliteness followed by 20.00 per cent of the respondents had high cosmopoliteness.

4.1.11 Scientific orientation

Table 13 Distribution of respondents according to their scientific orientation

n=120

Sr. No.	Categories	Frequency	Percentage
1.	Low (Up to 15)	21	17.50
2.	Medium (Between 16 to 21)	79	65.83
3.	High (22 and above)	20	16.67
	Total	120	100.00

It is observed from Table 13 that the information of the respondents regarding their scientific orientation. It is clear from above data that 65.83 per cent of the respondents had medium scientific orientation. Whereas, 17.50 per cent of the respondent had low followed by 16.67 per cent of the respondents had high scientific orientation.

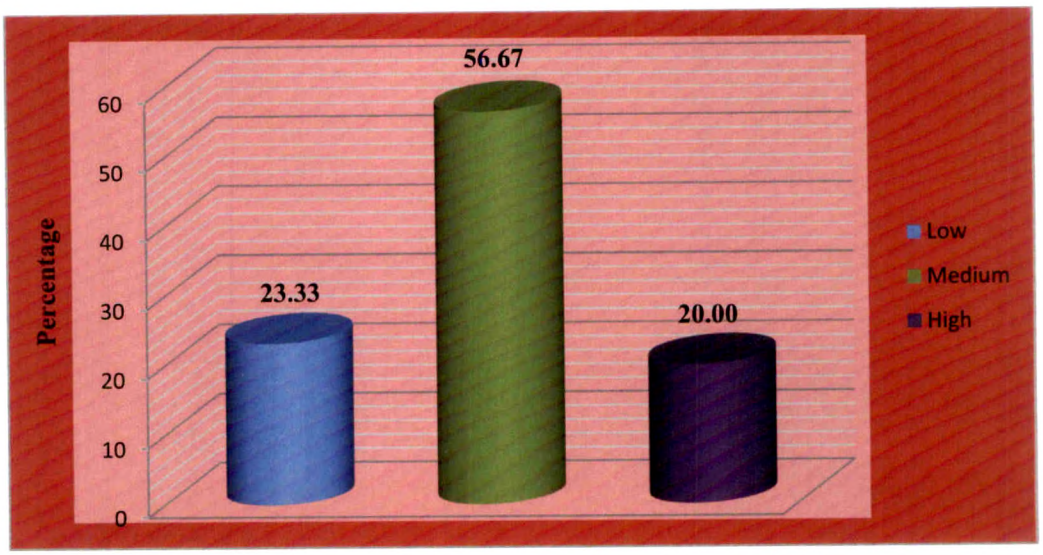


Fig 11: Distribution of respondents according to their cosmopoliteness

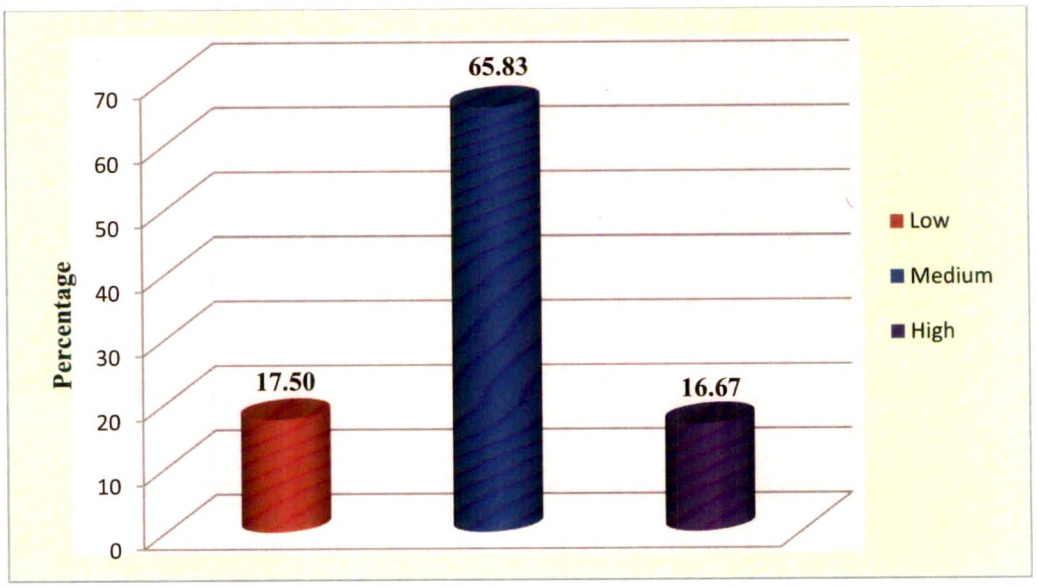


Fig 12: Distribution of respondents according to their scientific orientation

4.1.12 Risk preference

Table 14 Distribution of respondents according to their risk preference

n=120

Sr. No.	Categories	Frequency	Percentage
1.	Low (Up to 12)	30	25.00
2.	Medium (Between 13 to 18)	68	56.67
3.	High (19 and above)	22	18.33
	Total	120	100.00

It is observed from Table 14 that 56.67 per cent of respondents had medium risk preference whereas, 25.00 per cent of respondents had low risk preference followed by 18.33 per cent of the respondents having high risk preference.

4.1.13 Knowledge of farmers regarding cotton production technology

4.1.13.1 Practice wised knowledge of cotton production technology

Table 15 Distribution of respondents according to their practice wise knowledge about cotton production technology n=120

Sr. No.	Items / practices	Knowledge		No Knowledge	
		Frequency	Percentage	Frequency	Percentage
1.	Selection of land for cotton	120	100.00	-	-
2.	Before sowing of cotton soil testing is important	120	100.00	-	-
3.	Cart load requirement of compost/ha	111	92.50	9	7.50
4.	Improved variety of cotton	120	100.00	-	-
5.	Seed treatment	45	37.50	75	62.50
6.	Per hectare seed rate requirement	120	100.00	-	-
7.	Proper time of cotton sowing	112	93.33	8	6.67
8.	Distance between two rows while sowing	89	74.17	31	25.83
9.	Recommended dose of fertilizer at the time of cotton sowing	73	60.83	47	39.17
10.	Depth of application of chemical fertilizers in soil	105	87.50	15	12.50
11.	Per hectare NPK requirement	113	94.17	7	5.83

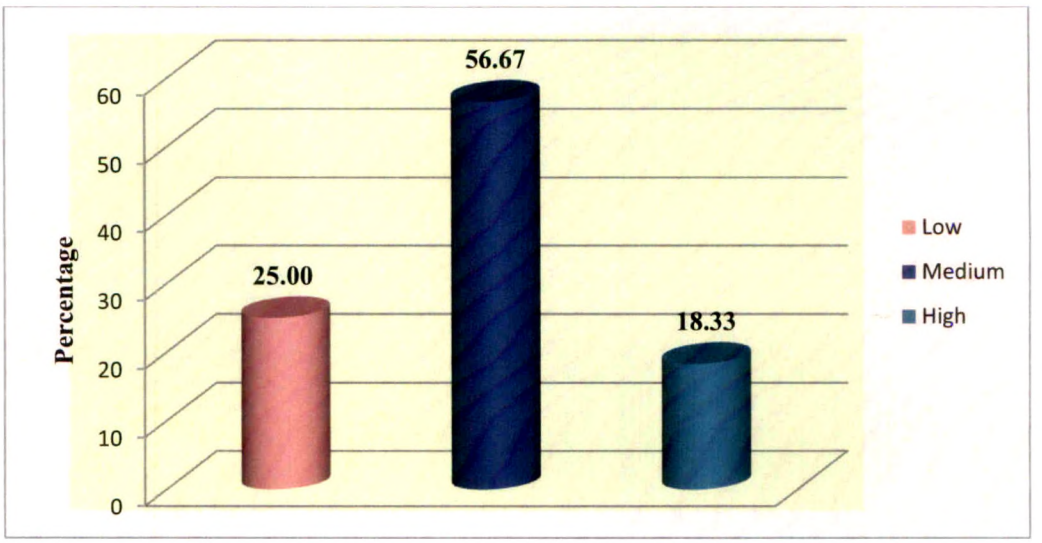


Fig 13: Distribution of respondents according to their risk preference

12.	Neemark per cent for biological pest control	115	95.83	5	4.17
13.	Spraying of Neemark for biological pest control	115	95.83	5	4.17
14.	Per hectare total requirement of water	89	74.17	31	25.83
15.	Water management	45	37.50	75	62.50
16.	Pest attack on cotton crop	120	100.00	-	-
17.	Control of insects pheromone trap are used	111	92.50	9	7.50
18.	Behind leaf of cotton Trichograma card is used	105	87.50	15	12.50
19.	Leaf sucking pest	118	98.33	2	1.67
20.	For control of sucking pest rogor is used	68	56.67	52	43.33
21.	Control of bollworm Crysopa is used	58	48.33	62	51.67
22.	10 thousand predators use for the biological pest control	44	36.67	76	63.33
23.	Time of harvesting	120	100.00	-	-
24.	Per hectare production of cotton	81	67.50	39	32.50

Percentages of respondents were worked out for knowing knowledge of farmers regarding selected cotton production technology.

Table 15 revealed that all of the respondents had knowledge about selection of land for cultivation of cotton and important of soil testing before sowing.

Table 15 revealed that 92.50 per cent respondents had knowledge and 7.50 per cent of respondents had no knowledge about requirement of cart loads of compost per ha.

Table 15 revealed that all of the respondents had knowledge about improved variety of cotton.

Table 15 revealed that 62.50 per cent of the respondents had no knowledge and 37.50 per cent of respondents had knowledge about seed treatment.

All of the respondents had knowledge about seed rate requirement of cotton sowing.

Majority (93.33 per cent) of the respondents had knowledge and 6.67 per cent of respondents had no knowledge about proper time of cotton sowing. While 74.17

per cent of respondents had knowledge about distance between two rows while sowing and 25.83 per cent were not having knowledge.

It is observed that 60.83 per cent of respondents had knowledge about recommended dose of fertilizer at the time of sowing of cotton and 39.17 per cent were not having knowledge.

Majority (87.50 per cent) of respondents had knowledge about depth of application of chemical fertilizers in soil and 12.50 per cent of respondents having no knowledge.

It is observed that 94.17 per cent of respondents had knowledge and 5.83 per cent of respondents had no knowledge about per hectare NPK requirement.

Majority (95.83 per cent) of respondents had knowledge and 4.17 per cent was not having knowledge about Neemark per cent for biological pest control, while 95.83 per cent of respondents had knowledge about spraying of Neemark for biological pest control and 4.17 per cent of were not having knowledge.

It is observed from Table15 that 78.33 per cent of respondents had knowledge about per hectare total requirement of water for cotton crop and 21.67 per cent were not having knowledge.

Table 15 revealed that 37.50 per cent of respondents had knowledge about proper water management and 62.50 per cent were not having knowledge.

All of the respondents had knowledge about pest attack on cotton crop, while 92.50 per cent of respondents had knowledge about controls of insects pheromone trap are used and 7.50 per cent of respondents were not having knowledge.

It is observed that 87.50 per cent of respondents had knowledge and 12.50 per cent of respondents had no knowledge about behind leaf of tree Trichograma card is used.

It is observed that 98.33 per cent of respondents had knowledge and 1.67 per cent of respondents had no knowledge about leaf sucking pest.

More than half of the (56.67 per cent) respondents had knowledge about control of sucking pest rogor is used and 43.33 per cent were not having knowledge.

It is observed from Table15 that 48.33 per cent of respondents had knowledge about control of bollworm Crysopa is used and 51.67 per cent were not having knowledge.

Data indicated that 63.33 per cent of respondents did not have knowledge about 10 thousand predators used for the biological pest control and 36.67 per cent of respondents had knowledge about it.

All of the respondents had knowledge about time of harvesting. While 67.50 per cent of respondents had knowledge about per hectare production of cotton and 32.50 per cent were not having knowledge.

4.1.13.2 Knowledge level

Table 16 Distribution of respondents according to their practice wise knowledge about cotton production technology

n=120

Sr. No.	Categories	Frequency	Percentage
1.	Low (Up to 17)	29	24.17
2.	Medium (Between 18 to 21)	66	55.00
3.	High (22 and above)	25	20.83
	Total	120	100.00

From Table 16, it is observed that majority (55.00 per cent) of the respondents had possessed medium level of knowledge followed by 24.17 per cent of the respondents had low and 20.83 per cent of the respondents had high knowledge level about cotton production technology, respectively. Thus in general the farmers possessed medium level of knowledge of cotton production technology.

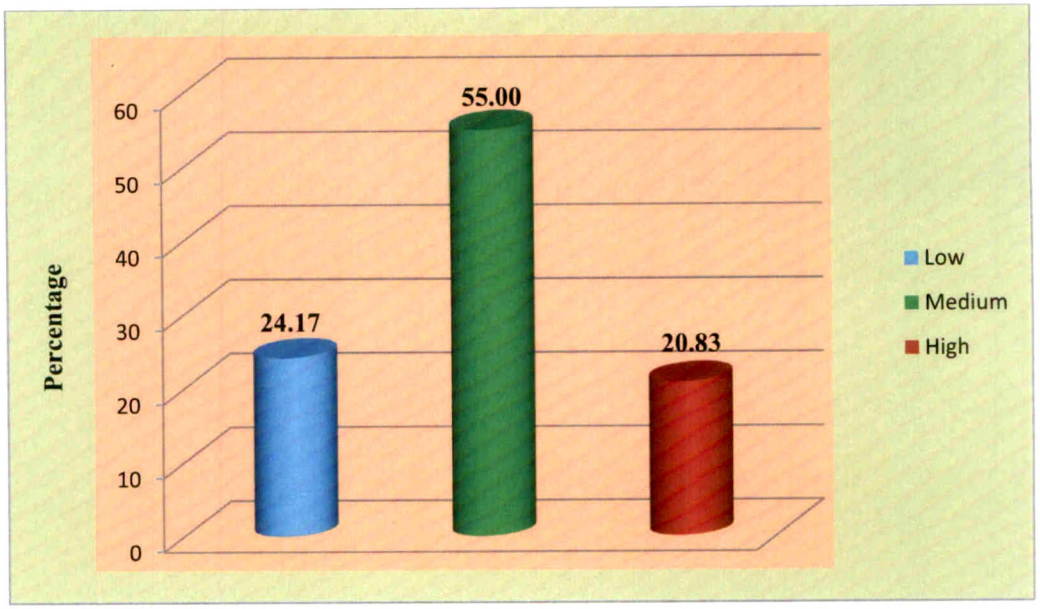


Fig 14: Distribution of respondents according to their practice wise knowledge about cotton production technology

4.2 Extent of adoption of cotton production technology attending farmer field school

Table 17 Distribution of respondents according to extent of adoption of cotton production technology attending FFS

Sr. No.	Recommended practice	Adoption					
		Full		Partial		Non-adoption	
		Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
1.	Selection of (medium to heavy, well drained) soil	22	18.33	98	81.67	-	-
2.	Soil testing (only use micro nutrient testing or NPK testing)	90	75.00	-	-	30	25.00
3.	Application of 15 to 25 cart load compost/ha	88	73.33	30	25.00	2	1.67
4.	Improved variety (Bt.)	120	100.00	-	-	-	-
5.	Seed treatment	-	-	-	-	120	100.00
6.	Use 4-6 kg seed per hectare	11	9.17	27	27.50	82	68.33
7.	Sowing during 15th May to 15th June	102	85.00	18	15.00	-	-
8.	60 x 60 cm distance between two rows	87	72.50	33	27.50	-	-
9.	At the time of sowing 40% N, full dose of P and K	31	25.83	89	74.17	-	-
10.	Application of chemical fertilizer in soil 5 to 10 cm. in depth	98	81.67	22	18.33	-	-
11.	Recommended dose of fertilizer per ha NPK 80:40:40	107	89.17	13	10.83	-	-
12.	5 per cent Neemark are used for biological pest control	96	80.00	24	20.00	-	-
13.	2-3 spraying of Neemark after 15 days interval for biological pest control	95	79.17	25	20.83	-	-

14.	700-750 mm per ha of total requirement of water	30	25.00	90	75.00	-	-
15.	70 per cent management of water	27	22.50	93	77.50	-	-
16.	Use pheromone trap for pest control	9	7.50	-	-	111	92.50
17.	Trichograma card behind the leaf of tree	109	90.83	11	9.17	-	-
18.	Control of pest rogor is used	102	85.00	18	15.00	-	-
19.	Application of crysopa predators for biological pest control 10 thousand no. per hectare for bollworm control	18	15.00	30	25.00	72	60.00
20.	Cotton picking at morning hours	120	100.00	-	-	-	-

In order to ascertain the extent of adoption of cotton production technology attending farmer field school the respondents were asked to indicate as to what extent they followed the recommendations. The information pertaining to practice wise adoption of cotton production technology attending farmer field school is depicted in Table 17.

It is revealed from Table 17 that18.33 per cent of the respondents had fully adopted, 81.67 per cent of respondents had partially adopted recommended practices like selection of medium to heavy, well drained soil. While, 75.00 per cent of respondents had fully adopted and 30.00 per cent of the respondents had no adoption about soil testing for NPK and micro nutrient content.

It is seen from Table 17 that majority (73.33 per cent) of respondents had fully adopted, 25.00 per cent of respondents had partially adopted and 1.67 per cent of respondents no adoption about recommended practices of application of compost to soil before sowing.

All of the respondents had fully adopted improved variety of Bt. Cotton and all of the respondents had no adopted use of seed treatment.

Table 17 shows that majority (68.33 per cent) of respondents had no adopted, 27.50 of respondents had partially adopted and 9.17 per cent of respondents fully adopted recommended use of 4-6 kg seed per ha. It is clear from Table 17, that majority (85.00 per cent) of the respondents had fully adopted and 15.00 per cent of respondents had partially adopted recommended practices of sowing during 15th May to 15th June.

Table 17 shows that majority (72.50 per cent) of the respondents had fully adopted and 27.50 per cent of them had partially adopted practices of 60 x 60 cm distance between two rows as per recommendations.

Table 17 shows that majority (74.17 per cent) of the respondents had partially adopted and 25.83 per cent of the respondents had fully adopted the technology of application of 40 per cent N and full dose of P and K at the time of sowing.

It is observed from the Table 17 that majority (81.67 per cent) of the respondents had fully adopted the practice of application of chemical fertilizer in soil 5 to 10 cm in depth and 18.33 per cent of the respondents had partially adopted. It is clear from Table 17 that most (89.17 per cent) of the respondents had fully adopted and 10.83 per cent of them partially adopted recommended doses of fertilizer per hectare respectively.

The recommended practice such as 5 per cent Neemark was used for biological pest control by majority (80.00 per cent) of respondents fully and 20.00 per cent of them partially adopted, majority (79.17 per cent) of the respondents had fully adopted the practice of 2-3 sprayings of Neemark after 15 days interval and 20.83 per cent of the respondents had partially adopted the same.

Table 17 shows that majority (75.00 per cent) of the respondents had partially adopted and 25.00 per cent of the respondents had fully adopted the practices of 700-750 mm per ha of requirement of water and 77.50 per cent of the respondents had partially adopted and 22.50 per cent of the respondents had fully adopted the practices of 70 per cent management of water.

Table 17 shows that majority (92.50 per cent) of the respondents had no adopted and 7.50 per cent of the respondents had fully adopted the practices of use of pheromone trap for pest control and 90.83 per cent of the respondents had fully adopted

and 9.17 per cent of the respondents had partially adopted the practices of Trichograma card behind the leaf of tree.

Table 17 shows that majority (85.00 per cent) of the respondents had fully adopted and 15.00 per cent of the respondents had partially adopted the practices of control of pest rogor is used.

As the recommendation of application of crysopa predators for biological pest control 10,000 no. per hectare for bollworm control is concern 60.00 per cent of respondents had not adopted, 25.00 per cent of respondents had partially adopted and 15.00 per cent of respondents had fully adopted this technology.

It was clear from Table 17 that all of the respondents had fully adopted cotton picking practices as per recommendation.

4.2.1 Adoption level

Table 18 Distribution of respondents according to their level of adoption

n=120

Sr. No.	Category	Frequency	Percentage
1.	Low (Up to 21)	15	12.50
2.	Medium (Between 22 to 28)	89	74.17
3.	High (29 and above)	16	13.33
	Total	120	100.00

It is observed that Table 18 that most (74.17 per cent) of the respondents had medium level of adoption, 13.33 per cent of respondents were from high level of adoption and 12.50 per cent of respondents were low adoption level.

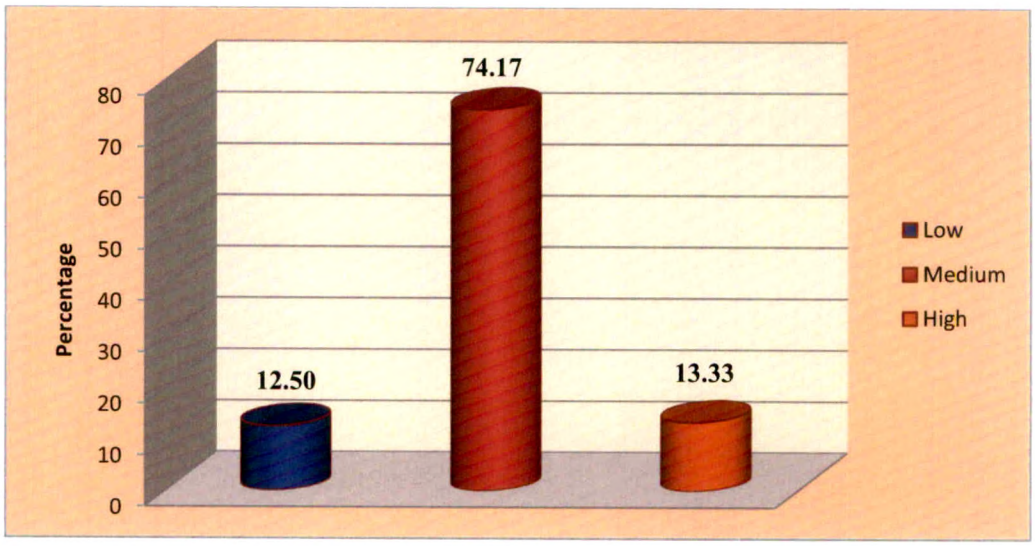


Fig 15: Distribution of respondents according to their level of adoption

4.3 Relationship of selected characteristics with adoption of cotton production technology among farmers of farmer field school

Table 19 Relationship of independent variables with adoption of cotton production technology by farmer attending FFS

Sr. No.	Independent variables	Correlation coefficient 'r'
1.	Age	-0.174^{NS}
2.	Education	0.299**
3.	Size of land holding	0.247*
4.	Annual income	0.223*
5.	Type of family	0.229*
6.	Size of family	0.206*
7.	Socio-economic status	0.224*
8.	Mass media exposure	0.272**
9.	Extension contact	0.211*
10.	Cosmopoliteness	0.183^{NS}
11.	Scientific orientation	0.222*
12.	Risk preference	0.244*
13.	Knowledge	0.237*

* = Significant at 0.05 per cent

** = Significant at 0.01 per cent

From Table 19 it is observed that out of thirteen variables Size of land holding, Annual income, Type of family, Size of family, Socio-economic status, Extension contact, Scientific orientation, Risk preference and Knowledge had positive and significant relationship with adoption of cotton production technology among farmers of FFS at 0.05 per cent level of probability, while Education and Mass media exposure had positive and significant relationship with adoption of cotton production technology among farmers of FFS at 0.01 per cent level of probability. Whereas, age had negative but non-significant relationship while, cosmopoliteness had positive but non-

significant relationship with adoption of cotton production technology among farmers of farmer field school.

4.4 Constraints faced by farmers in adoption of cotton production technology

The expressed opinion of the respondents on constraints in adoption of production practices are presented below.

Table 20 clearly indicates that all of the respondents expressed the constraints that they did not get sufficient labour for preparatory tillage and inter cultivation and fertilizers are too costly. Table 20 clearly indicates that 93.33 per cent of the respondents expressed the constraints that high cost of implements and lack of electricity.

Table 20 clearly indicates that constraint like lack of money for seed at proper time, high cost of hybrid seed, non availability of good quality of seed at proper time, lack of water, application of insecticides/pesticides felt dangerous to health, non availability of sufficient quantity of female labour for cotton picking were the constraints expressed by 91.67, 99.17, 89.17, 95.00, 98.33 and 97.50 per cent respectively.

Table 20 Constraints faced by farmers in adoption of cotton production technology **n=120**

Sr. No.	Constraints	Frequency	Percentage
1.	Do not get sufficient labour for preparatory tillage and inter cultivation	120	100.00
2.	High cost of implements	112	93.33
3.	Lack of money for seed at proper time	110	91.67
4.	High cost of hybrid seed	119	99.17
5.	Non availability of good quality of seed at proper time	107	89.17
6.	Lack of water	114	95.00
7.	Lack of electricity	112	93.33
8.	Fertilizers are too costly	120	100.00
9.	Application of insecticides/pesticides felt dangerous to health	118	98.33
10.	Non availability of sufficient quantity of female labour for cotton picking	117	97.50

DISCUSSION

Chapter V

DISCUSSION

The present study entitled "Adoption of cotton production technology among farmers of farmer field school" was conducted in Jalna district. This area was randomly selected as the farmers from these talukas participated in the farmer field school.

The specific objectives on the study were

5.1 Profile of farmers.

5.2 Adoption of cotton production technology.

5.3 Relationship between profile of farmers with adoption of cotton production technology by farmers of Farmer Field School.

5.4 Constraints faced by farmers in adoption of cotton production technology.

The investigation was carried in Jalna, Badnapur and Bhokardan talukas of Jalna district of Marathwada region as there were more number of farmers who underwent farmer field school and were growing cotton crop and using cotton production technology for enhancing production.

A list of farmers who participated in training programme of farmer field school and practicing the same was obtained from concerned authority and a total of 120 respondents were selected randomly as the sample for study. The information relevant to the decided objectives was collected from 120 respondents from 12 villages. The data were gathered by specially designed interview schedule. The respondents were contacted personally for effective interview.

In order to facilitate the analysis and interpretation of the data, statistical tools like frequency, percentage, standard deviation and correlation coefficient were used.

5.1 Profile of farmers of farmer field school on cotton production technology

5.1.1 Age

It was note worthy from Table 3 that majority of the respondents (66.67 per cent) were from middle age group followed by young age group (18.33 per cent) and old age group (15.00 per cent).

This shows that majority of the respondents were from middle age group. The reason might be that middle aged persons are more experienced. They are actually doing the agriculture.

The findings are consistent with this finding of Sawant (2006), Athawale (2008) and Sewatkar (2008).

5.1.2 Education

It was clear from Table 4 that 37.50 per cent of the respondents were educated up to middle school, 20.00 per cent of respondents were educated up to primary school level, 20.00 per cent of the respondents were educated up to high school level, 16.67 per cent of respondents were literate, 5.83 per cent of respondents were educated up to college level. While zero per cent of the respondents were illiterate.

The findings are consistent with this finding of More *et al.* (2000), Chikhale (2002), Athawale (2008), Deokar (2008) and Sewatkar (2008).

5.1.3 Size of land holding

It was observed from Table 5 that 48.34 per cent of respondents were semi medium farmers (2.1 ha to 4 ha), 19.17 per cent of respondents were small farmers (1.1 ha to 2 ha), 15.83 per cent of respondents were medium farmers (4.1 ha to 10 ha), 13.33 per cent of the respondents were marginal farmers (Up to 1 ha). While 3.33 per cent of respondents were large farmers (10.1 ha and above).

The findings are consistent with this finding of Sonsale (2000), Deokar (2008) and Shendage (2010).

5.1.4 Annual income

It was observed from Table 6 that 92.50 per cent of the respondents had medium level of annual income i.e. Rs. 18442 to 645941, while 7.50 per cent of respondents had high level of annual income above Rs. 645942 and zero per cent of respondents had low annual income.

The findings are consistent with the finding of Pandhare (2005), Deokar (2008) and Sewatkar (2008).

5.1.5 Type of family

It was observed from Table 7 indicates that a most of the respondents (77.50 per cent) were having joint family, while 22.50 per cent of the respondents were nuclear family.

The findings are consistent with this finding of Hegade (2001), Gavhane (2005) and Chipade (2010).

5.1.6 Size of family

It was observed from Table 8 that 46.66 per cent of respondents had medium family size whereas, 39.17 per cent of respondents had low family size and 14.17 per cent of respondents had high family size.

The findings are consistent with this finding of Kadam (2004), Kore (2005), Sawant (2006) and Nichal (2010).

5.1.7 Socio-economic status

It was observed from Table 9 that 45.83 per cent of respondents had middle socio-economic status, followed by 38.34 per cent of respondents in lower middle socio-economic status. The data shows that 7.50 per cent of respondents were having lower socio-economic status, 5.00 per cent of respondents were having upper middle socio-economic status and 3.33 per cent of respondents were having upper socio-economic status.

This finding is in conformity with Deshmukh (2003), Patil (2004) and Sawant (2006).

5.1.8 Mass media exposure

It was observed from Table 10 that 54.16 per cent of respondents had medium mass media exposure, whereas, 24.17 per cent of respondents had low mass media exposure and 21.67 per cent of respondents had high mass media exposure.

This finding was supported by the finding of Patil (2004) and Athawale (2008).

5.1.9 Extension contact

It was observed from Table 11 that 54.17 per cent of the respondents had medium extension contact, 25.00 per cent of the respondents had low extension contact followed by 20.83 per cent of the respondents had high extension contact.

This finding is line with Khandare (2002), Patil (2004), Athawale (2008) and Shendage (2010).

5.1.10 Cosmopoliteness

It was observed from Table 12 that 56.67 per cent of the respondents had medium cosmopoliteness, 23.33 per cent of the respondents had low cosmopoliteness followed by 20.00 per cent of the respondents had high cosmopoliteness.

This finding was supported by the finding of Borse (2002), Chaudhari (2006), Lad (2009) and Sable (2012).

5.1.11 Scientific orientation

It was clear from Table 13 that 65.83 per cent of the respondents had medium scientific orientation, whereas, 17.50 per cent of the respondent had low followed by 16.67 per cent of the respondents had high scientific orientation.

This finding is in the line with Athawale (2008), Deokar (2008), Shendage (2010).

5.1.12 Risk preference

It was observed that more than half of the respondents 56.67 per cent had medium risk preference whereas, 25.00 per cent of respondents had low risk preference followed by 18.33 per cent of the respondents having high risk preference.

This finding is supported by the findings of Athawale (2008), Bondarwad (2009), Katke (2011), Zunjar (2011), Sable (2012).

5.1.13 Knowledge of farmers regarding cotton production technology

From Table 15 it was revealed that all of the respondents had knowledge about selection of land for cultivation of cotton and important of soil testing before sowing. While 92.50 per cent of respondents were having knowledge of cart loads of

compost per ha. Further all of the respondents had knowledge about improved variety of cotton.

It was revealed from Table 15 that 37.50 per cent of respondents were having knowledge of seed treatment. While all of the respondents having knowledge of per hectare seed rate requirement.

From Table 15 it was revealed that (93.33 per cent) of respondents having knowledge of proper time of cotton sowing, 74.17 per cent of respondents having knowledge of distance between two rows between sowing. While 60.83 per cent of respondents were having knowledge of recommended dose of fertilizer at the time of sowing of cotton, 87.50 per cent of respondents were having knowledge about depth of application of chemical fertilizers in soil. 94.17 per cent of respondents were having knowledge of per hectare NPK requirement.

From Table 15 it was revealed that (95.83 per cent) of respondents were having knowledge of Neemark per cent for biological pest control, while 95.83 per cent of respondents were having knowledge of spraying of Neemark for biological pest control.

It was observed from Table15 that 74.17 per cent of respondents were having knowledge of per hectare total requirement of water for cotton, while 37.50 per cent of respondents were having knowledge of proper water management, while all of the respondents were having knowledge of pest attack on cotton crop and 92.50 per cent of the respondents were having knowledge of controls of insects pheromone trap are used, 87.50 per cent of respondents were having knowledge of behind leaf of tree Trichograma card is used and 98.33 per cent of respondents were having knowledge of leaf sucking pest, more than half of the (56.67 per cent) respondents were having knowledge of control of sucking pest rogor is used.

It was observed from Table15 that 48.33 per cent of respondents were having knowledge of control of bollworm Crysopa is used, while 36.67 per cent of respondents were having knowledge of 10 thousand predators for the biological pest control. While all of the respondents were having knowledge of time of harvesting and 67.50 per cent of respondents were having knowledge of per hectare production of cotton as 14-15 q/ha in dry land, irrigated 19-22 q/ha in irrigated as regard above findings

irrigated conditions. This might be related to their personal experience as well as farms visited by them and efforts made by extension agency.

Also, it might be due to their inquisitiveness to get knowledge and their wide exposure to different sources of information.

5.1.13.1 Knowledge level

Table 16, showed that majority (55.00 per cent) of respondents were having medium level of knowledge followed by 24.17 per cent of respondents low level of knowledge and 20.83 per cent of respondents possessing high knowledge level.

Thus, it could be concluded that majority of respondents had medium level of knowledge about selected practices of cotton.

This finding was supported by Borse (2002), Chavai (2004), Sawant (2006), Athawale (2008), Nichal (2010), Deshmukh *et al.* (2011) and Zunjar (2011).

5.2 Extent of adoption of cotton production technology attending farmer field school

Table 17 revealed that 18.33 per cent of the respondents had fully adopted recommended practices like selection of medium to heavy, well drained land (soil).

It is evident from Table 17 that 75.00 per cent of respondents had fully adopted NPK and micro-nutrient content (soil testing). 73.33 per cent of respondents had fully adopted application of compost to soil before sowing.

Table 17 revealed that all of the respondents had fully adopted improved variety (B.T.).

This might be due to lack of exact knowledge about seed treatment.

Table 17 showed that 68.33 per cent of respondents had not adopted use of 4-6 kg seed per ha and 85.00 per cent of respondents had fully adopted sowing during 15th May to 5th June. While, 72.50 per cent of respondents had fully adopted practices of 60 x 60 cm distance between two rows.

Table 17 revealed that 74.17 per cent of respondents had partially adopted the technology of application of 40.00 per cent N and full dose of P and K at the time of sowing, 81.67 per cent of respondents had fully adopted application of chemical fertilizer in soil 5 to 10 cm in depth and 89.17 per cent of respondents had fully adopted doses of

fertilizer per hectare respectively as much as 80.00 per cent and 79.17 per cent of respondents had fully adopted, 5 per cent of Neemark for biological pest control and practices of 2-3 sprayings of Neemark after 15 days interval.

Table 17 revealed that 75.00 and 77.50 per cent of respondents had partially adopted the practices of 700-750 mm per ha of requirement of water and the practices of 70.00 per cent management of water.

It is seen from Table 17 that 92.50 per cent of respondents had not adopted use of pheromone trap for pest control. While 90.83 per cent of respondents had fully adopted Trichograma card behind the leaf of tree and 85.00 per cent of respondents had fully adopted control of pest rogor is used.

Table 17 showed that 60.00 per cent of respondents had not adopted application of Crysopa predators for biological pest control 10 thousand number per ha for bollworm control and all of the respondents had fully adopted cotton picking at morning hours.

5.2.1 Adoption level

Table 18, that most (74.17 per cent) of the respondents had medium level of adoption followed by 13.33 per cent of respondents had high level of adoption and 12.50 per cent of respondents had low adoption level.

Thus, it could be concluded that majority of respondents had medium level of adoption about recommended practices about recommended practices of cotton production technology.

This finding was supported by Sawant (2006), Athawale (2008) and Bondarwad (2009).

5.3 Relationship of selected characteristics with adoption of cotton production technology by farmer attending FFS

5.3.1 Age and adoption

The data manifested that, age of the respondents was found to be negatively non significant relationship with adoption.

This finding was supported by Athawale (2008).

5.3.2 Education and adoption

Education of the respondents was found to be positive and highly significant relationship with adoption.

This finding was supported by Sonsale (2000), Sawant (2006), Athawale (2008) and Bondarwad (2009).

5.3.3 Size of land holding and adoption

The data revealed that, land holding of the respondents was found to be positive and significant relationship with adoption.

This finding was supported by Borkar (2000), Chavai (2004) and Athawale (2008).

5.3.4 Annual income and adoption

Annual income of the respondents was found to be positive and significant relationship with adoption.

This finding was supported by Sonsale (2000), Chavai (2004) and Sawant (2006).

5.3.5 Type of family and adoption

The data revealed that, family type of the respondents was found to be positive and significant relationship with adoption.

This finding was supported by Chandranna *et al* (2008) and Tamboli (2012).

5.3.6 Size of family and adoption

Size of family of the respondents was found to be positive and significant relationship with adoption.

This finding was supported by Dhapke (2004) and Sawant (2006).

5.3.7 Socio-economic status and adoption

Socio-economic status of the respondents was found to be positive and significant relationship with adoption.

This finding was supported by Bhagwat (2003), Sawant (2006), Athawale (2008) and Bondarwad (2009).

5.3.8 Mass media exposure and adoption

The data revealed that, mass media exposure of the respondents was found to be positive and highly significant relationship with adoption.

This finding was supported by Athawale (2008).

5.3.9 Extension contact and adoption

The data revealed that, extension contact of the respondents was found to be positive and significant relationship with adoption.

This finding was supported by Sonsale (2000), Athawale (2008), Bedre (2009) and Sasane (2010).

5.3.10 Cosmopoliteness and adoption

Cosmopoliteness of the respondents was found to be positive and non significant relationship with adoption.

This finding was supported by Padmavati *et al.* (1998).

5.3.11 Scientific orientation and adoption

The data revealed that, scientific orientation of the respondents was found to be positive and significant relationship with adoption.

This finding was supported by Athawale (2008).

5.3.12 Risk preference and adoption

The data revealed that, risk preference of the respondents was found to be positive and significant relationship with adoption.

This finding was supported by Borse (2002), Bhagwat (2003), Chavai (2004), Sawant (2006) and Athawale (2008).

5.3.13 Knowledge and adoption

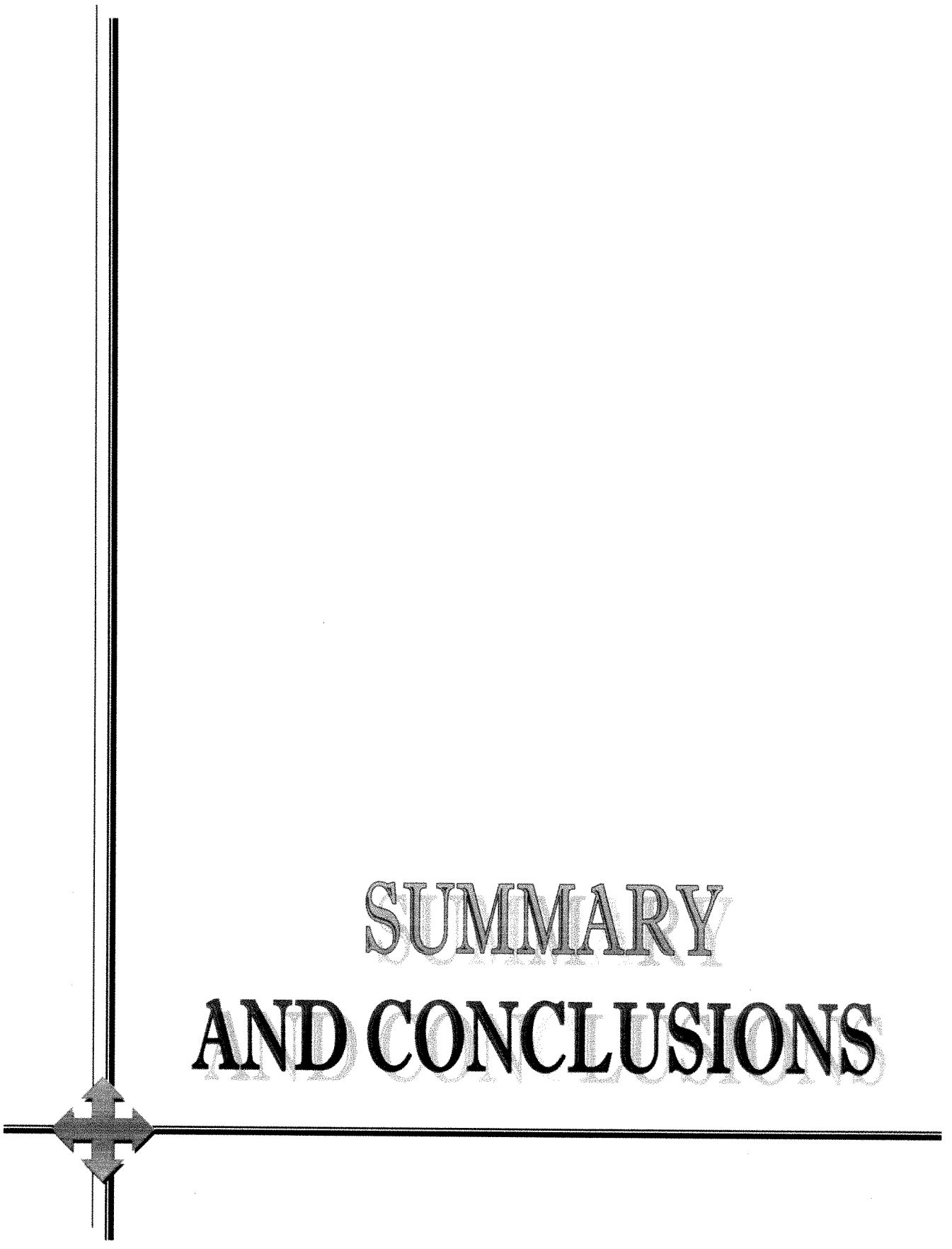
Knowledge of the respondents was found to be positive and significant relationship with adoption.

This finding was supported by Deshmukh (2006), Dandnaik (2009) and Godale (2013).

5.4 Constraints faced by farmers in adoption of cotton production technology

The constraints faced by the cotton growers in adoption of the cultivation practices are presented in table 20. The data presented in Table portrayed that all of the respondents had expressed problems of lack of sufficient labour for preparatory tillage and intercultivation and fertilizers are too costly, followed by 99.17 per cent of respondents had expressed high cost of hybrid seed, 98.33 per cent of them had application of insecticides/pesticides felt dangerous to health, 97.50 per cent of them had non availability of sufficient quantity of female labour for cotton picking, 95.00 per cent of them lack of water. 93.33 per cent of respondents had expressed high cost of implements and lack of electricity. As constraints much as 91.67 per cent of respondents expressed lack of money for seed at proper time and 89.17 per cent of respondents expressed non availability of good quality of seed at proper time.

From foregoing findings it could be concluded that these constraints were acting as stumbling blocks in furthering adoption and hence needs attention and efforts to lessen them.



SUMMARY AND CONCLUSIONS

Chapter VI

SUMMARY AND CONCLUSIONS

The present investigation was conducted in Jalna district of Marathwada region, which a view to know the adoption of cotton production technology among farmers of farmer field school.

The specific objectives of the study were

6.1 Profile of farmers.

6.2 Adoption of cotton production technology.

6.3 Relationship between profile of farmers with adoption of cotton production technology by farmers of Farmer Field School.

6.4 Constraints faced by farmers in adoption of cotton production technology.

The information relevant to the decided objectives was collected from 120 respondents from twelve villages. The data was gathered by specially designed interview schedule. The respondents were contacted personally for effective interview. In order to facilitate the analysis and interpretation of the data statistical tools like frequency, percentage, standard deviation and correlation coefficient were used.

The salient features of the findings are summarized below.

6.1 Profile of farmers of farmer field school on cotton production technology

6.1.1 Age

It was observed that from Table 3 that majority of the respondents (66.67 per cent) were from 29 to 50 years of age, followed by18.33 per cent of the respondents from young age group (Up to 28 years) and 15.00 per cent of the respondents were from old age group (above 51 years).

It could be concluded that most of the respondents had middle group of age.

6.1.2 Education

It was observed from Table 4 more of the respondents 37.50 per cent educated up to middle school level, followed by 20.00 per cent respondents were primary school level, 20.00 per cent of respondents were educated up to high school level, 16.67 per cent of respondents can read and write only, 5.83 per cent of

respondents were educated up to graduation/ post graduation level and zero per cent of the respondents were illiterate.

It could be concluded that most of the respondents had educated up to middle school level.

6.1.3 Size of land holding

It was revealed from Table 5 that 48.34 per cent of respondents were semi medium farmers (2.01 ha to 4.00 ha), 19.17 per cent of respondents were small farmers (1.01 ha to 2.00 ha), 15.83 per cent of respondents were medium farmers (4.01 ha to 10.00 ha), 13.33 per cent of the respondents were marginal farmers (Up to 1.00 ha). While 3.33 per cent of respondents were large farmers (10.01 ha and above).

It could be concluded that most of the respondents had small farmers.

6.1.4 Annual income

It was noticed from Table 6, that majority of the respondents had medium level of income, followed by high annual income.

Effects of natural calamities, low knowledge of improve technology farmers were grouped into medium annual income.

6.1.5 Type of family

It was noticed from Table 7, most of the respondents (77.50 per cent) were having joint family, while 22.50 per cent of the respondents were nuclear family.

6.1.6 Size of family

It was observed from Table 8 that, majority of the respondents (46.66 per cent) had medium family size, followed by 39.17 per cent low and 14.17 per cent high family size.

Educated farmers also know importance of small family so that majority of the respondents had medium family size, followed by low.

6.1.7 Socio-economic status

It was noticed from Table 9, that most of the respondents had middle socio-economic status, 38.34 per cent of the respondents had lower middle socio-economic status. 7.50 per cent of the respondents lower socio-economic status, 5.00 per cent of the respondents upper middle socio-economic status while 3.33 per cent of the respondents upper socio-economic status.

6.1.8 Mass media exposure

It was noticed from Table 10, that 54.16 of the respondents had medium mass media exposure, followed by low level (24.17 per cent) and high level (21.67 per cent) of mass media exposure respectively.

6.1.9 Extension contact

It was manifested from Table 11 that most of the respondents had medium level of extension contact, followed by low level and high level of extension contact.

6.1.10 Cosmopoliteness

The data presented in Table 12 indicated that majority of the respondents 56.67 per cent had medium level of cosmopoliteness, followed by 23.33 per cent of the respondents had low level and 20.00 per cent of the respondents had high level of cosmopoliteness.

6.1.11 Scientific orientation

It was noticed from Table 13, that 65.83 per cent of the respondents had medium scientific orientation, followed by 17.50 per cent of the respondent had low and 16.67 per cent of the respondents had high scientific orientation.

6.1.12 Risk preference

It was noticed from Table 14, As regards risk preference most of the respondents (56.67 per cent) had medium level of risk preference, followed by 25.00 per cent of the respondents were having low level of risk preference. Whereas, 18.33 per cent of the respondents had high level of risk preference.

6.1.13 Knowledge

The data regarding the knowledge of cotton production technology attending FFS is summarized in Table 15.

It was delighted to know from Table that all of the respondents had knowledge about selection of land for cotton and before sowing of cotton soil testing is important. Whereas, 92.50per cent had knowledge about cart load requirement of compost/ha.

It was observed that all of the respondents had knowledge about improved variety of cotton and per hectare seed rate requirement of cotton. Whereas, 37.50 per cent of the respondents had knowledge about seed treatment of cotton.

It was noticed that 93.33 per cent of the respondents had knowledge about proper time of cotton sowing and 79.17 per cent of the respondents had knowledge about distance between two rows while sowing. Whereas, 64.17 per cent of the respondents had knowledge about recommended dose of fertilizer at the time of cotton sowing and 94.17 per cent of the respondents had knowledge about depth of application of chemical fertilizers in soil.

It was observed that 95.83 per cent of the respondents had knowledge about per hectare NPK requirement. While, 97.50 per cent of the respondents had knowledge about Neemark per cent for biological pest control and 98.33 per cent of the respondents had knowledge about spraying of Neemark for biological pest control.

It was also observed that 78.33 per cent of the respondents had knowledge about per hectare total requirement of water and 37.50 per cent of the respondents had knowledge about water management. Whereas, all of the respondents had knowledge about pest attack on cotton crop and control of insects pheromone trap are used. While, 87.50 per cent of the respondents had knowledge about behind leaf of tree Trichograma card is used and 98.33 per cent of the respondents had knowledge about leaf sucking pest. While, 56.67 per cent of the respondents had knowledge about control of sucking pest rogor is used and 48.33 per cent of the respondents had knowledge about control of bollworm Crysopa is used.

Further, it was clearly observed that 36.67 per cent of the respondents had knowledge about 10 thousand predators use for the biological pest control. While, all of the respondents had knowledge about time of harvesting and 67.50 per cent of the respondents had knowledge about per hectare production of cotton.

6.1.13.1 Knowledge level

It could be concluded that most of the respondents had medium level of knowledge about cotton production technology among farmers of FFS i.e. 55.00 per cent.

6.2 Extent of adoption of cotton production technology attending farmer field school

The data regarding the knowledge of cotton production technology attending FFS is summarized in Table 17.

It is revealed that 18.33 per cent of respondents had fully adopted recommended practices like selection of medium to heavy, well drained soil and 75.00 per cent of the respondents had fully adopted soil testing for NPK and micro nutrient content. While, most of the respondents 73.33 per cent had fully adopted recommended practices of application of compost to soil before sowing.

It is observed that cent per cent respondents had fully adopted improved variety of Cotton (Bt.) and all of the respondents had no adopted use of seed treatment. While, only 9.17 per cent of the respondents had fully adopted use of 4-6 kg seed per hectare and most of the respondents 85.00 per cent of the respondents had fully adopted sowing during 15th May to 15th June, 72.50 per cent of the respondents had fully adopted practices like 60 x 60 cm distance between two rows and 74.17 per cent of the respondents had partially adopted practices like application of 40.00 per cent N and full dose of P and K at the time of sowing. Whereas, 81.67 per cent of the respondents had partially adopted application of chemical fertilizer in soil 5 to 10 cm. in depth and 89.17 per cent of the respondents had fully adopted practices like Recommended dose of fertilizer per ha NPK 80:40:40.

It is indicated that 80.00 per cent of the respondents had fully adopted 5 per cent Neemark are used for biological pest control and 79.17 per cent of the respondents had fully adopted practices like 2-3 spraying of Neemark after 15 days interval for biological pest control. While, 25.00 per cent of the respondents had fully adopted practices like 700-750 mm per ha of total requirement of water and 22.50 per cent of the respondents had fully adopted practices like 70 per cent management of water.

It is seen that only 7.50 per cent of the respondents had fully adopted practices like use pheromone trap for pest control and 90.83 per cent of the respondents had fully adopted practices like Trichograma card behind the leaf of tree. Whereas, 85.00 per cent of the respondents had fully adopted practices like control of pest rogor is used. While, 15.00 per cent of the respondents had fully adopted practices like application of Crysopa predators for biological pest control 10 thousand

numbers per hectare for bollworm control and all of the respondents had fully adopted practices like cotton picking at morning hours.

6.2.1 Adoption level

It could be concluded that most of the respondents had medium level of adoption i.e. 74.17 per cent of the respondents.

6.3 Relationship of independent variables with adoption of cotton production technology by farmer attending FFS

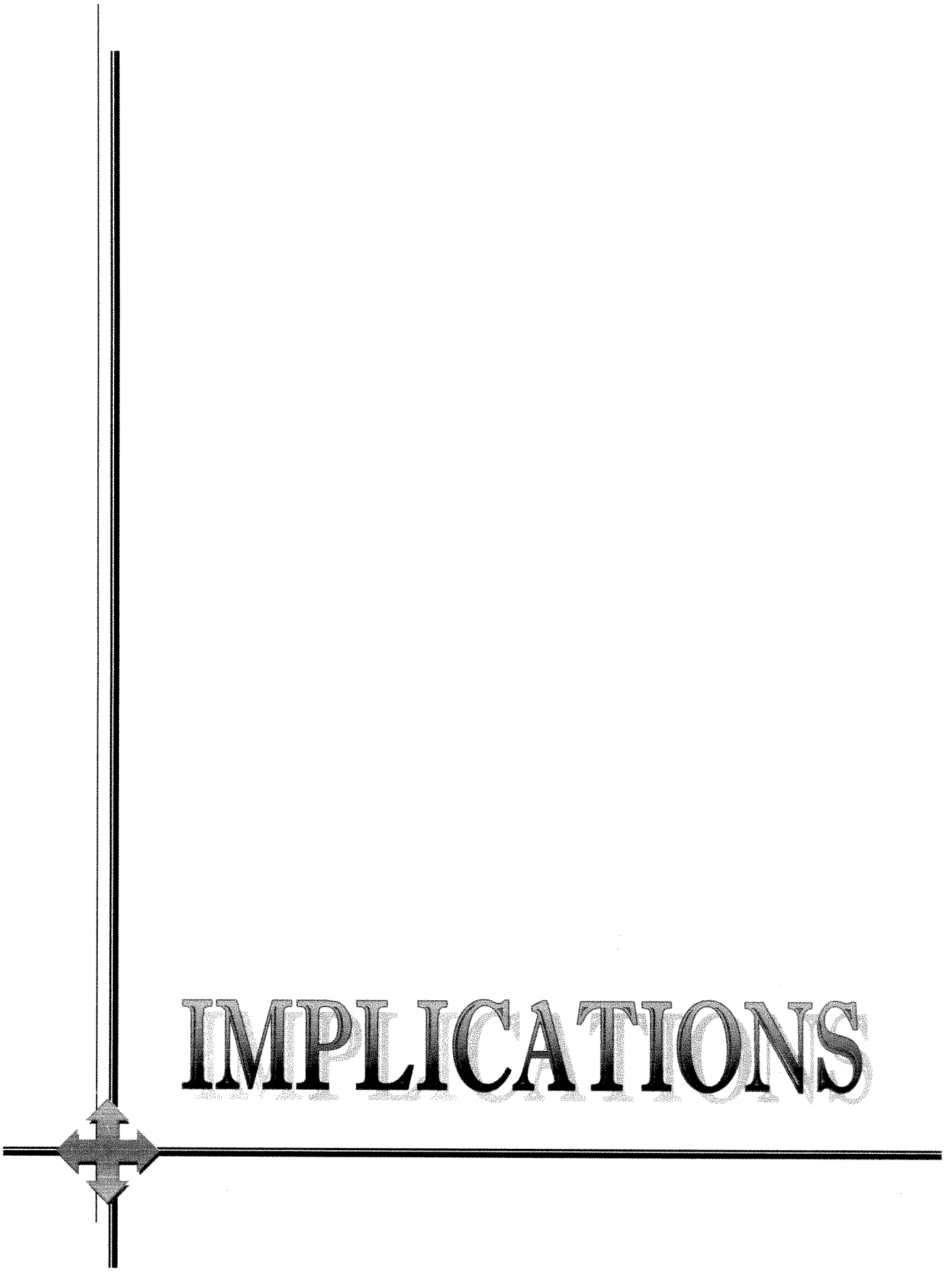
It is observed from Table 19 that out of thirteen variables size of land holding, annual income, type of family, size of family, socio-economic status, extension contact, scientific orientation, risk preference and knowledge had positive and significant relationship with the adoption of cotton production technology by farmers attending FFS at 0.05 per cent level of probability. While education and mass media exposure had positive and significant relationship with the adoption of cotton production technology by farmers attending FFS at 0.01 per cent level of probability. Only age showed negative and non-significant relationship and cosmopoliteness had positive but non-significant relationship with adoption.

6.4 Constraints faced by farmers in adoption of cotton production technology

The constraints encountered by respondents pertaining to aspects of cotton production technology attending FFS are summarized in Table 20.

It was observed that all of the respondents expressed difficulties like do not get sufficient labour for preparatory tillage and inter cultivation. Whereas, 93.33 per cent of the respondents expressed constraints like high cost of implements and 91.67 per cent of the respondents expressed difficulties like lack of money for seed at proper time. While, 99.17 per cent of the respondents expressed difficulties like high cost of hybrid seed and 89.17 per cent of the respondents expressed constraints like non availability of good quality of seed at proper time.

Table 20 also indicated that lack of water was expressed by 95.00 per cent of the respondents. While, 93.33 per cent of the respondents were expressed constraints like lack of electricity all of the respondents expressed difficulties like Fertilizers are too costly. Whereas, 98.33 per cent of the respondents were expressed constraints like application of insecticides/pesticides felt dangerous to health and 97.50 per cent of the respondents expressed difficulties like non availability of sufficient quantity of female labour for cotton picking.



IMPLICATIONS

Chapter VII

IMPLICATIONS

Taking the prop of the findings at hand from present investigation, following suggestion can be put forth.

It was observed that most of the respondents had medium adoption level with regard to cotton production technology. Hence, it is suggested that more number of training programme should be arranged with demonstrations by the concerned extension personnel to enhance the level of adoption of cotton production technology practices by the farmers.

Further, it was apparent from the relevant data that variables like education, size of land holding, annual income, type of family, size of family, socio-economic status, mass media exposure, extension contact, scientific orientation, risk preference and knowledge had positive significant relationship with the adoption of cotton production technology.

High cost of implements, high cost of hybrid seed, lack of money for seed at proper time were the constraints expressed by the respondents hence it is suggested that these inputs be made available on subsidized rate to the farmers.

In order to overcome the constraints about non availability of good quality seed at proper time, it is suggested that concerned extension agency may provide the required seed to the farmers in the nick of time.

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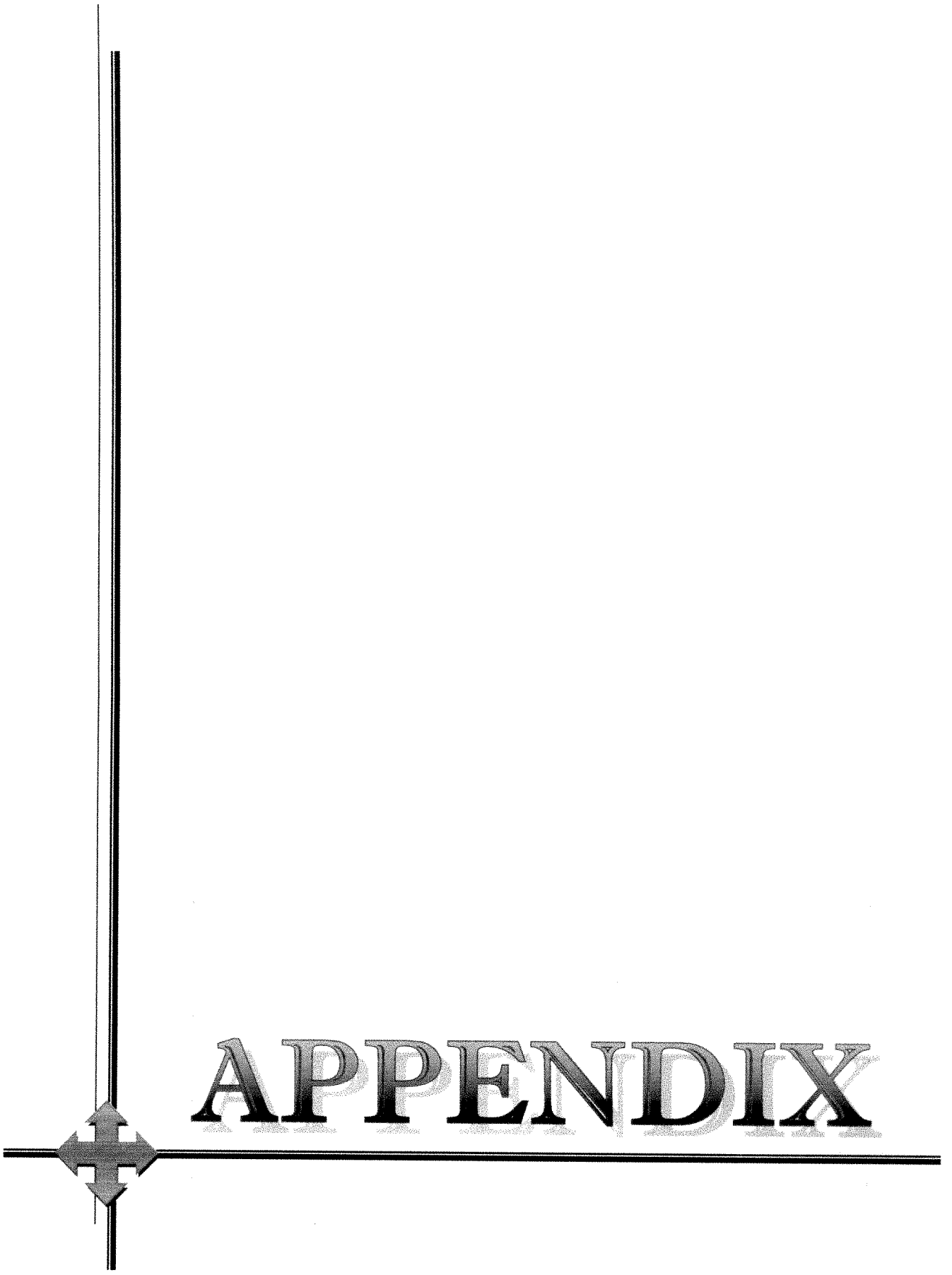


APPENDIX

विस्तार शिक्षण विभाग,
कृषि महाविद्यालय, लातूर
वसंतराव नाईक मराठवाडा कृषि विद्यापीठ, परभणी

परिशिष्ट

संशोधनाचा विषय :- शेती शाळेतील शेतकऱ्यांचा कापुस उत्पादन तंत्रज्ञानाचा अवलंब

संशोधकाचे नांव :- हरणे भास्कर प्रभाकर

मार्गदर्शकाचे नांव :- डॉ. व्ही. बी. कांबळे
सहयोगी प्राध्यापक (विस्तार शिक्षण)
कृषि महाविद्यालय, लातूर

विभाग 'अ'

शेतकऱ्याचे नांव :- श्री./श्रीमती.....

गांव :- .....

तालुका :- ..... जिल्हा .....

१) वय :- ..... वर्षे

२) शिक्षण :-
- अ) अशिक्षित
- ब) फक्त लिहिता वाचता येते.
- क) प्राथमिक शिक्षण (इ. १ ली ते ४ थी)
- ड) माध्यमिक शिक्षण (इ. ५ वी ते १०वी)
- ई) उच्च माध्यमिक शिक्षण (इ. ११ वी ते १२ वी)
- उ) महाविद्यालयीन शिक्षण (इ.१२ वी नंतर)

३) जमीन धारणा :-

अ. क्र.	जमिनीचा प्रकार	क्षेत्र	
		हेक्टर	आर
१.	कोरडवाहू		
२.	बागायती		
३.	पडीक		
	एकूण		

४) वार्षिक उत्पन्न :-

अ) मुख्य व्यवसाय : ----------

ब) दुय्यम व्यवसाय : ----------

एकूण : ----------

५) **कुटुंबाचा प्रकार :-**

अ) एकत्र कुटुंब : ----------

ब) विभक्त कुटुंब : ----------

६) **कुटुंबातील सदस्य संख्या :-**

अ.क्र.	कुटुंबातील सदस्य	पुरूष	स्त्री	एकूण
अ)	लहान कुटुंब (१-५ व्यक्ती)			
ब)	मध्यम कुटुंब (६-१० व्यक्ती)			
क)	मोठे कुटुंब (१० व्यक्तीपेक्षा जास्त)			

७) **सामाजिक आर्थिक दर्जा :-**

अ) व्यवसाय

१) व्यवसाय नाही
२) अकुशल
३) अर्धकुशल
४) कुशल
५) शेती / धंदा

ब) जमीन (हे.)

१) जमीन नाही
२) अति अल्पभूधारक (०.०१-१.० हे.)
३) अल्प भूधारक (१.०१-२.० हे.)
४) साधारण भूधारक (२.०१ -४.० हे.)
५) मध्यम भूधारक (४.०१-१०.० हे.)
६) जास्त भूधारक (१०.०१ पेक्षा जास्त)

क) जात

१) अनुसूचित जाती/जमाती
२) अति मागासवर्गीय
३) मागासवर्गीय
४) अमागासवर्गीय
५) उच्चवर्गीय

ड) शिक्षण

१) अशिक्षित
२) फक्त लिहिता वाचता येते.
३) प्राथमिक शिक्षण
४) माध्यमिक शिक्षण
५) उच्च माध्यमिक

६) पदवी

इ) सामाजिक सहभाग

१) कोणत्याही संस्थेचा सभासद नाही.
२) एका पेक्षा जास्त संस्थेचा सभासद नाही.
३) सामाजिक व राजकीय सभासद.
४) आर्थिक हातभार किंवा सार्वजनिक कामासाठी पैसे उभारणे.
५) प्रत्यक्ष कार्यालयात जाणारा.
६) सामाजिक कार्याशी संबंधित.

ई) मालमत्ता

१) नाही
२) एक शेती, जनावरे, किंवा साधने
(बैलगाडी, म्हैस, गाय, सायकल)
३) दोन शेती, जनावरे, किंवा साधने
(बैलगाडी, रेडीओ)
४) तीन शेती अवजारे किंवा साधने
(सुधारलेली शेती अवजारे, वर्तमानपत्रे, विजेची उपकरणे)
५) पाच ते दहा शेती अवजारे किंवा साधने
(गोबर गॅस, पंपसेट, मोटार सायकल)
६) दहा पेक्षा जास्त शेत जनावरे किंवा साधने
(ट्रॅक्टर, मोटार गाडी, दूर चित्रवाहीनी)

ए) घर

१) झोपडी
२) कच्चे घर
३) विटा व कौलांचे घर
४) सिमेंटचे घर
५) सिमेंटचे दुमजली घर

८) माहिती घेण्यासाठी उपयोगात येणारे माध्यम :-

अ.क्र.	माध्यम	नेहमी	कधीतरी	कधीच नाही
१.	आकाशवाणी			
२.	दुरदर्शन			
३.	वर्तमानपत्र			
४.	मासिक			
५.	शैक्षणिक चित्रपट			

६.	शेतकरी मेळावे			
७.	प्रात्यक्षिक			
८.	शेतीविषयक साहित्य			
९.	इतर			

९) विस्तार संपर्क :-

अ. क्र.	अधिकारी	रोज	आठवड्यातून एकदा	पंधरा दिवसातून एकदा	महिन्यातून एकदा	कधीच नाही
१.	कृषि अधिकारी					
२.	कृषि विकास अधिकारी					
३.	विस्तार अधिकारी					
४.	कृषि तज्ञ					
५.	विषय तज्ञ					
६.	प्रगतीशील शेतकरी					
७.	संपर्क अधिकारी					
८.	नातेवाईक					
९.	इतर					

१०) बाह्य संपर्क :-

अ.क्र.	तपशील	सतत	क्वचित	नाही
१.	तालुक्याचे ठिकाण			
२.	जिल्ह्याचे ठिकाण			
३.	तहसील कार्यालय			
४.	राजधानीचे ठिकाण			
५.	आठवडी बाजार			
६.	प्रगतशील शेतकऱ्याची जमिन			
७.	प्रदर्शने			
८.	कृषि विद्यापीठ			

९.	कृषि संशोधन केंद्र			
१०.	कृषि विज्ञान केंद्र			
११.	इतर			

११) शास्त्रीय उगमस्त विधाने :-

अ. क्र.	शास्त्रीय उगम विधाने	पूर्णत: मान्य	मान्य	सांगता येत नाही	अमान्य	पूर्णत: अमान्य
१.	जुन्या शेती पध्दतीपेक्षा नवीन शेती पध्दती शेतकऱ्यास जास्त फायदा देते.					
२.	शेतकऱ्यांची परंपरागत शेती पध्दती ही आजसुध्दा अंमलात आणण्यासाठी चांगली आहे.					
३.	एखाद्या अनुभवी शेतकऱ्याने सुध्दा नवीन शेतीतंत्र वापरावे.					
४.	जरी नवीन शेती शिकण्यास शेतकऱ्यांना वेळ लागत असला तरी शेतकऱ्यांना त्यांच्या कामाचा मोबदला मिळतो.					
५.	चांगला शेतकरी नवीन शेती तंत्राचा उपयोग करतो.					
६.	शेतकऱ्यांचे जीवनमान सुधार-ण्यासाठी परंपरागत शेती पध्दती बदलली पाहिजे.					

१२) जोखीम पत्करण्याची क्षमता :-

अ. क्र.	विधान	पूर्णपणे सहमत	सहमत	अनिश्चित	असहमत	पुर्णपणे असहमत
१.	शेतकऱ्याने जास्त पिके पेरावी व एक किंवा दोन पिके पेरणीमुळे होणाऱ्या नुकसानीचा धोका टाळावा.					

२.	शेतकऱ्याने साधारणपणे चांगली संधी साधून जास्त नफा मिळवावा पण धोका नसलेली कमी उत्पन्नातून समाधान मानू नये.					
३.	जो शेतकरी साधारण शेतकऱ्यापेक्षा जास्त धोका पत्करण्यास तयार असतो तो आर्थिक दृष्ट्या यशस्वी होतो.					
४.	जेव्हा यशस्वी होण्याची शक्यता असते, तेव्हा धोका पत्कारावा.					
५.	इतर बहुतांशी शेतकऱ्यांनी यशस्वीपणे नवीन पध्दतीचा अवलंब केल्यानंतर शेतकऱ्याने तिचा अवलंब करणे चांगले.					
६.	शेतातील अगदी नवीन पध्दतीचा अवलंब करण्यात जोखीम असते. परंतु अशी जोखीम सुध्दा मोलाची.					

१३) ज्ञान चचणी :-

१. कापसाच्या लागवडी करीता कोणत्या प्रकारच्या जमिनीची निवड करावी?
अ) हलकी ब) मध्यम क) मध्यम ते खोल उत्तम निचऱ्याची

२. कापसाची लागवड करण्यापूर्वी कसले माती परीक्षण आवश्यक आहेत?
अ) फक्त सूक्ष्म अन्नद्रव्य परीक्षण
ब) फक्त नत्र, स्फुरद, पालाश परीक्षण
क) दोन्हीही

३. कापूस लागवडीकरीता किती गाड्या शेणखत आवश्यक आहेत?
अ) ५ - १० ब) १५ - २५ क) २५ पेक्षा जास्त

४. कापूस लागवडी करीता कुठले वाण वापरतात?
अ) बी.टी. ब) देशी क) अमेरिकन

५. पेरणी पूर्वी बियाणास कोणत्या प्रकारची बीज प्रक्रिया करावी?
अ) गाउचो ब) थायरम क) कार्बेन्डाझीम

६. कापसाच्या पेरणीसाठी हेक्टरी किती बियाणे लागते?
अ) ४-६ किग्रॅ. ब) १०-१४ किग्रॅ. क) १५-२० कि.ग्रॅ.

७. कापूस पेरणीसाठी योग्य वेळ कुठली?
अ) १५ मे - १५ जून

ब) १६ जुलै - १५ ऑगस्ट
क) ऑगस्ट नंतर

८. पेरणीसाठी दोन ओळीतील अंतर किती असावे?
अ) ६०x६० सेमी ब) ९०x९० सेमी क) १२०x९० सेमी

९. कापूस पेरणीच्या वेळी खते देण्याची मात्रा सांगा?
अ) अर्धे नत्र (अर्धे पेरणीनंतर ३०-३५ दिवसांनी), पूर्ण स्फुरद: पूर्ण पालाश
ब) पूर्ण नत्र: अर्धे स्फुरद: अर्धे पालाश
क) पूर्ण नत्र: अर्धे स्फुरद: पूर्ण पालाश

१०. रासायनिक खतांच्या स्वरूपात अन्न द्रव्य टाकतांना ती जमिनीत किती खोलवर पडली पाहिजेत?
अ) ५-१० सेमी ब) १-५ सेमी क) २०-२५ सेमी

११. कापसासाठी प्रती हेक्टर लागणाऱ्या रासायनिक खतांची मात्रा किती असावी लागते?
अ) ८०:४०:४० ब) ४०:४०:४० क) ४०:८०:४०

१२. जैविक कीड नियंत्रणासाठी किती टक्के निंबोळी अर्काची फवारणी करावी?
अ) ३% ब) ५% क) २%

१३. जैविक कीड नियंत्रणासाठी निंबोळी अर्काच्या किती फवारण्या किती दिवसाच्या अंतराने कराव्यात?
अ) १०-१२ फवारण्या १४ दिवसाच्या अंतराने
ब) २-३ फवारण्या १५ दिवसाच्या अंतराने
क) ७-८ फवारण्या ८ दिवसाच्या अंतराने

१४. कापसासाठी प्रती हेक्टरी पाण्याची एकूण गरज किती?
अ) ७००-७५० मि.मी. ब) ४००-५०० मि.मी. क) २००-३०० मि.मी.

१५. पाणी व्यवस्थापन खालीलपैकी कसे करावे?
अ) ७०% पाणी बोंडे धरू लागल्यापासून फुटे पर्यंत आवश्यक.
ब) ऑक्टोबर मध्ये पाने गळतात तेव्हा अत्यंत आवश्यक
क) दोन्हीही बरोबर

१६. कापसावर कोणत्या किडी पडतात?
अ) मावा ब) तुडतुडे क) बोंड अळी ड) तिन्हीही

१७. कीड नियंत्रणासाठी कोणत्या सापळ्याचा उपयोग होतो?
अ) लोखंडी सापळा ब) कामगंध सापळा क) इतर सापळा

१८. ट्रायकोग्रामा कार्ड झाडाच्या कुठल्या भागाला लावतात?
अ) पानांच्या मागे ब) फांद्यांना क) खोडांना

१९. कोणत्या प्रकारचे कीटक कापसाच्या पानातील रस शोषण करतात?
अ) भुंगा ब) हिरवी बोंड अळी क) मावा

२०. रस शोषणाऱ्या किडींसाठी कोणते कीटकनाशक वापरतात?
अ) रोगर ब) एन्डोसल्फान क) डी.डी.टी.

२१. बोंड अळीच्या नियंत्रणासाठी कोणते जैविक कीड नियंत्रक वापरतात?
अ) क्रायसोपा ब) ट्रायकोडर्मा क) एच.एन.पी.व्ही.

२२. जैविक कीड नियंत्रक भक्षक अळीची प्रती हेक्टरी संख्या किती असावी?
अ) १०,००० ब) २०,००० क) ३०,०००

२३. कापूस वेचणी कोणत्या वेळी करावी?
अ) संध्याकाळच्या वेळी ब) दुपारच्या वेळी क) स्वच्छ व सकाळच्यावेळी

२४. शिफारसीनुसार लागवड केल्यानंतर कापसाचे प्रती हेक्टरी उत्पादन कसे मिळते?
अ) कोरडवाहू १४-१५ क्विं., बागायती १९-२२ क्विं.
ब) कोरडवाहू ८-१० क्विं., बागायती ७-९ क्विं.
क) कोरडवाहू २०-२२ क्विं., बागायती २५-२८ क्विं.

विभाग 'ब'

शेतकऱ्यांच्या शेतीशाळेचे अवलंब :-

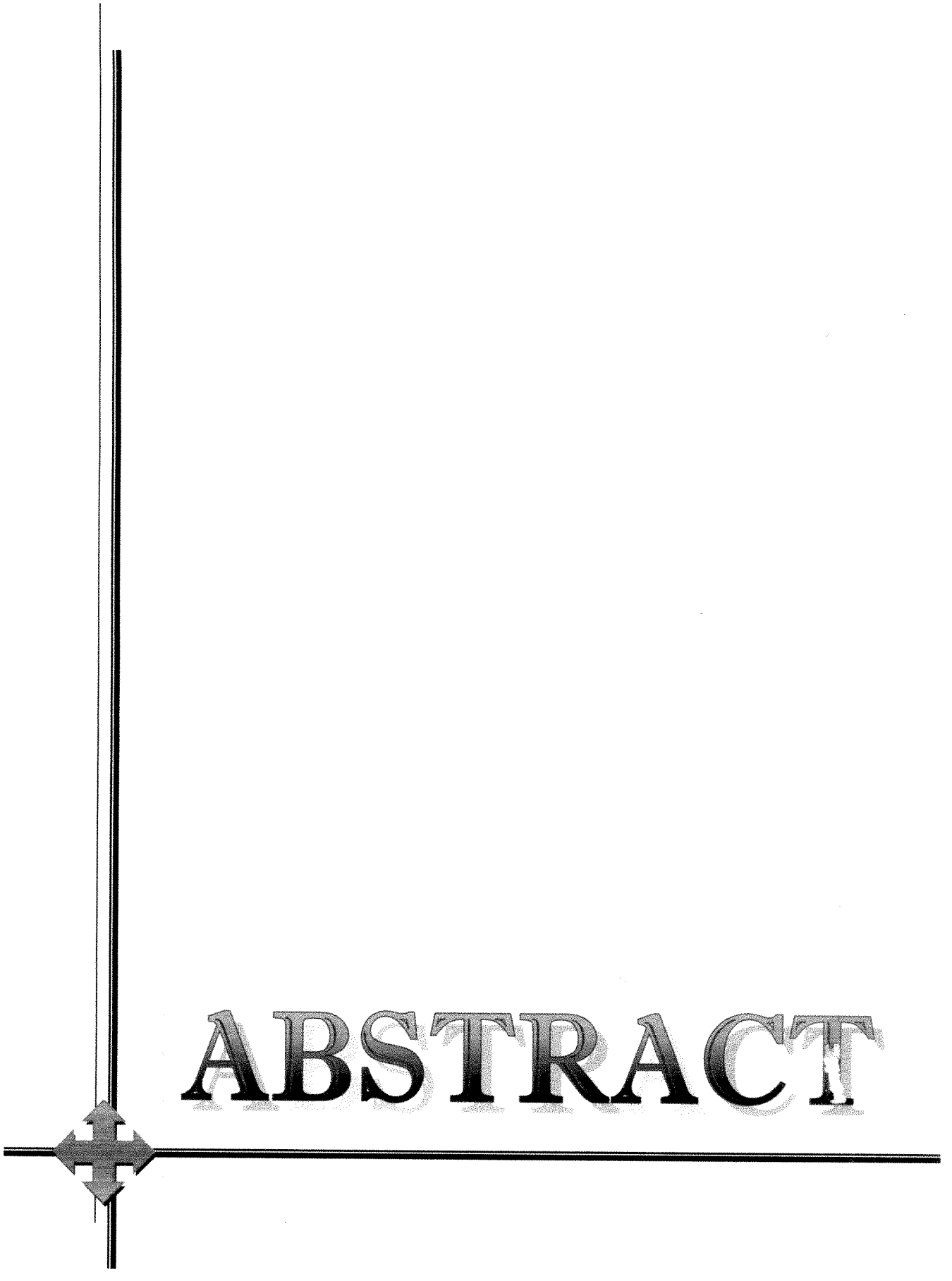
अ. क्र.	तंत्रज्ञान	अवलंब किती प्रमाणात केले.		
		पूर्णपणे	अंशत:	केले नाही
१.	कापसाच्या लागवडीकरीता मध्यम ते खोल उत्तम निचऱ्याच्या जमिनीची निवड केली.			
२.	कापूस लागवडीसाठी फक्त सुक्ष्म अन्न द्रव्य पध्दत किवा नत्र, स्फुरद, पालाश परीक्षणासाठी वापरले.			
३.	कापूस लागवडीकरिता १५-२५ गाड्या शेण खतांचा वापर केला.			
४.	कापूस लागवडीकरीता कापसाचा बी.टी. वाण वापरला.			
५.	बीजप्रक्रिया पेरणीपूर्वी बियाणास १०५ ग्रॅम प्रति किलो कार्बेन्डाझीम ५०% पाण्यात विरघळणारे चोळून पेरणी केली.			
६.	कापसाच्या पेरणीसाठी ४-६ किग्रॅ. बियाणे वापरले.			
७.	पेरणीसाठी योग्य वेळ १५ मे ते १५ जून.			
८.	दोन ओळीतील अंतर ६०x६० सेंमी. ठेवले.			
९.	पेरणीच्या वेळी खते देण्याची मात्रा ५०% नत्र, पूर्ण स्फुरद, पूर्ण पालाशचा वापर केला.			
१०.	रासायनिक खतांच्या स्वरूपात अन्नद्रव्ये टाकतांना ती ५-१० सेंमी. खोलवर पडली.			
११.	कापसासाठी प्रती हेक्टरी रासायनिक खतांचे प्रमाण ८०:४०:४० ठेवले.			
१२.	जैविक कीड नियंत्रणासाठी ५% निंबोळी अर्काची फवारणी केली.			

१३.	जैविक कीड नियंत्रणासाठी २-३ फवारण्या १५ दिवसांच्या अंतराने केल्या.			
१४.	कापसासाठी ७००-७५० मि.मी. प्रती हेक्टरी पाणी वापरले.			
१५.	कापसासाठी पाणी व्यवस्थापन ७०% पाणी बोंडे धरू लागल्यापासून फुटे पर्यंत वापरले.			
१६.	कीड नियंत्रणासाठी कामगंध सापळ्याचा वापर केला.			
१७.	ट्रायकोग्रामा कार्ड झाडांच्या पानांच्या मागे लावले.			
१८.	रस शोषणाऱ्या किडींसाठी रोगर हे कीटकनाशक वापरले.			
१९.	बोंड अळीच्या नियंत्रणासाठी जैविक कीड नियंत्रक क्रायसोपा भक्षक अळीची प्रती हेक्टर १०,००० संख्या वापरली.			
२०.	कापूस वेचणी स्वच्छ व सकाळच्या वेळी केली.			

विभाग 'क'

अवलंबनातील अडचणी :-

१) पूर्व व अंतर मशागतीस मजूर मिळत नाही.
२) सुधारित अवजारे महाग आहेत.
३) बियाणास वेळेवर पैसा उपलब्ध होत नाही.
४) बियाणे महाग आहेत.
५) वेळेवर चांगल्या प्रतीचे बियाणे मिळत नाही.
६) पाण्याचा अपुरा पुरवठा.
७) विद्युत पुरवठा खंडित होणे किंवा विद्युत पंप चालू नसणे.
८) रासायनिक खते महाग आहेत.
९) किटक नाशके वापरणे आरोग्यास हानिकारक आहेत.
१०) कापूस वेचणीसाठी स्त्री मजूर वेळेवर व मुबलक प्रमाणात मिळत नाहीत.
११) इतर (नमुद करा).



ABSTRACT

Department of Extension Education

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THESIS ABSTRACT

Thesis Title

ADOPTION OF COTTON PRODUCTION TECHNOLOGY AMONG FARMERS OF FARMER FIELD SCHOOL

Name of the student : **Mr. Harne B.P.** Research Guide : **Dr. V. B. Kamble**

Reg. No. : **2012 A/ 72 ML**

Degree : **M.Sc. (Agri.)** Major Subject : **Extension Education**

The present study was conducted mainly with the objective to study the extent of adoption of cotton production technology among farmers of farmer field school. For the study, Jalna district was selected as area of cotton was high as compare to other district of Marathwada region. Three talukas viz., Jalna, Badnapur and Bhokardan were selected and four villages from each talukas were selected randomly. From each village ten respondents who cultivating cotton crop were randomly selected for constituting the sample size 120. Ex-post Facto research design was used for the study.

Majority of the respondents had medium age, less than half of the respondents possessed middle level of education, medium land holding, medium annual income, most of the respondents belongs to joint family with medium family size, middle socio-economic status, medium mass media exposure, medium extension contact, medium cosmopoliteness, medium scientific orientation, medium risk preference and possessed medium knowledge.

Majority of the respondents fully adopted the cultivation practices like application of compost/ha, improved variety, sowing date, sowing distance, application of chemical fertilizer, recommended dose of NPK, application of Neemark for pest control, use of Trichograma card, rogor is used for control of pest, cotton picking time, whereas, majority of the respondents did not adopted the package of

practices like seed treatment, seed rate, use of pheromone trap and application of Crysopa predators.

Major constraints faced by the respondents were not get sufficient labour of preparatory tillage and inter cultivation, high cost of hybrid seed, fertilizers are too costly, application of insecticides/pesticides felt dangerous to health.

The variables like education, size of land holding, annual income, type of family, size of family, socio-economic status, mass media exposure, extension contact, scientific orientation, risk preference and knowledge had positive significant relationship with the adoption of cotton production technology. Whereas, age showed negative and non-significant relationship and cosmopoliteness had positive but non-significant relationship with adoption.