Plant Archives Vol. 20, Supplement 1, 2020 pp. 1377-1381 **e-ISSN:2581-6063 (online), ISSN:0972-5210**

ADOPTION LEVEL OF IMPROVED AGRICULTURAL TECHNOLOGIES AMONG THE COTTON GROWERS OF PERAMBALUR DISTRICT

Kalidasan. T[1], B. Loganathan[1], M. Natarajan[1], M. Kavaskar[1] and C. Muruganandam[2]

[1]Department of Agricultural Extension, faculty of Agriculture, Annamalai University. Annamalainagar, Tamil Nadu, India

[2]Department of Horticulture, Faculty of Agriculture Annamalai University. Annamalainagar, Tamil Nadu, India

Email ID – kaliagru@gmail.com

Abstract

Cotton is one of the vital commercial fiber crops, play a prominent role in the national and international economy due to its high commercial value, it is also popularly known as 'White Gold'. In India, it is important cash and commercial crop valued for its fiber and vegetable oil. It is a source for earning the valuable foreign exchange by providing employment to millions of people and hence plays a significant role in the national economy. The diverse products obtained from cotton include textile raw material, cottonseed is a major source of vegetable oil and cotton cake as a rich source of high quality protein for livestock feed. Cotton is primarily grown as a fiber crop. It is harvested as 'seed cotton', which is then 'ginned' to separate the seed and lint. The long 'lint' fibers are further processed by spinning to produce yarn that is knitted or woven into fabrics. World cotton production was estimated at 103.17 million bales of 480 lbs in 2016-17 (USDA, February, 2017) which is 6.150 million bales higher than the previous year 2015-16. India continued to maintain the largest area under cotton and second largest producer of cotton next to China with 35.29 per cent and 24.00 per cent of world cotton area and production, respectively. India also sustained the position of being the second largest consumer and exporter of cotton. It is expected to export 5.0 million bales and expected to consume 6.8 million bales in 2016-17. In India, cotton contributes about 85.00 per cent raw material to textile industry, occupying an area of 11.8 million hectares with a production of about 28.5 million bales (USDA 2016-17). Half of the respondents (50.00 per cent) had a medium level of adoption followed by low (36.67 per cent) and high (13.33 per cent) level of adoption of recommended cotton cultivation technologies.

Keywords **:** Adoption level, Cotton growers and Cotton Technologies.

Introduction

Tamil Nadu is having cotton area just under 1.42 lakh hectares with a production of 5.00 lakh bales, and the productivity was 599 kg/ha during the year 2015-2016. The requirement of cotton has been projected at 40.00 million bales by 2030. Cotton has been a prominent part of the cropping pattern in the region since the early 20th century, fitting into the larger ecology of downstream users of cotton in the textile and hosiery industries. There is a huge demand for cotton in Tamil Nadu. In 2004, more than half of the mills in operation in India were in Tamil Nadu accounting for around 44.00 per cent of the total consumption by all mills in the country. Yet, according to industry sources less than 15.00 per cent of the varietal requirements of the mills are sourced from within the states. This provides a strong market for cotton growers.

Agriculture technology is never completely accepted by the farmer in all respects, as such there always appears to be a gap between the recommended technology by the scientist and its modified use at the farmer's level. The technological gap is thus the major problem in the efforts of increasing agricultural production in the country. A need of the day is to reduce the technological gap between the agriculture technology recommended by the scientists and its acceptance by the farmers in their field.

It is noticed by reviewing the research report and finding, reported in the research journals that the package of practices as adopted by the farmers are somewhat different from what is recommended by the scientists for optimum production. In India, enough research on cotton production technology has been generated in agricultural universities and research institutes, but the target adopters of the technology were not able to adopt it to the desired level. There always exists a gap between recommended technologies and their adoption by the ultimate users of the technology.

Perambalur district

The highest productivity in cotton was realized in Coimbatore, Vellore and Villupurum districts. The low productivity was released in Ramanathapurum, Thoothukudi, Madurai and Perambalur districts.

In Perambalur district, cotton is cultivated predominantly as a rain-fed crop during kharif season (July-August). The area under cotton was 26, 542 hectares during the year 1999-2000. Even though the area was high, it did not reflect higher productivity (368.00. Kg/lint/ha). After that, the area declined to as low as 2024 hectares in the year 2003-2004 and the productivity had decreased to 260 kg/ha. In 2015-2016 the area under cotton was around 20,383 ha. Cotton cultivation under rain-fed condition is really a risky venture. The farmers are afraid of adopting new technologies because of their poor economic base, insured rainfall, erratic changes in climate, unexpected natural calamities, severe pests and diseases etc., In addition, the farmers experienced numerous bio-physical, technological, economical and institutional constraints in the production and marketing of cotton.

Agriculture technology is never completely accepted by the farmer in all respects, as such there always appears to be a gap between the recommended technology by the scientist and its modified use at the farmer's level. The technological gap is thus the major problem in the efforts of increasing agricultural production in the country. A need of the day is to reduce the technological gap between the agriculture technology recommended by the scientists and its acceptance by the farmers in their field.

It is noticed by reviewing the research report and finding, reported in the research journals that the package of practices as adopted by the farmers are somewhat different from what is recommended by the scientists for optimum production. In India, enough research on cotton production technology has been generated in agricultural universities and research institutes, but the target adopters of the technology were not able to adopt it to the desired level. There always exists a gap between recommended technologies and their adoption by the ultimate users of the technology.

Materials and Methods

There are 33 revenue villages in Veppur block. The list of villages under cultivation cotton were collected from the office of the Assistant Director of Agriculture, Veppur. Based on the maximum area under cotton RCH-20, six villages namely Olaippadi, Paravai, Puduvettakudi, Varagur, Kilaperambalur and Thungapuram were selected for the study. A sample size of 120 respondents was selected from the six villages by using the proportionate random sampling technique.

Adoption level of cotton

Rogers (1983) defined adoption as a decision to make full use of an innovation as the best course of action available. In this study extent of adoption refers to measure how far a particular technology was adopted by an individual correctly without any distortion of the message.

In this study, recommended production technologies for RCH-20 hybrid cotton were selected for assessing the extent of adoption. The cultivation practices for maximizing yield of cotton under rain-fed condition were selected in consultation with extension scientists, subject matter specialists and officials of the state department of agriculture. Totally, 19 major practices with 47 sub-practices were selected for studying the extent of adoption. Each individual was asked about adoption against each item. A score of two was given for adoption, while non- adoption received one score. The scores for all these items were added-up for each respondent and his total adoption score was arrived at by using the formula for the adoption index as adopted by Siddharthan (2011) which was followed in this study.

The proportion (actual/recommended) was calculated separately for each of the practices. Then the values for all the practices were summed up and divided by the total number of practices. The resulting values were taken as the adoption index to find out the extent of adoption of practices. Based on the respondents score, they were categorized into low, medium and high using the cumulative frequency method.

Results and Discussion

Adoption level of recommended cotton cultivation technologies

The result of analysis in overall adoption of recommended technologies in cotton was presented in Table-1

Table 1 : Distribution of respondents according to their overall adoption of recommended cotton technologies

(n=120)

S.No.	Category	Number	Per cent
1.	Low	44	36.67
2.	Medium	60	50.00
3.	High	16	13.33
Total		**120**	**100.00**

From the data in Table 1, it could be seen that half of the respondents (50.00 per cent) were found under a medium level of adoption followed by more than one-third of the respondents under, low level (36.67 per cent) and 13.33 per cent of the respondents had a high level of adoption. More than sixty per cent of the respondents had medium to high level of knowledge would have motivated them to adopt a number of technologies. Besides the respondents with medium risk orientation, scientific orientation, extension agency contact and innovativeness would have adopted the latest recommended technologies to a higher extent. These findings are in line with the findings of Kannan (2013) who observed that most of the respondents fell below medium level of adoption of recommended technologies in his study.

Practice wise adoption of recommended cotton cultivation technologies

In order to have a better understanding of variation in the overall extent of adoption of recommended technologies in cotton, practice wise extent of adoption was analysed and the results are presented in Table-2

Table 2 : Practice wise adoption of recommended cotton technologies (n=120)

S.No.	Technologies	Number	Per cent
1.	**Land preparation**		
	Number of ploughing	120	100.00
	Mean		**100.00**
2.	**Spacing**		
	Recommended spacing	120	100.00
	Correct depth of sowing	75	62.50
Mean			**81.25**
3.	**Varieties**		
	Recommended varieties	100	83.33
	Mean		**83.33**
4.	**Season**		
	Season of cotton cultivation	120	100.00
	Mean		**100.00**

5.	**Seed rate**		
	a. Recommended quantity of seed / acre	120	100.00
	b. Recommended fuzzed seed / acre	100	83.33
	c. Recommended delinted seed / acre	90	75.00
	Mean		**86.11**
6.	**Seed treatment**		
	a. Recommended acid for acid treatment	70	58.33
	b. Recommended quantity of acid / kg of seed	65	54.16
	Mean		**56.24**
7.	**Sowing of seeds**		
	a. Method of sowing seeds	120	100.00
	b. Correct depth of sowing	100	83.33
	Mean		**91.66**
8.	**Gap filling**		
	a. Correct time of gap filling	117	97.50
	Mean		**97.50**
9.	**Thinning**		
	a. Correct time of thinning	85	70.83
	Mean		**70.83**
10.	**Weed management**		
	a. Name of the herbicide recommended	30	25.00
	b. Recommended quantity of herbicide	26	21.66
	c. Correct time of first weeding	50	41.66
	Mean		**29.44**
11.	**Fertilizer application**		
	a. Recommended quantity of FYM	110	91.66
	b. Recommended quantity of urea / acre	103	85.83
	c. Recommended quantity of phosphorus / acre	78	65.00
	d. Recommended quantity of potash / acre	92	76.66
	e. Correct time of manuring	109	90.83
	Mean		**81.99**
12.	**Micronutrient Application**		
	a. Recommended micro-nutrient / acre	78	65.00
	b. Recommended quantity of micro-nutrient	69	57.50
	c. Method of application	97	80.83
	Mean		**67.77**
13.	**Foliar application**		
	a. Have you applied any foliar spray	85	70.83
	b. Mention the name of a chemical or nutrient acid	50	41.66
	c. Specify the quantity used	44	36.66
	Mean		**49.71**
14.	**Bio-fertilizer application**		
	a. Recommended bio-fertilizer / acre	40	33.33
	b. Correct quantity of bio-fertilizers	27	22.50
	c. Correct time of bio-fertilizers application	29	24.16
	Mean		**26.66**
15.	**Topping practices**		
	a. Recommended time of topping	70	58.33
	b. Recommended stage of topping	65	54.16
	Mean		**56.24**
16.	**Plant growth regulator application**		
	a. Recommended plant growth regulator	100	83.33
	b. Correct time of application of plant growth regulator	85	70.83
	c. Recommended quantity of plant growth regulator	70	58.33
	Mean		**70.83**
17.	**Irrigation management**		
	a. Number of irrigation	90	75.00
	b. Correct time of irrigation	75	62.50
	c. Correct interval of irrigation	80	66.66
	Mean		**68.05**

18.	**Plant protection measures**		
	a. Recommended pesticide	90	75.00
	b. Correct quantity of pesticide	80	66.66
	c. Recommended chemical for disease control	85	70.83
	d. Correct quantity of chemical for disease	75	62.50
Mean			**68.74**
19.	**Harvesting**		
	a. Recommended method of harvesting	120	100.00
	b. Method of separation of cotton	110	91.66
	c. Correct time of harvesting	120	100.00
	d. Protection of harvested cotton	105	87.50
Mean			**94.79**
Average Mean			**72.69**

Land preparation

An overwhelming, cent per cent of the respondents (100.00 per cent) adopted a recommended number of ploughings (2 ploughing) for cotton cultivation. The majority of the respondents had a high level of knowledge about field preparation to get higher yield. Hence there was higher adoption.

Spacing

Of the total respondents, cent per cent of the respondents had adopted the recommended spacing (60x30 cm) for cotton followed by the correct depth of sowing (62.50 per cent). The majority of the respondents had a high level of knowledge about field preparation to get higher yield. Hence there was higher adoption.

Varieties

It could be observed from the Table-2, that 83.33 per cent of the respondents adopted the recommended varieties of cotton like RCH-20 which gives more yield and also having the specific characteristics like pest resistant and non-lodging.

Season

From the Table-2, that 100.00 per cent of the respondents cultivated at the recommended season (July-August) for their cotton cultivation. This might be due to the awareness and knowledge level of the respondents about the correct season of the sowing and the recommended variety of cotton to get higher yield.

Seed rate

Seed rate is important to get higher yield. Cent per cent of the respondents had adopted the recommended seeding rate (delinted seed 6 kg) followed by 83.33 per cent of the respondents had adopted recommended fuzzed seed/acre. This might be due to the sufficient knowledge level of the respondents at seed rate.

Seed treatment

The majority of the respondents had adopted recommended acid for seed treatment (58.33 per cent) and 54.16 per cent of the respondents adopted recommended quantity of acid. Most of the respondents were not adopted the seed treatment by H_2SO_4 due to their lack of awareness and knowledge. Lack of awareness, lack of visible impact of treated plants and lack of interest of seed treatment may be attributed as the reason for non adoption.

Sowing of seeds

Of the total respondents, 100.00 per cent of the respondents had adopted the recommended method of sowing (hand dibbling) and correct depth of sowing (83.33 per cent). This might be due to the sufficient knowledge level of the respondents on the sowing of seeds.

Gap filling

An overwhelming, majority of the respondents (97.50 per cent) adopted recommended gap filling practice. Gap filling practice is one of the important practices. To get higher yield in cotton, hence most of the respondents adopted this practice.

Thinning

Thinning is important to get higher yield. The majority of the respondents (70.83 per cent) had adopted the recommended thinning practices. Maintaining optimum plant population is one of the pre requests for obtaining higher yield. Hence, most of the farmers adopted.

Weed management

It could be seen from the Table-16, that 29.44 per cent of the respondents adopted the recommended weed management practices. The remaining of the 70.56 per cent of the respondents were non adopters. It was ascertained during the survey that most of them reported that insufficient of labours during peak season and non-availability experienced labourers were the major reasons for non adoption of weed management practices in their cultivation.

Fertilizer application

Of the total respondents, 81.99 per cent of the respondents adopted the recommended dosage of chemical fertilizer to get higher yields whereas 19.01 per cent of the respondents did not adopt this practice. This may be due to the high cost of the chemical fertilizer and non-availability of desired brand fertilizer. Most of them were poor to apply different fertilizers at different levels at different intervals, besides unawareness of the recommended dosage of chemical fertilizers.

Micronutrient application

More than half (67.77 per cent) of the respondents applied micro- nutrients to their cotton crop as they gained this information from the state Department of Agriculture officials during their contact. Whereas the rest of the respondents (32.23 per cent) were non adopters. This might be due to unawareness and lake of knowledge of the respondents about the micronutrient application for cotton.

Foliar application

It could be observed from the Table-2, that 49.71 per cent of the respondents had adopted the foliar application. The remaining 50.29 per cent of the respondents did not adopt this practice. This might be due to the lack of awareness and lack of knowledge level of the respondents about the foliar application for cotton to get higher yield.

Bio-fertilizer application

It could be seen from the Table-2, that 26.66 per cent of the respondents adopted the recommended weed management practices. The remaining of the 73.34 per cent of the respondents was non adopted. Most of the respondents were of the pessimistic view that pest incidence might increase due to the application of bio-fertilizer. Besides some of them stated that it will increase the cost of cultivation. Hence most of them were not willing to adopt this practice.

Topping

Only 56.24 per cent of the respondents adopted the topping, whereas the remaining respondents (43.76 per cent) did not adopt the practice. Most of them had to gain knowledge about the benefits of topping practices and some of them had a pessimistic view that if you topping is done, it will reduce the growth and yield of the plant. Hence, the majority of them did not adopt this practice

Plant growth regulator application

More than seventy per cent of the respondents (70.83 per cent) adopted the plant growth regulator application, whereas of the respondents (29.17 per cent) did not adopt the practice. It was found during a survey, that most of the respondents had adequate knowledge about the plant growth regulator application. Besides some of them expressed non availability of good quality plant growth regulators in local shops and the high cost of labour was the main reason for non adopting of this practice. This finding lines with Meenakshi, R. (2006)

Irrigation management

Of the total respondents, 68.05 per cent of the respondents were adopted the irrigation management. This might be due to traditionally follow practices by the respondents. The remaining 31.95 per cent of the respondents not-adopted. Our farming area is a rain-fed condition and failure of monsoon. Hence most of them were not willing to adopt this practice. This finding lines with Jeya, R (2011).

Plant protection measures

It could be observed from the Table-2, that 68.74 per cent of the respondents adopted the recommended plant protection measures practice for their cotton cultivation. This might be due to the awareness and knowledge level of the respondents about correct plant protection measures of the recommended practices of cotton to get higher yield. Kanagasabai, R. (2013)

Harvesting

Recommended harvesting practices were adopted by nearly ninety five per cent of the respondents (94.79 per cent) in their cultivation. The majority of the respondents were aware of the recommended harvesting practices. This might be due to the higher knowledge level of the respondents on recommended harvesting practices.

Summary and Conclusion

The result concluded that in practice wise adoption of recommended cotton technologies the mean value showed that cent percent in land preparation and season followed by gap filling, harvesting, sowing of seeds, seed rate, varieties, fertilizer application, spacing, thinning, plant protection measures irrigation management, micronutrient application, topping practices, seed treatment, foliar application and bio fertilizer application respectively. The result also concluded that in practice wise adoption level of recommended cotton technologies in Perambalur District, the average mean value indicated that 72.69 per cent.

From the above concluded result majority of the respondents showed a medium level of adoption due to the reason of the climatic variation in Perambalur District.

References

Jeya, R. and Thiyagarajan, S. (2011). A Study on Yield Gap in Cotton Cultivation, Agriculture Update, 6(1): 75-77.

Kanagasabai, R. (2013). A Study on Knowledge and Extent of Adoption of Recommended Bt Cotton Technologies in Perambalur District, Unpublished M.Sc.(Ag.) Thesis, Annamalai University, Annamalai Nagar.

Kannan, J. (2013). A Study on Knowledge and Adoption Behaviour of Maize Growers, Unpublished M.Sc. (Ag.) Thesis, Annamalai University, Annamalai Nagar.

Meenakshi, R. (2006). A Study on Awareness, Knowledge and Extent of Adoption of Recommended Cotton Technologies by Farmers, Unpublished M.Sc. (Ag.) Thesis, Annmalai University, Annamalainagar.

Siddharthan, R.R. (2011). Study on Adoption of Integrated Nutrient Management Technologies by Paddy Farmers, Unpublished M.Sc. (Ag.) Thesis, Annamalai University, Annamalai Nagar.