TRAINING NEEDS OF RAINFED COTTON GROWERS FROM LOW PRODUCTIVITY AREA

By

Mr. Dhawale Sandip Dada
(Reg. No. 012/189)

A Thesis submitted to the

**MAHATMA PHULE KRISHI VIDYAPEETH,
RAHURI - 413 722, DIST.AHMEDNAGAR,
MAHARASHTRA, INDIA**

in partial fulfillment of the requirements for the degree

of

MASTER OF SCIENCE (AGRICULTURE)

in

AGRICULTURAL EXTENSION

DEPARTMENT OF EXTENSION EDUCATION

POST GRADUATE INSTITUTE
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C E R T I F I C A T E

This is to certify that the thesis entitled **TRAINING NEEDS OF RAINFED COTTON GROWERS FROM LOW PRODUCTIVITY AREA,** submitted to the Faculty of Agriculture, Mahatma Phule Krishi Vidyapeeth, Rahuri, Dist. Ahmednagar, Maharashtra (India), in partial fulfillment of the requirements for the degree of **MASTER OF SCIENCE (AGRICULTURE)** IN **AGRICULTURAL EXTENSION,** embodies of results of piece of bonafide research work carried out by **Mr. SANDIP DADA DHAWALE,** under my guidance and supervision and that no part of the thesis has been submitted to any other University for degree or diploma.

The assistance and help received during the course of this investigation and sources of reference have been duly acknowledged.

Place : MPKV, Rahuri **(G.K. Waman)**

Dated : /06/2014 **Research Guide**

Dr. B.R. Ulmek
Associate Dean,
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Rahuri - 413 722, Dist. Ahmednagar,
Maharashtra, (INDIA)

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This is to certify that the thesis entitled **TRAINING NEEDS OF RAINFED COTTON GROWERS FROM LOW PRODUCTIVITY AREA,** submitted to the Faculty of Agriculture, Mahatma Phule Krishi Vidyapeeth, Rahuri, Dist. Ahmednagar, Maharashtra (India), in partial fulfillment of the requirements for the degree of **MASTER OF SCIENCE (AGRICULTURE)** IN **AGRICULTURAL EXTENSION,** embodies of results of piece of bonafide research work carried out by **Mr. SANDIP DADA DHAWALE,** under the guidance and supervision of **Dr. G.K. WAMAN**, Assistant Professor, Department of Extension Education, Mahatma Phule Krishi Vidyapeeth, Rahuri and that no part of the thesis has been submitted for any other Degree or Diploma.

Place : MPKV, Rahuri

Dated : /06/2014. **(B.R. Ulmek)**

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Place: MPKV, Rahuri **(Dhawale S.D.)**

Date: / /2014

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ABSTRACT

TRAINING NEEDS OF RAINFED COTTON GROWRS FROM LOW PRODUCTIVITY AREA

By

Mr. Dhawale Sandip Dada

MASTER OF SCIENCE (AGRICULTURE)
in
AGRICULTURAL EXTENSION
MAHATMA PHULE KRISHI VIDYAPEETH, RAHURI
2014

Research Guide : Dr. G.K. Waman

Department : Extension Education

Cotton belongs to Malvaceae family. Cotton is a principle cash fibre crop in India. Cotton will be cultivated under irrigated or rainfed condition. Cotton has following four species 1) *Gossypium arboreum,* 2) *Gossypium herbaccum,* 3) *Gossypium hirsutum* and 4) *Gossypium barbodense*.

Out of these four species *Gossypium arboreum* and *Gossypium herbaccum* are diploid species referred as Deshi cotton and having low productivity and low quality cotton contribute 30% production of cotton. *Gossypium hirsutum* and *Gossypium barbadense* are tetraploid species contribute 70% cotton production having since quality fibre. In India highest cotton producing state is Gujarat (95 lakh bales) followed by Maharashtra (67 lakh bales).

The present study was conducted with the objectives, the study of profile of rainfed cotton growers, sources of information used by the respondents, correlation between independent and dependent varaibles, to ascertain the training

needs of rainfed cotton growers, to know the constraints faced and to obtain the suggestion of the rainfed cotton growers for overcoming the constraints.

The present investigation was conducted in Jamkhed and Karjat tahsils of Ahmednagar district. Among these tahsils total 120 respondents was selected by proportionate random sampling method.

It was observed that 54.17 per cent of the respondents comes under middle age group. Majority of the respondents i.e. 50 per cent respondents having secondary Education 63.33 per cent of the respondents comes under medium group of family. 50 per cent of the respondents having medium group of land holding. 83.33 per cent respondent's having medium group of annual income and 50 per cent of the respondents comes under medium group of social participation. The study revealed that about 54.17 per cent respondents belonged to the medium category of source of information used. 69.16 per cent of respondent's observed that they were belonged to the fair group of cropping pattern 53.33 per cent of respondents had medium level of knowledge about cotton cultivation. It was observed that a majority of the respondents i.e. 50 per cent comes under medium need of training need category.

It was observed that cotton growers needs training in area like, plant protection, fertilizer management, Water management, Inter cropping, varieties, spacing, inter cultivation, soil type, seed treatment, preparatory tillage, sowing time marketing, picking, storage, Transportation.

Among the selected characteristics of the cotton growers, only family size, cropping pattern and source of information exhibited a non-significant relationship with their training needs. Whereas age, education, annual income and social participation exhibited negative and significant relationship with their training needs at 5 per cent probability level. Size of land holding and knowledge of the cotton growers exhibited positive and significant relationship with the training needs.

It was observed that a majority of the cotton growers faced the constraints viz., high labour wages (81.66 per cent), unavailability of electricity (78.33 per cent), lack of market information (76.94 per cent), lack of knowledge about germination percentage (75.00 per cent), lack of cotton storage facility (74.16 per cent), lack of trainings (75.00 per cent), lack of cooperative market units (72.50 per cent), high cost of plant pesticide and fungicide (75.00 per cent), lack of extension services at proper time (58.33 per cent), high cost of seeds (58.33 per cent), knowledge of grading (58.33 per cent).

It was observed that, 90.83 per cent of cotton growers suggested that to develop efficient and effective marketing system followed by establishment of cotton storage facility (85.83 per cent). Fertilizers should be provided at subsidized rates (81.67 per cent), to established the co-operative marketing unit (80.83 per cent) and training and demonstrations should be organized for cotton growers (74.16 per cent). A majority of them suggested that guidance about detail package of practices of cotton cultivation (69.17 per cent), to

make available seeds at cheaper rate (68.33 per cent) to reduce the tedious process of sanctioning the subsidies on micro irrigation appliances (59.17 per cent), bank should provided loan with minimum interest (56.67 per cent) and timely supply of plant protection appliances (55.00 per cent).

These rainfed cotton growers need to train by organizing one day training programme at their own village by Agriculture University and also Agricultural college through lecture and practical combine method before commencement of every season. There was a need to study the rainfed cotton growers in respect of Integrated Pest Management (IPM) in cotton crop. However, this study will be useful as a bench mark for further proble into the studies of similar types.

The findings of the present investigation would be helpful to the administrators, extension workers, social and research workers in order to develop future strategy to make use of potentialities of rainfed cotton growers for their more effective and efficient involvement in cotton cultivation.

The study will give certain guidelines to the research workers for conducting studies on cotton growers about various aspects like, plant protection, fertilizer management, water management, inter cropping, varieties, spacing followed by inter cultivation, soil type, seed treatment, preparation tillage, marketing, picking, storage and transportation. There was need to study the cotton growers in respect of Integrated Pest Management in Cotton crop.

CANDIDATE'S DECLARATION

I hereby declare that this thesis or part there of has not been submitted by me or other person to any other University or Institute for a Degree or Diploma

Place : MPKV, Rahuri (S.D. Dhawale)

Dated : /06/2014

1. INTRODUCTION

1.1 Introduction

Cotton belongs to Malvaceae family cotton is a principle cash fibre crop in India. Cotton will be cultivated under irrigated or rainfed condition. In India mainly four species of cotton are cultivated. These species are 1) *Gossypium arboreum*, 2) *Gossypium herbaccum*, 3) *Gossypium hirsutum*, 4) *Gossypium barbadense* out of these four spp. *Gossypium arboreum* and *Gossypium herbaccaum* are diploid spp. referred as Deshi cotton and having low productivity and low quality cotton in contribute 30 per cent production of cotton.

Current estimates for world production was about 25 million tones or 110 million bales annually, accounting for 2.5 per cent of the world arable land. China was the world's largest producer of cotton. The USA had been the largest production of cotton.

Gossypium hirsutum and Gossypium barbadense are tetraploid species contribute 70 per cent cotton production having since quality fibre. In India highest cotton producing state is Gujarat (95 lakh bales) followed by Maharashtra (67 lakh). In Maharashtra mostly cotton are cultivated under rainfed condition through tradition method. So, production of cotton is low with low quality. Extension agencies are engaged in various sector of development in the country and are working for giving the training to the farmer about new improved practices.

All the rainfed cotton growers from this area cultivate the cotton on traditional method. The average yield under such

cultivation was comparatively less because of lack of knowledge about improved package of practices. The present knowledge of farmers was identified and steps should be taken to improve their knowledge through process of training. To increase the production, efficiency and quality of rainfed cotton crop, training programme was prove useful in view of this the present investigation was entitled, Training needs of rainfed cotton growers from low productivity area was planned.

1.2 Importance of Training

Training refers to an act, process or method of one who trains. Training indicates a planned activity to which a person was subjected to induce learning. Training aims at behavioral changes to be used in life or vocation. It has a sense of immediacy about application.

Training helps the individual to reach his maximum potential by way of increased knowledge, improved skills and changed attitudes enabling him to perform his job predictably according to established standards. Training was an integral part of the overall strategy of agricultural development. India being an agrarian country, where a major share of national agricultural production and food security was ensured by small and marginal farmers with poor resource, knowledge and skill base, it was highly imperative to design and implement capacity building programmes to capacitate the farmers to harness the benefit of frontier technologies and practices.

The success of any training programme leading to expected terminal behavior on the part of the participants depends very much on proper selection and skillful use of the methods of training. During the last two decades, many new methods have been developed, tested, combined and adapted to different learning situation. While some of these diverse methods are entirely new, others are more or less imaginative adaptations of the old methods. Some of these methods were too simple that any trainer without any special preparations can use; while others were fairly sophisticated and need adequate expertise and experience on the part of the trainers.

To increase the production and efficiency of the rainfed cotton crop, training programme was to be prove useful. In view of this, the present investigation was entitled, **Training needs of rainfed cotton growers from low productivity areas**, was planned.

1.3 Specific objectives of the study

i. To study the profile of rainfed cotton growers.
ii. To study the sources of information used by the rainfed cotton growers.
iii. To study correlation between independent and dependent variables.
iv. To ascertain the training needs of rainfed cotton growers.
v. To know the constraints faced and to obtain the suggestions of the rainfed cotton growers for overcoming the constraints.

1.4 Hypothesis

In the course of investigation, hypothesis was, there was a exist relationship between personal and socio-economic characteristics of rainfed cotton growers and their training needs of rainfed cotton growers from low productivity area.

1.5 Importance of the study

Up till now no such research study has been conducted on cotton growers in Jamkhed and Karjat tahsil of Ahmednagar district. In these two tahsils, most of the cotton was cultivated on rain water only. So, the productivity of cotton was very low as compare to other tahsils. There was much scope to increase the productivity by conducting such study in these areas. The present investigation was mainly focus on determining the socio-economic characteristics of cotton growers associated with their training needs for the use of improved technology.

1.6 Limitation of the study

This study was confined to 120 cotton growers selected from 14 villages from Jamkhed and Karjat tahsils of Ahmednagar District only. Hence, the findings of the present study was applicable to only those localities having similar environmental, ecological and socio-economic condition. This study was area specific and time consuming.

2. REVIEW OF LITERATURE

Review of literature is an important aspect in social research since it provides necessary guidelines and motivates the researcher to proceed in desirable direction. Literature relevant to the present topic of research collected from various books, journals, periodicals are incorporated in present chapter pertaining to selected variable under the study. The literature reviewed is presented in following order.

2.1 Profile of the Rainfed cotton growers

2.2 Sources of information used by rainfed cotton growers

2.3 Knowledge of rainfed cotton growers about cotton cultivation

2.4 Training needs of rainfed cotton growers.

2.5 Relationship between training needs of rainfed cotton growers and their personal and socio-economic characters.

2.6 Constraints faced by the rainfed cotton growers.

2.7 Suggestions made by the respondent rainfed cotton growers.

2.1 Profile of the Rainfed cotton growers

2.1.1 Age

Kharat (1996) found that, 37.45 per cent of the pomegranate growers were in the category of young age group, 34.83 per cent were in middle age group and 27.72 per cent were in old age group.

Jassi *et al.* (1998) while assessing training needs of the young farmers about horticultural and vegetable crops

reported that, 44.00 per cent of them were in young age group, 28.00 per cent were in middle age group and 28.00 per cent were in old age group.

Ravindra *et al.* (1998) found that, most (61.25 per cent) of the respondents were in young age group and 28.75 per cent of the respondents were in middle age group whereas 10.00 per cent of the respondents were in old age group.

Anonymous (2000) in Research Review Report on Extension Education found that, 46.37 per cent of the pomegranate growers were in age group between 31 to 45 years, while 32.72 per cent were 45 and above years old. About 20.90 per cent of them were young below 30 years of age group.

Agresco report of Agricultural Extension, Agricultural Economics and Agricultural Statistics sub-committee, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli (2001) in their study Impact of Production Technology of selected crops recommended by SAU's in Maharashtra observed that, a majority of the respondents were from middle age group (59.84 per cent) while 20.49 per cent were old age group and 19.67 per cent were from young age group.

Deshmukh (2002) revealed that majority of the trainee of cotton growers were from young age group where as non trainee cotton growers were from middle age group.

Bellurkar (2003) observed that, 42.20 per cent of the women were middle age group followed by young age group (41.50per cent) and 16.30 per cent in old age group.

Thorat (2003) reported that 13.00 per cent of the mango growers belong to young age group, 71.00 per cent of the mango growers belong to middle age group and 16.00 per cent of the mango growers belong to old age group.

Uplap (2004) studied training needs of the farm women about food grain storage practices and reported that 30.72 per cent were in young age group, 47.06 per cent were in lower middle age group, 20.00 per cent in upper middle age group and 2.35 per cent were in old age group.

Deshmukh (2005) revealed that age of the respondents varies between 17-18 years and 23.00 per cent were in above 16 years while remaining 15.55 per cent were in above 18 years age group.

Mulla (2006) reported that, more than half (53.60 per cent) of the respondents were in middle age group while 24.80 per cent and 21.60 per cent of them belongs to young and old age group of respondents respectively.

Tayade (2006) indicated that half (50.00 per cent) of the respondents were in middle age group followed by 44.17 per cent were from young age group.

Gawande (2008) reported that 53.54 per cent of cotton growers were belonged to middle age group followed by 27.50 per cent respondents of old age group and 19.16 per cent respondents of young age group.

2.1.2 Education

Kopnar (1994) indicated that, a most (53.33 per cent) of the ber growers had received middle school education.

Sundari and Rukumani (1998) reported that majority 64.00 per cent of the respondent were illiterate, about 14.00 per cent educated up to primary levels while 25.00 per cent were educated up to secondary level.

Choughule (2000) reported that 8.00 per cent cashewnut growers were illiterate, 19.00 per cent having pre-primary education, 23.50 per cent were having primary education, 39.50 per cent were having education up to high school level and 9.50 per cent up to college level.

Borse (2002) found that 37.27 per cent of cotton growers were educated upto secondary level while 20.00 per cent were educated upto primary level.

Narmatha (2002) revealed that, 36.07 per cent of the respondents had primary level of education followed by 30.66 per cent having high school level of education.

Rawale (2003) observed that half (50.45 per cent) of the respondent had high school level of education.

Bimla (2004) reported that most of (86.50 per cent) of the respondents were illiterate.

Mulla (2006) observed that, about 45 per cent of the women members were having primary level of education followed by 25.60 per cent were illiterate.

Raut (2006) reported that most 87.78 per cent of sample of respondents were literate in different groups while 12.22 per cent of respondents were illiterate.

Tayade (2006) observed that 29.16 per cent of were educated up to secondary level followed by 27.50 per cent of

rural women educated up to higher and secondary level education.

Wankhede (2008) reported that near about one fourth (24.55 per cent) of the banana growers were educated up to pre-primary education, followed by primary education (20.23 per cent), 19.09 per cent of them educated up to secondary education, followed by illiterate (16.36 per cent) where as 11.13 per cent were graduate and 8.64 per cent were having higher secondary education.

2.1.3 Family size

Deokate (1998) revealed that, 46.45 per cent Jasmine growers had a family size of 5-6 members, while 25.46 per cent of Jasmine growers had a family size 7 and above members and 29.09 per cent of Jasmine growers had family size up to 4 members.

Chavan (1999) reported that, 36.13 per cent of Sunflower growers belongs to small size of family, 46.00 per cent of them belongs to medium size of family while 17.42 per cent of them belongs to large size of family.

Katkar (2001) indicated that about 52.00 per cent of the mango growers were from medium size of families consisting of 5-10 members.

Jadhav (2004) revealed that, most of the i.e. 75.44 per cent cultivators had medium size (6-10 members) family.

Kulhal (2004) reported that, maximum numbers of respondents 51.67 per cent were belong to medium size of family, while 30.33 per cent of respondents belong to small size

of family where as 17.50 per cent of respondents were from large size of family.

Dhakane (2005) revealed that, 56.00 per cent of the respondents were having medium size of family consisting of 6 to 10 members.

Khaire (2005) reported that, 74.50 per cent of the respondents having medium size of family consisting of 4 to 7 members.

Wankhede (2008) reported that, most i.e. 63.18 per cent of the banana growers had family size between 5 to 8 members followed by 28.18 per cent banana growers who had up to 4 members family size.

2.1.4 Size of land holding

Shirolkar (1991) reported that, a majority (71.43 per cent) of farm women had small size land of holding i.e. upto 2 hectares.

Chougule (2000) reported that, 06.00 per cent of the cashewnut growers had marginal size of land holding whereas, 08.50 per cent had small, 63.00 per cent had semi-medium and 19.50 per cent had medium size of the land holding.

Maney and Farzana (2000) observed that, most of the rural families were either small or medium with less than 2.00 ha of land.

Deshmukh (2002) concluded that majority of trainees of cotton growers were big farmers. Whereas, majority of non trainees were medium farmers.

Misal (2002) revealed that, 33.00 per cent of the respondents had semi-medium land holding (2.00 to 4.00 ha), 26.00 per cent had medium land holding (4.00 to 10.00 ha), 16.00 per cent of the respondent had small land holding (1.01 to 2.00 ha). Marginal (up to 1 ha) and big (10.01 ha and above) land holding were owned by 14.00 per cent and 11.00 per cent of respondents, respectively.

Jadhav (2004) reveals that, large proportion i.e. 43.86 per cent of the cultivators had land between 2.01 to 4.00 ha.

Khaire (2005) reported that, 73.50 per cent fig growers were having medium size of land holding i.e. 1.01 to 4.00 ha.

Raut (2006) reported that, most i.e. 72.22 per cent of the orange growers were having small land holding followed by medium land holding i.e. 20.00 per cent and large land holding i.e. 7.78 per cent.

Wankhede (2008) reported that, nearly half of the i.e. 48.64 per cent respondents banana growers had semi-medium land holding followed by 42.27 per cent of them had small land holding.

2.1.5 Total Annual income

Nagane (2002) revealed that, 47.06 per cent of the respondents had medium level of income where as 22.99 per cent had high level of income.

Thorat (2003) reported that 57.00 per cent of the mango grower from low level of income, 19.00 per cent of having

medium level of annual income while, 24.00 per cent having high level of annual income.

Jadhav (2004) indicates that, large proportion i.e. 43.86 per cent of cultivators had their annual income up to Rs. 2,00,000/-.

Prasad (2004) found that most 66.25 per cent of the respondents has high level of income, 32.50 per cent have medium level of income and 3.57 per cent had low income.

Dhakane (2005) revealed that, 58.67 per cent of grape growers were having annual income ranging from 1 lakh to 2 lakhs.

Gunjarkar (2006) observed that, about 54.18 per cent the respondents had medium level of annual income.

Mulla (2006) reported that 65.60 per cent of the respondent had medium level of income followed by 17.60 per cent of them had high level of income.

Laxmana (2007) found that, most (55 per cent) of the respondents had high level of income where as less than half i.e.45 per cent of the respondents had low level of income.

Wankhede (2008) reported that, 61.59 per cent of the banana growers had medium annual income i.e. Rs. 3,00,001/- to 4,20,000/-.

Tayade (2010) observed that 66.67 per cent of the respondents of cotton growers had annual income from Rs. 56268 to Rs. 153783.

2.1.6 Social Participation

Deoraj (2001) reported that, about 67.33 per cent of the women respondents of dairy co-operative society had low level of social participation while 18 per cent of the high level participation.

Katkar (2001) found that nearly two third (65.33 per cent) mango grower had medium social participation followed by few in (16.67 per cent and 18.00 per cent) had low and high level of participation, respectively.

Nagane (2002) found that, most of the respondents (92.51 per cent) did not participate in any social organization while 4.81 per cent participate in one social organization.

Shalmali (2003) reported that 92.10 per cent of the respondents had not participated in social organization while 07.36 per cent and 01.05 per cent of them participation in one or two organization.

Gangwar (2004) noticed that, majority of the women respondents had medium level participation.

Jadhav (2004) shows that, majority i.e. 71.91 per cent of the cultivators had medium level of participation in various social and economical organization and institution however 19.32 per cent and 8.77 per cent of them had less and more participation in various organization.

Rajan (2000) found that 63.75 per cent of the respondents showed medium level participation followed by 21.35 per cent having high level of participation.

Wankhede (2008) reported that, more than half i.e. 58.86 per cent of the respondent's of banana growers had medium social participation level followed by 26.82 per cent and 14.32 per cent had low and high level of social participation.

Mande and Nimbalkar (2010) showed social participation did not show any relation with training need of the farm women in post harvest technology.

2.1.7 Cropping pattern

Pallavi (2003) indicated that a most (82.35 per cent) of the respondents were growing paddy, followed by groundnut (76.47 per cent), gram (44.70 per cent), jawar (40.00 per cent) and wheat (39.41 per cent).

Balsubramani *et al.* (2004) revealed that a most of the respondents (86.67 per cent) practiced a single season of cropping patterns while 13.33 per cent of the respondents practiced more than one season cropping patterns.

Narkhede and Khalache (2008) revealed that 23.00 per cent respondents belonged to 81 to 140 per cent change in there cropping intensity, where as 47.00 per cent respondents belonged to above 81 to 100 per cent changed in their cropping pattern.

Vijay Kumar (2008) found that a most of the respondents (81.43 per cent) followed fair cropping pattern while 10.00 per cent followed a good cropping pattern. Only 8.57 per cent of them had poor cropping pattern or not adopted the cropping pattern as derived in that area/locality.

Dhane *et al.* (2002) stated that most of the farmers were growing paddy, jawar and wheat as a staple food crops, followed groundnut (61 per cent), pulse crop (42 to 50 per cent), Sugarcane (36 per cent) and vegetable like onion, tomato, green peas and brinjal (10 to 30 per cent). More than half (59 per cent) of area was under food grain crops followed by pulse, vegetables and oil seed crops.

Anonymous (2008) reported that a majority (72.50 per cent) of the respondents wheat growers preferred sugarcane crop as an annual crop. In Kharif 49.17per cent of farmers grown soybean crop while regarding rabi season, 50.00 per cent of the farmers preferred wheat crop.

Divakar (2011) revealed that a most of the respondents (71.34 per cent) had fair cropping pattern followed by good cropping pattern (28.66 per cent) and no one belonged to poor cropping pattern.

2.2 Sources of information used by the rainfed cotton growers

Ravindra *et al.* (1998) reported that, most of the women respondent 75.00 per cent had no any Source of information from any organization while remaining had medium source of information.

Singh (2000) reported that, most of the respondents 65.00 per cent had no any cosmopolitness with agricultural agencies for information while remaining 35 per cent had good source of information.

Borse (2002) found that 54.55 per cent of the respondents were using medium sources of information where as 26.35 per cent of them had used low source of information, about 20.00 per cent of the respondents were using high source of information.

Chonegowada (2002) reported that most of the women respondents 78.00 per cent had no used any sources of information from any organization while remaining had medium level use of sources of information.

Kulhal (2004) found that 56.67 per cent of the respondents were using medium sources of information, where as 25.00 per cent of them had used high source of information, about 19.00 per cent of the respondents were using low sources of information.

Prasad (2004) found that most of the respondent 88.00 per cent had no any cosmopoliteness with agricultural agencies.

Dhakane (2005) observed that, 42.67 per cent of the grape growers had used medium level of sources of information.

Mate (2006) revealed that, 69.50 per cent of the respondents were using medium sources of information, where a 20.00 and 14.50 per cent of the respondents had used high and low sources of information, respectively.

Wankhede (2008) reported that majority i.e. 54.54 per cent of the banana growers had medium use of information sources.

Mande and Nimbalkar (2010) reported that the source of information showed positive and highly significant correlation with training need of farm women.

2.3 Knowledge of the rainfed cotton growers about cotton cultivation

Bhujbal (1995) reported that, 37.42 per cent of the fig growers belongs to low level of knowledge, 32.26 per cent of the fig growers belongs to high level of knowledge.

Rajan (2000) found that, most of the respondents (52.25 per cent) had high level of knowledge while as less than half (25.00 per cent) of respondents had low level of knowledge.

Nikhade (2001) reported that, most of the sericulturist had neither high nor low knowledge but were included in moderate category (56.00 per cent).

Katkar (2001) observed that 15.33 per cent of the respondents were belonged to low knowledge group, 70.00 per cent from medium and 14.07 per cent were high knowledge group.

Chikkana *et al*. (2005) found that, most of the respondents 52.50 per cent had medium level of knowledge of sericulture while 40.25 per cent of the respondents have good knowledge of sericulture.

Laxmana (2007) found that most of the respondents 55.00 per cent high level of knowledge where as less that 45.05 per cent a respondent had low level of knowledge about sericulture cultivation.

Mande and Nimbalkar (2010) observed that knowledge is positively related with training need of farm women.

2.4 Dependant variable

2.4.1 Training need

Choudhari *et al.* (1999) concluded that, peasant women who belonged to low socio-economic status, lower and much more desire to acquire the training.

Panicker (2000) observed that, the rural women need training with increasing age, land holding, cosmopolitness, socio-economic status and economic motivation.

Sarkar (2001) observed that, 25.00 per cent of the respondents received training from different agencies such as KVK, KGOs and banks prominent among them being the NGOs.

Maneria *et al.* (2002) found that most of the respondents 62.50 per cent fall under the medium level of training needs group while 20.83 per cent were kept under high training need groups and remaining 16.67 per cent possessed low level of training need about soybean production technology.

Nagaraja (2003) found that, most of the respondents (55.35 per cent) had medium level of training needs while 25 per cent of had high training needs remaining had require very high training needs.

Sethurao (2003) revealed that, most of the respondents (66.79 per cent) had high training needs while remaining 34 per cent require medium training needs.

Himantharaj (2004) reported that, most of the women respondents (75.00 per cent) require high level of training needs and 25 per cent had require medium training needs.

Mande and Nimbalkar (2010) reported that the most of farm women 58.00 per cent needed medium training while 30.67 per cent needed high and 11.33 per cent needed low training in post harvest technology of groundnut.

Kiran and Kinani (2010) reported that most of the respondents 55.00 per cent opted for somewhat needed, 35.00 per cent and 10.00 per cent of the respondents opted for not needed and most needed the training in post harvest technology in groundnut.

2.5 Relationship between training needs of rainfed cotton growers and their personal and socio-economic characters

2.5.1 Age and training needs

Bora and Ray (1995) observed that there exists a negative and significant relation between age of sericulturists and training needs.

Dutt and Chole (2002) reported that there exists a significant and negative relation between age and training need.

Walke (2008) reported that there exists a negative correlation between age and training needs.

Pharate (2008) observed that there exists no significant relation between age and training needs.

2.5.2 Education and training needs

Bora and Ray (1995) found that there is no relationship between education and training needs.

Dutt and Chole (2002) reported that, there exists significant and positive relationship between education and training needs.

Maghade (2007) observed that there exists a positive and significant relationship between level of education and training need.

Pharate (2008) observed that there exists a positive and significant relationship between education and training need.

Walke (2008) reported that there exists negative and non-significant relationship between two variables i.e. education and training needs.

2.5.3 Size of family and training need

Khaire (2005) observed that there is no any significant relationship exists between size of family and training need.

2.5.4 Size of land holding and training need

Sharma *et al.* (1998) reported that size of land holding is having significant and negative relationship with training need.

Mande and Nimbalkar (2010) found that there is positive and significant relationship between size of land holding and training need.

2.5.5 Total Annual income and training needs

Dutt and Chole (2002) reported that, there exists significant and positive relationship between annual income and training needs.

Mane (2005) observed that, there was a significant and positive relationship between annual income and training needs.

Maghade (2007) observed that there exists a positive relation between annual income and level of training needs.

Pharate (2008) observed that there exists a positive and significant relation between level of annual income and training needs.

Walke (2008) reported that there exists a positive correlation between annual income and level of training need.

2.5.6 Social participation and training needs

Bora and Ray (1995) reported that there was no significant relationship between social participation and training needs.

Dutt and Chole (2002) reported that there exists significant and positive relationship between social participation and training needs.

Maghade (2007) observed that, there exists a positive relationship between social participation and training needs.

Pharate (2008) observed that there exists a positive and significant relationship between level of social participation and training needs.

Walke (2008) reported that there exists a positive correlation between social participation and training needs.

2.5.7 Cropping pattern and training needs

Shrivastava (2012) reported that there exist a positive and non significant correlation between cropping pattern and training needs.

2.5.8 Source of information and training needs

Bhoite (1999) observed that there exists a positive relationship between information source use and training need.

Mane (2005) observed that there was a significant and positive relationship between information source use and training needs.

Maghade (2007) reported that there exists a positive correlation between information use and training need.

Walke (2008) observed that there exists a positive relationship between information source use and training needs.

2.5.9 Knowledge about rainfed cotton cultivation and training needs

Bhairamkar (2005) reported that knowledge is positively correlated with training need.

Maghade (2007) observed that there exists a positive correlation between knowledge and training needs.

Patil (2007) in his study reported that positive relationship between knowledge and training needs.

2.6 Constraints faced by the rainfed cotton growers

Raghuprasad (1992) reported that 46.00 per cent of women faced the problem of market, transport and training

facilities. Whereas 42.00 per cent of women's faced the problem of control of pest and diseases.

Gurav *et al.* (2003) concluded high initial cost, requirement of regular maintenance and quality spare parts locally to be the major constraints reported by the drip adopters.

Dhane (2004) reported that women sericulturists faced constraints in mulberry cultivation such as high labour charges (94.00per cent) inadequate irrigation facilities (78.00per cent) lack of guidance and lack of knowledge about market price of cocoons.

Modak and Sawant (2004) found that more than (90.00 per cent) of the respondents reported that the major constraints in marketing of minor fruits were inadequate transport facilities, high transportation charges, labour scarcity and high wage rate, unavailability of authorized place at Mumbai market and season bound business.

VijayPrakash (2005) reported that major constraints for the sericulture enterprise that the non-availability of inputs in time (72.20 per cent) followed by fluctuation in the cocoons prices (56.56 per cent).

Mallikarjun *et al.* (2006) reported that low rainfall (44.00 per cent) and high initial cost (21.00 per cent) were major constraints.

Raut (2006) reported that majority of the orange growers having lack of knowledge about soil pH (92.22 per cent)

Dar (2009) reported that majority of respondents (88.83 per cent) faced the problem of lack of technical knowledge

and 60.00 per cent respondents were faced constraints of lack of finance.

Agawane (2013) reported the unavailability of timely seeds (73.33 per cent), unavailability of fertilizers (56.67 per cent) and high cost of labour (75.00 per cent).

Kalamkar (2013) reported that majority of the respondents (85.83 per cent) faced the problem of lack of knowledge about processing technologies of potato and 81.66 per cent respondents were faced the constraints of high cost of labour.

2.7 Suggestions of the rainfed cotton growers

Jawale and Nachane (1994) suggested that motivational agencies such as personal contacts of government officers, VEW's and group discussions of the beneficiaries among themselves and each other's need to be encouraged and intensified, so as to increase the knowledge about the cultivation of mango and citrus for effective adoption.

Bhujbal (1995) concluded that majority of the fig growers suggested that loans should be provided timely and adequately. Also, the establishment of fig markets and processing industries were among the suggestions.

Yelpanekar (1997) observed that major suggestions of custard apple growers were fixed prices for fruits and subsidies should be given on cultivation of this crop, establishment of co-op. market and processing units.

Modak and Sawant (2004) fruit growers offered major suggestions for improving production technique like developing

new varieties (78.67 per cent) purchase of fruits on co-op. basis (66.67 per cent) information of these crops and availability of planting material (61.33per cent).

Mane (2005) reported that a majority of the respondents (83.00 per cent) suggested that high and remunerative prices should be given to the produce. The 85.50 per cent of them suggested that chemical fertilizers should at subsidized prices and 69.00 per cent of them suggested that pesticides should made available timely.

Anonymous (2008) reported that mostly wheat growers suggested timely supply of improved varieties seed (93.33 per cent) and the rate of fertilizer should be cheap (86.67 per cent).

Wankhede (2008) revealed that a majority of the respondents suggested that there is urgent need to establish the net house through government scheme (73.18 per cent) and minimize the cost of chemicals (54.32 per cent).

Agawane (2013) suggested that the providing timely seeds (70.00 per cent), providing reasonable price for seeds (50.00 per cent), providing fertilizers and insecticides at reasonable rate (66.67 per cent).

Kalamkar (2013) reported that 90.83 per cent respondents suggested the efficient and effective marketing system over the present one and 85.83 per cent respondents suggested to establish the cold storages.

3. METHODOLOGY

This topic deals with the details of Research site, research techniques, designing of questionnaire and the method of measuring the variables along with the statistical procedures used in the research work. The materials and methods used in this study are presented under the following heads.

3.1 Location of the research site
3.2 Sampling procedure
3.3 Designing of questionnaire
3.4 Pre testing of interview schedule
3.5 Procedure of data collection
3.6 Duration of the study
3.7 Compilation of data
3.8 Working of scores and grouping of respondents
3.9 Measurement and quantification of variables
3.10 Statistical tools and tests used
3.11 Operational definitions and terms used

3.1 Location of the research site

3.1.1 Geographical location

Ahmednagar district is lies between $19^0$49'58.96" North latitude and $74^0$45'09.54" East latitude and altitude 715.3 MSL. Beed district is on the East Thane and Pune district to the West. Osmanabad district to the South-East, Solapur district to the South and Nashik and Aurangabad to the North side of Ahmednagar district. Jamkhed and Karjat tahsils are situated in Southern part of Ahmednagar district.

3.2 Sampling procedure

3.2.1 Selection of district

In the Western Maharashtra and Khandesh region, the major cotton growing districts were, Jalgaon, Dhule, Nandurbar, Ahmednagar, Nashik, Sangli, Solapur, Satara. Amongst them, Ahmednagar was the only district which had lowest cotton productivity and because that was selected for present investigation.

3.2.2 Selection of tahsils

Jamkhed and Karjat tahsils of Ahmednagar districts were selected for the study purpose as the productivity of cotton is very low compare to other tahsils of Ahmednagar district. These tahsils situated in Southern part of Ahmednagar district and Western region of Maharashtra state. Jamkhed and Karjat tahsils are famous for rainfed cotton production.

Table 1. Tahsil Wise Production of cotton in Ahmednagar district

Sr. No.	Tahsil	Production in MT	Productivity (q/ha)
1.	Sangamner	154	14
2	Kopargaon	8067	15
3	Rahata	573	13
4	Shrirampur	3894	15
5	Newasa	8313	15
6	Shevgaon	45689	14
7	Pathardi	45097	13.5
8	Nagar	31	12.5
9	Rahuri	3483	15
10	Shrigonda	216	14.5
11	Karjat	5195	12
12	Jamkhed	14844	10
	Total	135556	11.60

(Source : Data published by statistical Department, Krishi Ayuktalya, Pune 2011-12)

3.2.3 Selection of villages

The list of villages having maximum area under cotton crop from sample tahsils were prepared with the help of Taluka Agriculture Officer and fourteen villages were randomly selected having lowest productivity.

3.2.4 Selection of respondents

With the help of Taluka Agriculture Officer list of rainfed cotton growers was prepared for each village. cotton growers were selected by proportionate random sampling method. Thus in all total 120 cotton growers were selected by proportionate random sampling from Jamkhed and Karjat tahsils of Ahmednagar district. The details of the selected tahsil, villages and number of respondents from each village are shown in Table 2.

Table 2. Design of Sampling

Sr. No.	Name of Village	Number of cotton growers selected for study purpose
	Jamkhed	
1.	Halgaon	10
2.	Sangawi	8
3.	Arangaon	12
4.	Pimparkhed	8
5.	kusadgaon	7
6.	Nahuli	6
7.	Ratnapur	9

Table 2 contd……

Sr. No.	Name of Village	Number of cotton growers selected for study purpose
	Karjat	
1.	Anandwadi	10
2.	Takali	5
3.	kuldharan	12
4.	Babulgaon	8
5.	Nimgaon	6
6.	Diksal	10
7.	Tikhi	9
	Total	**120**

120 farmers were selected from fourteen villages by proportionate random sampling for study purpose.

3.3 Designing of questionnaire

The structured questionnaire serves as a tool for collection of data. In view of this, questionnaire was prepared on the basis of objectives of the study, which includes relevant questions for seeking information in respect of independent and dependent variables. Efforts were also made to formulate a questionnaire with clear and easy questions. The questions were asked to respondents in local language i.e. Marathi in order to get accurate response of the respondents. The relevant questions regarding the training needs were also included in the questionnaire.

3.4 Pretesting of the questionnaire

The questionnaire was tested prior to its finalization by the researcher. It was pretested by interviewing 10 cotton growers who were non-respondents, from the sample area to know whether the cotton growers furnish the required information or otherwise.

3.5 Procedure of data collection

The researcher personally interviewed the respondents included in the sample. The purpose and objectives of the study were clearly explained to the respondents and they were assured anonymity about the information gathered by them and such information will be used for the purpose of mentioned study only. The researcher attempted to contact cotton growers at their farm during the time convenient to the respondents in order to get fullest possible information from them. Interview was conducted in informal and friendly manner and by establishing proper rapport with the respondents.

3.6 Duration of the study

The work of data collection was started 25th Feb. 2014 and completed on 15th March 2014 which took about period of 22 days.

3.7 Compilation of data

The information collected through interview was processed into primary table and then into the secondary tables. The qualitative data were quantified and later the quantified data were converted into frequency, percentages, wherever necessary

the scoring was also done. Further the coefficient of correlation was worked out and inferences were drawn.

3.8 Working of the scores and grouping of respondents

As mentioned earlier qualitative data were converted into quantitative data by giving scores wherever necessary. The total score obtained by each of the respondent for particular character was calculated. Cotton growers were logically classified into different categories based on the total scores obtained by them.

3.8.1 Measurement and quantification of variables

Sr. No.	Variable	Measurements of variables
A.	**Independent variables**	
1.	Age	Chronological age of the respondents in years.
2.	Education	Formal education of the respondents (Rainfed cotton growers)
3.	Family size	Family members of cotton growers.
4.	Size of land holding	Total land holding possessed by the respondent
5.	Total annual income	Gross income in rupees from all income sources per annum was consider.
6.	Social participation	Schedule was developed.
7.	Source of information	Schedule was developed.
8.	Cropping pattern	Schedule was developed.
9.	Knowledge	Schedule was developed.
B.	**Dependent variable**	
10.	Training needs	Schedule was developed.

A. Independent variables

1. Age

Chronological age of the respondent cotton grower at the time of data collection was considered as his/her age for the study. Scale used for the measurement of the age of the cotton growers is Sandesh (2004). Cotton growers were classified into different categories as follows :

Sr. No.	Age group	Category
1.	Up to 35 years	Young age
2.	36 to 50 years	Middle age
3.	51 and above years	Old age

2. Education

Education referred to the formal education attended by the cotton growers. According to the formal education level respondent cotton growers were classified into different categories as follows:

Sr. No.	Level of education	Category
1.	No education	Illiterate
2.	1st to 4th standard	Primary
3.	5th to 10th standard	Secondary
4.	11th to 12th standard	Higher secondary
5.	Above 12th standard	Degree and P.G.

3. Family size

It is the number of members residing in a family of the respondent. Accordingly, the respondents were classified in to

following three categories by using Mean ± SD. Mean is 6.1 and S.D. is 2.26 .

Sr. No.	Family size	Category
1.	Up to 3 members	Small
2.	4 to 8 members	Medium
3.	9 and above	Large

4. Size of land holding

It refers to total land holding possessed by the respondent. In the present investigation the size of land holding was measured in hectares of land possessed by the respondents. They were grouped on the basis of government normal.

Sr. No.	Size of land holding (ha)	Category
1.	Up to 1.00 ha	Marginal
2.	1.01 to 2.00 ha	Small
3.	2.01 to 4.00 ha	Medium
4.	4.01 and above	Large

5. Total annual income

Annual income of each cotton growers was determined by considering the total income earned from all the sources in one year and expressed in terms of rupees. The respondent cotton growers were categorized on the basis of Mean ± S.D. mean was Rs.35966 /- and s.d. was Rs.13703/-

Sr. No.	Annual income (Rs.)	Category
1.	Up to Rs.22000	Low
2.	Rs.22100 to Rs. 50000	Medium
3.	50100 and above	High

6. Social participation

It refers to degree of contact of cotton growers with social system in which score of 2, 1 and 0 assigned for office bearer, member and not membership respectively. Scoring was done by developing the schedule. Maximum score was the 22. Where as minimum score was 2. Further, cotton growers were categorized on the basis of range as follows.

Sr. No.	Social participation (Score)	Category
1.	Up to 6 score	Very low
2.	7 to 10 score	Low
3.	11 to 14 score	Medium
4.	15 to 18 score	High
5.	19 and above score	Very high

7. Cropping pattern:

It refers to the yearly sequence and spatial arrangement of crops and fallow on a given area of the respondent's. In other words, it denotes the crop grows in Kharif, rabi and Summer as well as annual and perennial in his/her land. A schedule was developed for measuring this independent variable. One score was given for growing crops in each of three seasons, while four score was given for perennial crops.

The following three categories of cropping pattern were made by using statistical method mean ± S.D. as bellow. Mean was 8.13 and s.d. was 3.

Sr. No.	Category	Score (Cropping pattern)
1.	Poor	Up to 6
2.	Fair	7 to 11
3.	Good	12 and above

8. Source of information

It refers to use of sources of agricultural information for seeking information about the cotton cultivation practices by the cotton growers. The cotton growers were asked to record the pattern of information sources used by them among different personal, group and mass media sources. Scores 0,1 and 2 were assigned for never, occasionally and regular use respectively. Scoring was done by developing the schedule. Cotton growers were classified into different categories based on Mean $\pm$ S.D. Mean is 21.6 and S.D. is 6.80.

Sr. No.	Source of information (Score)	Category
1.	Up to 15 score	Low
2.	16 to 28 score	Medium
3.	29 and above score	High

9. Knowledge about Rainfed cotton cultivation

In the present study the knowledge of the cotton growers with respect to package of practices of cotton. Knowledge was quantified by assigning scores 0, 1 and 2 for no knowledge, partial knowledge and full knowledge respectively. Scoring was done by developing the schedule. Maximum score was 28. Whereas minimum score was the 10. Later respondents were

classified in to different categories on the basis of range as given below.

Sr. No.	Score	Category
1.	Up to 15 score	Very low
2.	16 to 18 score	Low
3.	19 to 21 score	Medium
4.	22 to 24 score	High
5.	25 and above score	Very high

B. Dependent variable

Training needs

It refers to training required by the cotton growers for effective production of cotton. There are fifteen areas selected by researcher in which training required or not required by the respondents. The score of 2, 1 and 0 given for most needed, needed and not needed respectively. Scoring was done by developing the schedule.

The cotton growers were categorized in to three categories based on mean and standard deviation as the measure of check as given under. Mean is 17.56 and S.D. is 4.96.

Sr. No.	Score	Category
1.	Up to 13	Low
2.	14 to 22	Medium
3.	23 and above	High

3.9.2 Constraints

cotton growers were exposed to question regarding whether they faced any difficulties in production, management and marketing of cotton. Total score was calculated for each of the constraint and expressed in terms of frequency and percentage in order to draw the inference of the study.

3.9.3 Suggestions

Suggestions were invited from the cotton growers to overcome the constraints faced by them in cotton cultivation. The suggestions were grouped on the basis of their constraints and were placed in the form of frequency and percentage for drawing inference of the study.

3.10 Statistical tools and tests used

The data thus collected for the purpose of the study, were quantified, categorized and tabulated. Statistical techniques such as percentage, mean, standard deviation were employed to draw valid conclusions. To know the association between selected personal, social, economic, situational and psychological characteristics of the cotton growers with their level of training needs the coefficient of correlation was used.

3.10.1 Percentage

Percentage was used in descriptive analysis of data for making simple comparison.

3.10.2 Correlation coefficient

Karl Pearson's coefficient of correlation was used for measuring of the relationship between independent and dependent variables.

3.11 Operational definitions and terms used

1. Age

The age of cotton growers refers to chronological age of the respondent in terms of completed years.

2. Education

Education was operationalized as the formal educational level of respondents.

3. Family size

It is the number of members residing in a family of the respondent.

4. Size of land holding

It refers to total land holding possessed by the respondent.

5. Annual income

Refers to the total amount earned during the year from farm and non-farm sources.

6. Social participation

Means participation of respondents in various social organization.

7. Cropping pattern

It refers to the yearly sequence and spatial arrangement of crops and fallow on a given area of respondents.

8. Source of information

It refers to source or agency through which respondent receive the related information.

9. Knowledge

Knowledge of the cotton growers with respect to package of practices of rainfed cotton cultivation.

10. Training need

It refers to training/skill required by the cotton growers for efficient production of cotton crop.

4. RESULTS AND DISCUSSION

This chapter deals with the presentation of the results of investigation and critical discussion of the results presented. The data collect from 120 cotton growers of 14 villages from **Jamkhed** and **Karjat** tahasils of **Ahmadnagar** district, were compiled in to primary tables. Later, they were transferred in to secondary tables in view of the objectives of the study. Appropriate statistical tests were used to analyze the data in order to draw the inferences.

The results of investigation are presented and discussed in this chapter under following heads.

4.1 Profile of rainfed cotton growers.

4.2 Source of information used by the rainfed cotton growers.

4.3 Knowledge level of the rainfed cotton growers about cotton cultivation.

4.4 Training needs of rained cotton growers.

4.5 Correlation between training needs of rainfed cotton growers and their profile.

4.6 Constraints faced by the rainfed cotton growers.

4.7 Suggestions of the rainfed cotton growers.

4.1 Profile of rainfed cotton growers

4.1.1 Age

Age denotes the chronologically completed calendar years by the cotton growers. It influences behavior of an individual by exposing to varied situation number of times. Thus, it becomes an essential aspect to consider age of the respondents

in this study. The information pertaining to the age of the cotton growers was collected, tabulated and analyzed. The results are presented in Table 3.

Table-3. Distribution of the rainfed cotton growers according to their age

Sr. No.	Age group(Years)	Frequency (N=120)	Per cent
1.	Young (Up to 35years)	19	15.83
2.	Middle (36 to 50years)	65	54.17
3.	Old (51 and above years)	36	30.00
	Total :	**120**	**100.00**

Table – 3 revealed that's a more than half (54.17 per cent) of the cotton growers were from middle age group. Where as 15.83 per cent cotton growers belonged to young age group and 30.00 per cent cotton growers belonged to the old age group. However, in the present study it was found that average age of the cotton growers was 46 years, where as minimum age was observed 25 years and maximum age was 65 years.

Thus it could be inferred that a large proportion of cotton growers belonged to middle age group which was considered as actively working age groups of cotton growers. These findings were in line with the findings of Mulla (2006) he found that 53.60 per cent of women respondents were from middle age group.

4.1.2 Education

The level of formal education attained by an individual tends to influence the extent to which they are exposed to new

ideas and information. It plays an important role in problem solving capacity of cotton growers. The information pertaining to the education of the cotton growers was collected, tabulated and analyzed. The results are presented in Table 4.

Table 4. Distribution of the respondents cotton growers by their level of education

Sr. No.	Characteristics Category	Frequency (N=120)	Per cent
1	Illiterate	08	6.40
2	Primary Education (1st to 4th Standard)	05	4.00
3	Secondary Education (5th to 10th Standard	60	50.00
4	Higher Secondary Education (11th to 12th Standard)	37	30.80
5	Graduation and Post Graduation (Above 12th Std.)	10	8.80
	Total :	**120**	**100.00**

Table 4 revealed that 50.00 per cent cotton growers were within range of secondary Education. The 04.00 per cent of the cotton growers were educated upto primary level, where as only 08.80 per cent of cotton growers were educated above 12th std. and about 30.80 per cent cotton Growers were educated up to higher secondary education and 6.40 per cent respondents were found illiterate.

Thus, it was concluded that a majority of the cotton growers had received secondary and higher secondary education. An individual having higher education are more change oriented,

take certain risk, more respective to new idea and have greater Knowledge about an innovation. How ever, small proportions of highly education cotton growers were observed, because they might have sought or might be in search of job opportunities in the industrial or other sectors.

The findings of the present study were in the line with the findings of Inamdar (2000).

4.1.3 Family size

The size of family refers to the total number of individual living together under common roof, having blood ties with each other and are directly dependant on the head of the family. It was there thought that size of family might influence the management practices followed by them.

It view of this the data regarding the size of the family of cotton growers were collect and analyzed. The findings are presented in Table 5.

Table 5. Distribution of the cotton Growers by their size of family

Sr. No.	Characteristics Category	Frequency (N=120)	Per cent
1	Small(Up to 4 members)	28	23.33
2	Medium(5 to 8 members)	76	63.33
3	Large(9 and above members)	16	13.34
	Total :	**120**	**100.00**

It was observed from Table 5 that, less than two - third (63.33 per cent) of the cotton growers had medium size of

family, while 23.33 per cent and 13.34 per cent of the cotton growers had small and large size of family respectively.

Thus it was concluded that Majority of cotton growers had medium size of family and had members up to 4 to 8 members followed by small size of family (Up to 3 members) and large size of family (above 9 members). These findings were similar to the findings of Dhakane (2005).

4.1.4. Size of land holding

It refers to number of hectare of land owned and operated by the cotton growers. It largely determines the socio-economic status of family and source of livelihood. The data of the present investigation in this regard are presented in Table 6.

Table 6. Distribution of the cotton growers by their size of land holding

Sr. No.	Characteristics Category	Frequency (N=120)	Per cent
1	Marginal (Up to 1 ha.)	12	10.00
2	Small (1.01 to 2 ha.)	32	26.66
3	Medium (2.01 to 4 ha.)	60	50.00
4	Large (4.01 and above)	16	13.34
	Total :	**120**	**100.00**

The data from the Table 6 reveals that about half (50.00 per cent) of the cotton growers had Medium size of land holding. i.e. 2.01 to 4.00 ha. While, 26.66 per cent of the cotton growers had small size of land holding followed by large size (13.34 per cent) and marginal size (10.00 per cent) of land holding respectively.

Thus, it was seen from the findings that majority of the cotton growers had medium size of land holding.

These results were similar to the findings of Jadhav (2004).

4.1.5 Total annual income

It refers to the total income in a year from all sources that was farm and non- farm sources of all the family members of the cotton growers. The information pertaining to the annul income of the cotton growers was collected, tabulated and analyzed. The results are presented in Table 7.

Table 7. Distribution of the cotton growers by their level of annul income

Sr. No.	Characteristics Category	Frequency (N=120)	Per cent
1	Low (Up to 22 000 Rs.)	12	10.00
2	Medium (22100 to 50000 Rs.)	100	83.33
3	High (50100 and above)	08	06.67
	Total :	**120**	**100.00**

Table 7 revealed that a large Majority i.e. 83.33 per cent cotton growers had medium annul income where as 06.67 per cent respondents had high level income and 10.00 per cent had low level of annul income.

Thus, it was seen form the data that majority of cotton growers had medium annul income ranging from Rs. 22100 to 50000 /- Results of the present study were in line with that of Mulla (2006) reported that 65.60 per cent of the

respondents had medium annual income and 17.60 per cent of them having the high level of income.

4.1.6 Social participation

It refers to the degree of participation of the respondents in formal and informal organizations in or around the village. It brings an individual in close contact with other member of the social organizations. This provides an opportunity to exchange the ideas, information and experiences with others.

The information pertaining to the social participation of the cotton growers was collected, tabulated and analyzed. The results are presented in Table 8.

Table 8. Distribution of the cotton growers by their social participation

Sr. No.	Characteristics category	Frequency (N=120)	Per cent
1.	Very low (0 to 6 score)	28	23.33
2.	Low (7 to 10 score)	16	13.33
3.	Medium (11 to 14 score)	60	50.00
4.	High (15 to 18 score)	12	10.00
5.	Very high (19 and above score)	04	03.34
	Total :	**120**	**100.00**

Table 8 revealed that a considerable proportion of the cotton growers i.e. 50.00 per cent had medium level social participation whereas 23.33 per cent respondents had very low social participation and 13.33 per cent of the respondents had low social participation. About 10.00 per cent of the cotton

growers had high social participation while 03.34 per cent of the respondents had very high social participation.

The detail data pertaining to the information source of cotton growers were collected, tabulated and analyzed. The results were presented in Table 9.

Table 9. Distribution of the cotton growers by their social participation

Sr. No.	Name of organization	Member	Per cent	Office bearer	Per cent
1.	Gram Panchayat	9	7.50	3	2.50
2.	Panchayat Samiti	0	0	0	0
3.	Zilla Parishad	0	0	0	0
4.	Co-operative sugar factory	4	3.33	2	1.66
5.	Co-operative society	30	25.00	3	2.50
6.	Co-operative Milk Dairy	40	33.33	15	12.50
7.	Co-operative credit society	30	25.00	10	8.33
8.	Service Co-operative credit society	40	33.33	10	8.33
9.	Agri. Produce Market committee	5	4.16	0	0
10.	Women self help group	85	70.83	25	20.83
11.	Womens group	65	54.16	17	14.16
12.	Bhajani Mandal	46	38.33	12	10.00
13.	Young group	90	75.00	21	17.50
14.	Shetkari Sanghatana	20	16.66	5	4.17
15.	Tantamukti Gav Samiti	40	33.33	8	6.67

Table 9 indicates that, majority (75.00 per cent) of the cotton growers were the members of young groups followed by 70.83 per cent of the women's self help group. 54.16 per cent were the members of women's groups. It was observed that from the Table 9, about 20.83 per cent of the cotton growers were the office bearer in women's self help groups followed by young group (17.50 per cent) and 14.16 per cent are from women's group.

Thus, it was concluded that a majority of the cotton growers had medium social participation. These findings were similar to the findings of Yelpanekar, (1997).

4.1.7 Cropping pattern

Cropping pattern tends to have association with the adoption behaviour of individuals so that the information pertaining to cropping pattern followed by the respondents was collected, tabulated and analyzed.

Distribution of the respondents according to their cropping pattern.

Table 10. Distribution of the cotton respondents by their cropping pattern

Sr. No.	Cropping pattern	Frequency (N = 100)	Per cent
1.	Poor (Upto 6)	18	15.00
2.	Fair (7 to 11)	83	69.16
3.	Good (12 and above)	19	15.84
	Total :	**120**	**100.00**

Above Table 10 revealed that 69.16 per cent of the respondents had a fair cropping pattern followed by good cropping pattern 15.84 per cent respondents and poor cropping pattern 15 per cent respondents.

Thus above information clearly indicates that majority of respondents have fair cropping pattern.

4.2 Source of information used by the cotton growers

The information regarding the different sources of information used by the cotton growers. The data pertaining to the information source of cotton growers were collected, tabulated and analyzed. The results were presented in Table 11.

Table 11. Distribution of the respondent cotton growers by their information sources use

Sr. No.	Characteristics category	Frequency (N = 120)	Per cent
1.	Low (Up to 15 score)	24	20.00
2.	Medium (16 to 28 score)	80	66.67
3.	High (29 and above score)	16	13.33
	Total :	**120**	**100.00**

Table 11 revealed that a majority of the cotton growers (66.67 per cent) had medium level of information sources, whereas 20.00 per cent and 13.33 per cent cotton growers had low and high level of information sources, respectively. These findings of study are in line with the findings of Wankhede (2008).

Thus, it was concluded that a majority of the cotton growers had medium use of source of information.

The detail data pertaining to the information source of cotton growers were collected, tabulated and analyzed. The results were presented in Table 12.

Table 12. Source of information used by the cotton growers

Sr. No.	Source of information	Frequency (N = 120)		
		Frequently	**Rarely**	**Never**
A.	**Personal contact**			
1.	Gramsevak	9 (7.50)	22 (18.33)	89 (74.17)
2.	Agril. Assistant	17 (14.16)	29 (24.17)	74 (61.67)
3.	Agril. Supervisor	6 (5.00)	16 (13.33)	98 (81.67)
4.	Circle Agril. Officer	5 (4.17)	12 (10.00)	103 (85.83)
B.	**Personal localite contact**			
1.	Neighbours	109 (90.83)	11 (9.17)	0 (0.00)
2.	Friends	98 (81.67)	22 (18.33)	0 (0.00)
3.	Relatives	54 (45.00)	47 (39.17)	19 (15.83)
4.	Progressive farmers	29 (24.17)	40 (33.33)	51 (42.50)
5.	Local leaders	23 (19.16)	32 (26.68)	65 (54.16)
C.	**Group contact sources**			
1.	Result demonstrations	7 (5.83)	27 (22.50)	86 (71.67)
2.	Method demonstrations	15 (12.50)	35 (29.17)	70 (58.33)
3.	Exposure visits	4 (3.33)	33 (27.00)	83 (69.67)
4.	Group discussion	20 (16.67)	46 (38.33)	54 (45.00)
5.	Krishi Din	13 (10.83)	28 (23.33)	79 (65.84)
D.	**Mass contact sources**			
1.	Radio	43 (35.83)	40 (33.33)	37 (30.84)
2.	Television	79 (65.83)	32 (26.67)	9 (7.50)
3.	Newspaper	96 (80.00)	16 (13.33)	8 (6.67)
4.	Farm magazine	81 (67.50)	23 (19.17)	16 (13.33)
5.	Krishi Darshini	9 (7.50)	17 (14.17)	94 (78.33)

(Figures in parenthesis indicates percentages)

A. Personal contact sources

Table 12 indicates that amongst personal sources, very low percentage of the cotton growers had frequently used personal contact sources as source of information. It was observed that, 24.17 per cent respondents received information rarely from Agricultural Assistant of Agriculture Department of State Government followed by Gramsevak (18.33 per cent) and Agricultural Supervisor of Agriculture Department of state government.

B. Personal localite contact sources

It was revealed that majority (90.83 per cent) of the cotton growers always used neighbours as source of information followed by friends (81.67 per cent) and relatives (45.00 per cent).

C. Group contact sources

Table 12 indicates that amongst personal sources, very low percentage of the cotton growers had frequently used group contact sources as source of information. It was observed that, 38.33 per cent of the cotton growers had rarely used group discussion as a source of information followed by method demonstrations (29.17 per cent) and exposure visits (27.00 per cent).

D. Mass contact sources

It was observed that from Table 12 that, 80.00 per cent of the cotton growers frequently used Newspaper as their source of information followed by farm magazine (67.50 per cent) and Television (65.83 per cent).

4.3 Knowledge level of the cotton growers about cotton cultivation

The information pertaining to the level of knowledge regarding cotton cultivation practices possessed by the cotton growers was collected, tabulated and analyzed. Results were presented in Table 13.

Table 13. Distribution of the respondent cotton growers by their level of knowledge

Sr. No.	Characteristics category	Frequency (N = 120)	Per cent
1.	Very low (Upto 15 score)	10	8.34
2.	Low (16 to 18 score)	14	11.66
3.	Medium (19 to 21 score)	64	53.33
4.	High (22 to 24 score)	20	16.67
5.	Very high(25 and above)	12	10.00
	Total :	**120**	**100.00**

Table 13 revealed that, more than fifty per cent (53.33 per cent) of cotton growers had medium level of knowledge, where as 16.67 per cent respondents had high level of knowledge followed by 11.66 per cent of the respondent had low level of knowledge. About 10.00 per cent of the cotton growers had very high level of knowledge about cotton cultivation while 8.34 per cent of the respondents very low level of knowledge.

Thus, it indicates that majority of the cotton growers had medium to high level of knowledge. Observation of the present investigation were in line with findings of Chikkana *et al.*

(2005) found that, majority (52.20 per cent) sericulturist had medium level of knowledge.

Table 14. Practice wise level of knowledge of the cotton growers about cotton cultivation

Sr. No.	Practices	Level of knowledge (N = 120)		
		Complete knowledge	Partial knowledge	No knowledge
1.	Soil type/ Soil testing (Medium, well drained)	25 (20.84)	65 (54.16)	30.00 (25.00)
2.	Varieties (Phule Dhanwantari, Rajat, Kanak)	25 (20.83)	50 (41.67)	45 (37.50)
3.	Preparatory tillage (1-ploughing, 2-harrowing)	15 (12.50)	90 (75.00)	15 (12.50)
4.	Sowing time (1st or 2nd week of June)	20 (16.67)	90 (75.00)	10 (8.33)
5.	Spacing (Deshi – 60 x 15 Bt – 90 x 90)	20 (16.67)	60 (50.00)	40 (33.33)
6.	Inter cropping (Mung, Udid, Soybean)	30 (25.00)	40 (33.33)	50 (41.67)
7.	Seed treatment (Thiram, Captan, Azatobacter)	15 (12.51)	85 (70.83)	20 (16.66)
8.	Fertilizer management (125:65:65 kg NPK/ha)	20 (16.67)	30 (25.00)	70 (58.33)
9.	Intercultivation (Herbicide– Pyrithiobak) (Hand weeding, harrowing)	25 (20.83)	60 (50.00)	35 (29.17)
10.	Water management (At flowering, boll maturation, use of drip irrigation)	20 (16.67)	40 (33.33)	60 (50.00)
11.	Plant protection			
	a. American boll worm, red cotton bug, spotted boll worms : (Quinolphos 20 EC 20 ml in 10 liter water)	15 (12.5)	15 (12.5)	90 (75.00)
	b. Aphid and Jassid : Thimithoxam 70 W.S. 4 g/kg seed)			
	c. White fly (Acitamaprid 20 SP 4 g)			
	d. Root rot and wilt (Seed treatment with Trichoderma)			
12.	Picking (2-3 hand picking)	90 (75.00)	25 (20.83)	5 (4.17)
13.	Storage (before storing, sun drying for 3-4 days)	10 (8.33)	100 (83.33)	10 (8.34)
14.	Transportation (Bullock cart, Tractor, Temp, Railway)	90 (75.00)	25 (20.83)	5 (4.17)
15.	Marketing (Local market, tahsil market, district market, other state, trader	30 (25.00)	80 (66.67)	10 (8.33)

The data from Table 14 indicates that almost cent per cent of cotton growers had complete knowledge in transportation and picking followed by Marketing (25.00 per cent), Intercropping (25.00 per cent), inter cultivation (20.83 per cent) and varieties (20.83 per cent).

While, 83.33 per cent of cotton growers had partial knowledge about storage, followed by preparatory tillage and sowing time 75 per cent, seed treatment 70.83 per cent, marketing 66.67 per cent.

75 per cent cotton growers had no knowledge about plant protection followed by 58.33 per cent had no knowledge in fertilizer management, 50 per cent cotton growers had no knowledge in water management.

4.4 Training need

The information related to training needs of cotton growers was collected, tabulated and analyzed. The results were presented in Table 15.

Table 15. Distribution of the cotton growers by their training needs in cotton cultivation

Sr. No.	Characteristics category	Frequency (N = 120)	Per cent
1.	Low (Upto 13 score)	20	16.67
2.	Medium (14 to 22 score)	60	50.00
3.	High (23 and above score)	40	33.33
	Total :	**120**	**100.00**

Table 15 revealed that a majority of (50.00 per cent) respondents had came under medium needed training category,

whereas 33.33 per cent respondents was felled in most needed category whereas remaining 16.67 per cent respondent had low need of training in cotton cultivation.

Further the information pertaining to the subject wise training needs of cotton growers was collected, tabulated and analyzed results were presented in Table 16.

Table 16. Subject wise training needs of the cotton growers

Sr. No.	Practices	Need of training (N = 120)		
		Most needed	Needed	Not needed
1.	Soil testing/Soil type	30 (25.00)	65 (54.17)	25 (20.83)
2.	Varieties	45 (37.50)	50 (41.67)	25 (20.83)
3.	Preparatory tillage	15 (12.50)	90 (75.00)	15 (12.50)
4.	Sowing time	10 (8.33)	90 (75.50)	20 (16.17)
5.	Spacing	40 (33.33)	60 (50.50)	20 (16.17)
6.	Inter cropping	50 (41.67)	40 (33.33)	30 (25.00)
7.	Seed treatment	20 (16.67)	85 (70.83)	15 (12.50)
8.	Fertilizer management	70 (58.33)	30 (25.00)	20 (16.67)
9.	Inter cultivation	35 (29.16)	60 (50.00)	25 (20.84)
10.	Water management	60 (50.00)	40 (33.33)	20 (16.67)
11.	Plant protection	90 (75.00)	15 (12.50)	15 (12.50)
12.	Picking	5 (4.16)	25 (20.84)	90 (75.00)
13.	Storage	10 (8.33)	100 (83.33)	10 (8.34)
14.	Transportation	5 (4.17)	25 (20.83)	90 (75.00)
15.	Marketing	10 (8.33)	80 (66.67)	30 (25.00)

The data from the Table 16 indicates that, 75 per cent of the cotton growers had most need of training in plant protection followed by fertilizer management (58.33 per cent), water management (50.00 per cent).

It was observed that 83.33 per cent of the cotton growers had medium need of training in storage followed by preparatory tillage and sowing time (75.00 per cent), marketing (66.67 per cent) and seed treatment (70.83 per cent).

There was different fifteen areas of training need identified which were classified in to most needed, needed and no needed etc. Scoring was done as 2, 1 and 0 respectively. Training need index of the cotton growers in calculated by maximum obtainable score of these fifteen areas which was divided by the total obtained score. Average training need index is calculated by sum of all the fifteen training areas which was divided by training areas.

Formula for working out training need index of cotton growers of particular subject

$$\text{Training need index (TNI)} = \frac{\text{Total obtained score}}{\text{Maximum obtainable score}} \times 100$$

Average (mean) training need index or All over training need index of the cotton growers in cotton cultivation.

Formula

$$\text{Average training need index (ATNI)} = \frac{\text{Sum of the all index}}{\text{Total area}}$$

Average training need index (ATNI) = $\frac{870.80}{15}$ = **58.05 per cent**

Therefore overall training need index of the respondents was 58.05 per cent.

Table 17. Subjectwise training need index of the cotton growers

Sr. No.	Training subject	Training need index (%)	Rank
1.	Plant protection	90.00	I
2.	Fertilizer management	85.50	II
3.	Water management	83.67	III
4.	Inter cropping	80.66	IV
5.	Varieties	75.66	V
6.	Spacing	70.40	VI
7.	Inter cultivation	65.00	VII
8.	Soil testing/type	60.66	VIII
9.	Seed treatment	52.08	IX
10.	Preparatory tillage	48.50	X
11.	Sowing time	45.66	XI
12.	Marketing	40.30	XII
13.	Picking	35.66	XIII
14.	Storage	25.05	XIV
15.	Transportation	12.08	XV

The data presented in Table 17 reveled that, a large majority of cotton growers needed high training need in subject like, plant protection (90 per cent), fertilizer management (85.50 per cent), water management (83.67 per cent), inter cropping

(80.66 per cent), varieties (75.66 per cent)), spacing (70.40 per cent), inter cultivation (65.00 per cent), soil type (60.66 per cent), seed treatment (52.08 per cent), preparatory tillage (48.50 per cent), Sowing time (45.66) marketing (40.30 per cent), picking (35.66 per cent), storage (25.05 per cent), transportation (12.08 per cent).

Further the information pertaining to the suggestions of the cotton growers about training requirement on cotton crop was collected, tabulated and analyzed results were presented in Table 18.

Table 18. Suggestion of cotton growers about Training requirement on cotton crop

Sr. No.	Particulars	Frequency (N = 120)	Per cent
A.	**Duration of training**		
1.	One day	112	93.33
2.	Three days	31	25.83
3.	Five days	15	12.50
B.	**Place of training**		
1.	In own village	110	91.66
2.	Tahasil place	70	58.33
3.	State agriculture university	20	16.66
C.	**Organization of training**		
1.	Agricultural university	80	66.66
2.	Agriculture college	40	33.34
D.	**Training method**		
1.	Lecture and practical combine	109	90.84
2.	Group discussion	74	61.67

Table 18 contd....

Sr. No.	Particulars	Frequency (N = 120)	Per cent
E.	**Time of training**		
1.	Pre-seasonal	73	60.83
2.	During the crop growth	47	39.17
F.	**Number of training required**		
1.	One training in year	99	82.50
2.	Two training in year	32	26.67

The data depicted in Table 18 showed that 93.33 per cent of the cotton growers required one day training followed by 25.83 per cent and 12.50 per cent of the cotton growers required three days and five days of training respectively. Most of the (91.66 per cent) of the cotton growers wish the place of training should be in their own village while 58.83 per cent of the cotton growers were ready to get training at Tahsil Place followed by 16.66 per cent at SAU. It was seen from Table 18 that 66.66 per cent cotton suggested that training should be organized by SAU and 33.34 per cent by Agriculture college. Most of the cotton growers i.e. 90.84 per cent need training through lecture and practical combine while, 61.67 per cent of the cotton growers wish to training through group discussion. 60.83 per cent cotton growers the suggested pre-seasonal training while 39.17 per cent farmers were ready for training during the crop growth. A majority i.e. 82.50 per cent of the cotton growers suggested one training programme in a year while 26.67 per cent wish to take two training in a year.

4.5 Relationship between selected independent variables and dependent variable of the cotton growers

In the present study, efforts were made to find out the nature and magnitude of the relationship between selected characteristics of respondents and their training needs.

The correlation coefficient 'r' between training needs (Dependent variable) with various independent variables were presented in Table 19 and relationship between dependent and independent variable is discussed subsequently.

Table 19. Correlation between selected dependent and independent variables

Sr. No.	Independent variable	Correlation coefficient
1.	Age	-0.232*
2.	Education	-0.211*
3.	Annual income	-0.466**
4.	Family size	+0.064N.S.
5.	Size of land holding	+0.181*
6.	Social participation	-0.181*
7.	Cropping pattern	+0.015N.S.
8.	Source of information	-0.052N.S.
9.	Knowledge	+0.183*

* = Significant at 5 per cent level
** = Significant at 1 per cent level
N.S. = Non significant

1. Age and training needs

Table 19 indicate that the relationship between age and training need of respondents was negative and significant (r = -0.232).

The old persons stick to their old practices. They were not ready to adopt new technology as easily as. This may be because of they are not aware about the new recommendations evolved in the package of cotton production technology. The findings of investigation are in the line with that of Mande (1998) who reported negative and significant relation between age and training needs.

2. Education and training needs

Table 19 indicate that the correlation between education and training need of respondent negatively or significant (-0.211).

Higher the education widens the knowledge of individual in different areas. So that with the higher education individual feels less need of training as compaired to those having lower education level. These findings are in the line with that of Sharma (1998) found that there was negative relation between education and training needs.

3. Annual income and training needs

Table 19 indicate that there was a negative and highly significant relationship (r = -0.466) between annual income and training needs of respondents.

Thus, it was indicates that, lower the annual income, farmers having low knowledge and requires more training as compare to those having higher annual income. Findings of the

present study were in line with that of Dantare (1998) reported that, there exists significant and negative relationship between annual income and training needs.

4. Family size and training needs

Table 19 indicates that, there was positive but non-significant correlation between family size and training need.

Cotton growers belonged to either small or larger size families felt similar requirements about training needs for cotton cultivation. This findings was in line with findings of Kalamkar (2013).

5. Size of land holding and training needs

It can be seen that there was a positive and significant correlation (r = 0.181) between size of land holding and training needs.

This means that, as the farm size increases farmers want to exercise more components or aspects of technologies on his farm. Larger size of farmers get motivated them to adopt new and remunerative crops both in regard of yield and productivity per unit of area for that to avoid the risk he seeks training. So, as in case of cotton growers, larger the farm size higher was the training need. This finding is in line with the finding of Uplap (2004).

6. Social participation and training needs

Table 19 revealed that there was a negative and significant relationship between social participation and training needs (r = -0.181) at 5 per cent level of significance.

Findings of the present study were in line with that of Maghade (2007) observed that, there exists a positive relationship between social participation and training needs.

7. Source of information and training needs

Table 19 revealed that there was a non significant and negative relation between (r = -0.052) source of information and training need.

Table 19 indicates that, lesser the use of sources of information higher will be the requirement of training needs but relation is non significant. Findings of the present study in line with that of Mane (2005) reported that there exists relation between two variables.

8. Cropping pattern and training needs

Table 19 revealed that there exists positive or non significant correlation between cropping pattern and training needs (r = 0.015).

It means that, there was no influence of cropping pattern and the training need. The farmers belong to all categories of poor good cropping pattern requires similar kind of training of uptake of their cropping pattern. These findings were in line with the findings of Shrivastava (2012).

9. Knowledge about cotton cultivation and training need

Table 19 revealed that there exists a positive and significant correlation between knowledge about cotton cultivation and training needs of respondents (r = 0.193).

Thus, higher the knowledge level, higher was the training needs of cotton growers. Since, they want more details about the cotton technology. These findings were in line with the findings of Mande (1998).

4.6 Constraints faced by the cotton growers

Constrains were circumstances or causes which prohibit growers to adopt improved farm technology. In other words, constraints cause technological gap. The information pertaining to the constraints faced by respondents is presented in Table 20.

A. Input supply constraints

It was seen from the Table 20 that majority of the cotton growers i.e. 78.33 pre cent had constraints of the irregularity of electricity while 66.66 per cent of the cotton growers had the constraints about supply of fertilizers. It was observed that from Table 21, 50.00 per cent respondents had constraint of availability of plant protection measures whereas 50.00 per cent had constraints in supply of farm labour.

B. Economic constraints

It was seen from Table 20, a majority i.e. 81.66 per cent of the cotton growers had constraints, that high wages of labours followed by 75.00 per cent respondent's constraints about high cost of plant protection measures. More than half (58.33 per cent) had constraints in high cost of seeds and 33.33 per cent had constraints of insufficient capital.

C. Technological constraints

It was seen from Table 20 about three fourth proportion of the cotton growers had constraints about the knowledge of germination of the seeds. It was observed that, 58.33 per cent of the respondents had constraints in grading and 41.66 per cent had constraints in use of chemical fertilizers.

Table 20. Constraints faced by cotton growers

Sr. No.	Constraints	Frequency (N = 120)	Per cent
A.	**Input supply constraints**		
1.	Irregularity of electricity	94	78.33
2.	Inadequate availability of FYM/ organic manure/fertilizers	80	66.66
3.	Inadequate availability of plant protection measures	60	50.00
4.	Unavailability of labour	60	50.00
B.	**Economic constraints**		
1.	High cost of labour	98	81.66
2.	High cost of pesticides/ fungicides	90	75.00
3.	High cost of seeds	70	58.33
4.	Insufficient capital	40	33.33
C.	**Technological constraints**		
1.	Lack of knowledge about germination percentage of seeds	90	75.00
2.	Lack of knowledge about grading	70	58.33
3.	Lack of knowledge about use of chemical fertilizers	50	41.66
D.	**Extension related constraints**		
1.	Lack of organizing training programmes	90	75.00
2.	Lack of visits of Extension personnels in proper time	70	58.33
E.	**Marketing related constraints**		
1.	Lack of information about cotton marketing	92	76.94
2.	Lack of cotton storage facility	89	74.16
3.	Lack of co-operative marketing units	87	72.50

D. Extension related constraints

It was seen from the above Table 20 majority (75.00 per cent) of the cotton growers had constraints that, lack of organizing training programme and 58.33 per cent of the cotton growers had constraints that, lack of visits of Extension personnel within time.

E. Marketing related constraints

It was seen from the Table 20, 76.94 per cent of the cotton growers had constraints that, lack of knowledge about market information. Three fourth of the proportion (74.16 per cent) had constraints like unavailability of cotton storages facility and lack of co-operative marketing units (72.50 per cent).

4.7 Suggestions of the cotton growers for overcoming the constraints

Suggestions were invited from the respondent cotton growers to overcome the constraints faced by them in cotton cultivation. In all 10 major suggestions made by the respondents are shown in Table 21. From Table 21 it was observed that 90.83 per cent of cotton growers suggested that information should be supplied about market prices followed by establishment of cotton storage facility (85.83 per cent). Fertilizer should be provide at subsidized rates (81.67 per cent) to established the co-operative marketing unit (80.83 per cent) and training and demonstrations should be organized for cotton growers (74.16 per cent). A majority of them suggested that guidance about detail package of practices of cotton cultivation (69.17 per cent) to make available seeds at cheaper rate (68.33 per cent), to

reduce the tedious process of sanctioning the subsidies on micro-irrigation appliances (59.17 per cent), bank should provided loan with minimum interest (56.67 per cent) and timely supply of plant protection appliances (55.00 per cent).

Table 21. Suggestions of the cotton growers for overcoming the constraints

Sr. No.	Suggestions	Frequency (N = 120)	Per cent
1.	Efficient and effective marketing system over the present one	106	90.83
2.	To establish the storage facility	103	85.83
3.	There should be optimum supply of fertilizers at subsidized prices	98	81.67
4.	To establish the cotton marketing unit on co-operative basis	97	80.83
5.	Organize the training programme by extension personnels	89	74.16
6.	To make available information on package of practices by extension officer	83	69.17
7.	To make available seed at cheap prices	82	68.33
8.	To reduce tedious process of sanctioning subsidies on drip irrigation appliances	72	59.17
9.	To make available crop loan at cheaper rate	68	56.67
10.	Timely supply of plant protection appliances at cheaper rate	66	55.00

5. SUMMARY, CONCLUSIONS AND IMPLICATIONS

This chapter deals with the summary of the findings of the study and their implications for the future line of actions and research.

Though cotton growers are actively involved in cotton cultivation from soil to marketing and contribute significant proportion of their energy and time to increase income. It is therefore necessary to provide effective training to the cotton growers in particular subjects to improve their skill. Hence, the study was attempted in this direction.

The research study entitled, training needs of rainfed cotton growers from low productivity area was planned with following specific objectives.

1. To study the profile of rainfed cotton growers.
2. To study the sources of information used by the cotton growers.
3. To ascertain the training needs of cotton growers.
4. To study the correlation between independent variables and training need.
5. To know the constraints faced and to obtain the suggestions of the cotton growers for overcoming the constraints.

With the help of above objectives a hypothesis was formulations that there exists relationship between independent and dependent variables and it was tested in this study.

The methodology procedure consists of measurement of training need as dependent variable and selected independent variables of cotton growers, selection of research site, village and cotton growers, for the analysis of data statistical measures such as frequency, percentage, mean standard deviation and coefficient of correlation were used.

The data were collected with the help of interview schedule, which was pre-tested before using it for the collection of the data. The data was collected from 120 cotton growers.

The data were presented and discussed by using the frequencies and percentage. The coefficient of correlation (r) was computed to find out the relationship between dependent and independent variables. The summary of the important findings is given in the following pages.

5.1 Summary

5.1.1 Profile of the Rainfed cotton growers

The 54.17 per cent of the cotton growers were from middle age group. Nearly fifty per cent of the cotton growers were educated between secondary school level. The 63.33 per cent of the cotton growers had medium size of family. The 50.00 per cent of the cotton growers had medium size of land holding. A large majority i.e. 83.33 per cent of the cotton growers belonged to the medium income level. Considerable proportion of the cotton growers had medium level of social participation (50.00 per cent). The 66.67 per cent cotton growers belonged to the medium category of source of information used. The 69.16 per cent of the cotton growers belonged to the fair group of cropping

pattern in cotton cultivation. The 53.33 per cent cotton growers had medium level of knowledge about cotton cultivation.

5.1.2 Training needs of the cotton growers

It was observed that a majority of the cotton growers i.e. 50.00 per cent came under medium need of training need category.

5.1.3 Subject wise training need index of cotton growers

Cotton growers needed high training need in subject like, plant protection (90.00 per cent), fertilizer management (85.50 per cent), water management (83.67 per cent), inter cropping (80.66 per cent), varieties (75.66 per cent), spacing (70.40 per cent), inter cultivation (65.00 per cent), soil type (60.66 per cent), seed treatment (52.08 per cent), preparatory tillage (48.50 per cent), sowing time (45.66 per cent), marketing (40.30 per cent), picking (35.66 per cent), storage (25.05 per cent) and transportation (12.08 per cent).

5.1.4 Relationship between selected independent and dependent variable of cotton growers

Among the selected characteristics of the cotton growers, only family size, cropping pattern and source of information exhibited a non-significant relationship with their training needs. Whereas age, education, annual income and social participation exhibited negative and significant relationship with their training needs at 5 per cent probability level. Size of land holding and knowledge of the cotton growers exhibited positive and significant relationship with the training needs.

5.1.5 Constraints faced by the cotton growers

It was observed that a majority of the cotton growers faced the constraints viz., high labour wages (81.66 per cent), unavailability of electricity (78.33 per cent), lack of market information (76.94 per cent), lack of knowledge about germination percentage (75.00 per cent), lack of cotton storage facility (74.16 per cent), lack of trainings (75.00 per cent), lack of cooperative market units (72.50 per cent), high cost of plant pesticide and fungicide (75.00 per cent), lack of extension services at proper time (58.33 per cent), high cost of seeds (58.33 per cent), knowledge of grading (58.33 per cent), less availability of labour (50.00 per cent), lack of knowledge about use of fertilizers (41.66 per cent), insufficient capital (33.33 per cent).

5.1.6 Suggestions of the cotton growers for overcoming the constraints

It was observed that, 90.83 per cent of cotton growers suggested that to develop efficient and effective marketing system followed by establishment of cotton storage facility (85.83 per cent). Fertilizers should be provided at subsidized rates (81.67 per cent), to established the co-operative marketing unit (80.83 per cent) and training and demonstrations should be organized for cotton growers (74.16 per cent). A majority of them suggested that guidance about detail package of practices of cotton cultivation (69.17 per cent), to make available seeds at cheaper rate (68.33 per cent) to reduce the tedious process of sanctioning the subsidies on micro irrigation appliances (59.17 per cent), bank should provided loan with minimum interest

(56.67 per cent) and timely supply of plant protection appliances (55.00 per cent).

5.1.7 Suggestions of cotton growers for organizing of effective training programme

It was observed that, a majority (93.33 per cent) of cotton growers suggested that, one day training programme should be organized by SAU (66.66 per cent) at their own village (91.66 per cent). Further 60.83 per cent of them suggested that, training programme should be organized before starting of every season through lecture and practical combine method (90.84 per cent). About 82.50 per cent of the cotton growers suggested that, training should be once in a year.

5.2 Conclusions

Profile of the Rainfed cotton growers and training needs

Findings of the present study were summarized as follows.

A majority of the cotton growers (54.17 per cent) belonged to middle age group. Further, it was observed that there exists negative and significant correlation between age and training needs. Hence, it can be concluded that age having significant effect on training needs.

Nearly fifty per cent of the cotton growers were educated up to high school level. Further, it was observed that there exists a negative and significant correlation between level of education and training needs. Hence, conclusion emerged that, the level of education have significant effect on training needs.

A majority of the cotton growers (63.33 per cent) having medium size of family. Further it was observed that there exists non-significant relationship between size of family and training need. Hence, conclusion emerged that, size of family have no significant effect on training needs.

About fifty per cent of the cotton growers belong to medium size of land holding. Further it was observed that there exists positive and significant relationship between size of land holding and training need. Hence, conclusion emerged that, size of land holding have significant effect on training need.

A large majority of the cotton growers (83.33 per cent) belonged to the medium level annual income level. Further it was observed that there exists negative and significant correlation between level of annual income and training needs. Hence, conclusion emerged that, the annual income have significant effect on training needs.

Fifty per cent of the cotton growers were found in medium level social participation. Further it was observed that there was exists negative and significant correlation between two variables. Hence, conclusion emerged that, the social participation have significant effect on training need.

A majority of cotton growers (69.16 per cent) belonged to the fair group of cropping pattern in cotton cultivation. Further, it was observed that there exists non-significant correlation between cropping pattern and training needs. Hence, conclusion emerged that there was no any significant effect of cropping pattern in cotton cultivation on training needs.

About 66.67 per cent cotton growers belonged to the medium category of source of information use. Further it was observed that there exists non-significant relationship between source of information use and training needs. Hence, conclusion emerged that the source of information has no effect on the training needs.

A majority of the cotton growers (53.33 per cent) had medium level of knowledge about cotton cultivation. Further, it was observed that there exists positive and significant correlation between knowledge and training needs. Hence, conclusion emerged that higher knowledge higher is the training need.

It was observed that training need index was high in case of plant protection, fertilizer management, water management, inter cropping, varieties followed by spacing soil type, seed treatment and marketing. There was low training need index in case of transportation, storage and picking.

It was also observed that overall training need index of the cotton growers is 58.05 per cent.

It was observed that a large majority of the cotton growers faced the constraints viz., high labour wages, lack of knowledge about cotton cultivation, acute electricity problem, lack of market information and lack of knowledge about marketing of cotton.

It was observed that cotton growers suggested that to establish the cotton storages by the government, to establish the cotton marketing units, information should be supplied to improved varieties followed by guidance should be provided for

package of practices, fertilizer should be provided at subsidized rates, optimum price should be received to cotton in market and training as well as demonstrations should be provided for cotton cultivation. A majority of them suggested that guidance about advantages of cotton cultivation should be provided to people, bank should provided loan with minimum interest. Thus, from above results it becomes evident that the hypothesis formulated was accepted.

It was concluded that, a majority of cotton growers suggested that, one day training programme should be organized by Agricultural University at their own village. Further three fourth proportions of them suggested that, training programme should be organized before commencement of every season.

5.3 Implications

The researcher hopes that this research study will be highly useful in understanding the personal, social, economical, communication and psychological characteristics of the cotton growers, their training needs in cotton cultivation and constraints faced by the respondents. On the basis of the results of the study following implications are drawn.

Action implications

From above crucial findings, it was observed that cotton growers needs training in area like plant protection, fertilizer management, water management, inter cropping, followed by varieties, spacing, inter cultivation, soil type, seed treatment.

Therefore, organizing and conducting training programmes based on felt need of cotton growers would definitely influence and change the behaviour in desire manner. Therefore, extension agencies need to orient their training programmes towards the areas as identified in the present study.

These cotton growers need to train by organizing one day training programme at their own village by Agricultural Universities and also by agriculture college through lecture and practice combine method before start of every season having one or two trainings in a year.

Research implications

The findings of the present investigation would be helpful to the administrators, extension workers, social and research workers in order to develop future strategy to make use of potentialities of rainfed cotton growers for their more effective and efficient involvement in cotton cultivation.

The study will give certain guidelines to the research workers for conducting studies on cotton growers about various aspects like, plant protection, fertilizer management, water management, inter cropping, varieties, spacing followed by inter cultivation, soil type, seed treatment, preparation tillage, marketing, picking, storage and transportation. There was need to study the cotton growers in respect of Integrated Pest Management in Cotton crop.

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