Original Research Article

INTEGRATED PEST MANAGEMENT TECHNOLOGY IN COTTON IN PARBHANI DISTRICT OF MAHARASHTRA STATE

Abstract

The present investigation pertinent to this study was conducted in Manwat and Parbhani tahasil of Parbhani district. For the present study 70 cotton growers who follows IPM technology were selected in consultation with KVK subject matter specialists, Officials of State Agriculture department and Extension Agronomists. Further the sample of 70 farmers were divided into three categories viz., Low adopters, medium adopters, high adopters, based on their levels of adoption. To assess extent of adoption of various IPM technology of cotton the concept of TAI was used

According to the study, only 17.14 per cent respondents were high level of IPM technology adopters, 14.28 per cent have adopted IPM at low level while highest i.e. 68.57 per cent farmers had adopted IPM technology at medium level.

Keywords: Adoption level**,** IPM**,** TAI**,** Cotton

Introduction

Cotton (*Gossypium sp.*) is a fibre crop of family Malvacae. Cotton is a major cash crop of India as well as Maharashtra. Cotton plays a key role in the national economy in terms of employment generation and income generation in the agricultural and industrial sectors.

The area under cotton in India is 130.61 Lakh ha with production in India of 343 Lakh Bales and productivity of 510 kg/ ha. In Maharashtra area, production and productivity of cotton is 42.29 Lakh Hectares, 84.09 Lakh bales and 306 kg/ ha, respectively. In the region of Marathwada, area, production and productivity are 8889 Thousand ha, 12.9 MT and 256.48 Kg/ha, respectively. Parbhani district have area, production, productivity is 1811 Thousand ha, 3.7 MT and 227 Kg/ha, respectively. (Source: www.krushimaharashtra.gov.in).

Chemical pesticides were used carelessly to control major pests on cotton, which led to the development of pesticide resistance in the targeted insects and adverse effects on their

natural enemies and non-targeted pests, as well as disturbances in the natural order, the resurgence of minor pests, crop ecosystem pollution, risks to human health, and economic hazards (Pawar and Kadam, 1995). All of the mentioned issues call for a fresh approach to indigenous traditional plant preservation techniques that are non-toxic, affordable, and biological, mechanical, and cultural in nature. The term "Integrated Pest Management" (IPM) refers to a novel method of controlling insect pests. These procedures are simple to use and non-harmful, friendly to useful insects, maintain ecosystem and environment friendly.

Objective : LEVELS OF ADOPTION OF INTEGRATED PEST MANAGEMENT TECHNOLOGY IN COTTON .

Methodology

For the present study 70 cotton growers who follows IPM technology were selected in consultation with KVK subject matter specialists, Officials of State Agriculture department and Extension Agronomists. Further the sample of 70 farmers were divided into three categories viz., Low adopters, medium adopters, high adopters, based on TAI (Technology Adoption Index). Survey method was adopted for the collection of data. A pre-tested schedule was prepared to obtain data from the selected farmers through, personal interview method.

Technology Adoption Index (TAI)

The first objective i.e., to find out different levels of adoption is achieved by using Technology Adoption Index of each and every farmer using the following formula.

$$TAI = \frac{1}{k}\left[\frac{AX1}{RX1} + \frac{AX2}{RX2} + \cdots + \frac{AXK}{RXK}\right] X\ 100$$

Whare,

TAI = Technology Adoption Index

k = No. of Technology

AX_k = Actual use of selected technology

RX_k = Recommended use of selected technology

Categorizing the sample farmers

Taking into account the TAI, the sample farmers were grouped into low, medium and high adopters, by using the mean and standard deviation (SD) of the TAI obtained, which determines the level of adoption of the sample farmers.

Low adopters = Mean - SD

Medium adopters = Mean – SD to Mean + SD

High adopters = Mean + SD

Result and discussion

Table 1: Distribution of sample cultivators

Particulars	Technology level	No. of cultivators	percent
Mean(Technology Adoption Index)	84.27		
Standard deviation(SD)	11.22		
Low technology adopters (Mean-SD)	≤73.05	10	14.28
Medium Technology Adopters (Mean-SD) to (Mean+SD)	≥73.05 to ≤95.49	48	68.57
High technology adopters (Mean+SD)	≥95.49	12	17.14
Total		70	100

The selected cotton growers were grouped as low, medium and high IPM adopters on the basis of estimated mean and standard deviation of Technology Adoption Index, as prescribed in methodology and the results are shown in Table 1. It is observed from table that out of total 70 sample farmers, only 17.14 per cent were found to be adopting IPM technology at high level of adoption of IPM technology with Technology Adoption Index (TAI) ≥ 95.49. About 14.28 per cent sample farmers adopted IPM at low level with TAI ≤ 73.05 while highest i.e. 68.57 per cent farmers had adopted IPM technology at medium level of adoption with TAI ranged between 73.05 to 95.49. The Mean TAI and Standard deviation of TAI was 84.27 and 11.22 respectively.

Thus, it is observed from the Table 1 that very less farmers grouped into high technology adoption group. The reason behind this fact could be clear from socio-economic status of the farmer.4.1.1 Socio-economic characteristics of cotton grower

The socio-economic characteristics viz., age, family size, education, farm size, farming experience, IPM experience and annual income were studied.

Age

Age is one of the important feature which influence managerial ability, skill and judgement in farming business. It is seen from the Table 4.2 that, overall age of selected farmer was 44.55 years, while, the group wise analysis showed that age of low, medium and high technology adopter farmer was 49, 45.4 and 38.41 years, respectively. From this trend it is concluded that with decrease in age there was an increase in the level of technology adoption. It means that the young age farmers were more willing to adopt the IPM technology than the old age farmers. Therefore, age and level of adoption was inversely proportional to each other. Similar results was found by Kabir and Rainis (2014), who concluded that the age of the farmer is critical for adoption of IPM practices in vegetable farming in Bangladesh. The results are also in line with Hussain et al. (2011), where the conclusions revealed that one of the main factors which influence the adoption of IPM among cotton growers in Punjab was age, and also concluded that elder farmers do not adopt the IPM technology

Family size

Family size is the most influential factor with respect to the family labour that can be used in farm works. The family size of high, medium and low IPM adopters was 4, 4.27 and 4.75 respectively. It means in the family of high IPM adopters average 4 members while in the family of low and medium adopters average 4 to 5 members were found.

Education

Education is another important influential factor. It is seen from Table 4.2 that maximum i.e., 30 per cent of the low adopters and, 20.83 per cent of medium adopters were illiterates, whereas there were no illiterates found among the high technology adopters group, which portends that, education played an important role in adoption of IPM technology. Similarly, 20 per cent of low adopters, 16.66 per cent of high adopters and 6.24 per cent of medium adopters were educated up to primary school respectively.

It is observed that majority of farmers in the high adopters group had education level above high school, compared to that of medium and low adopters, concluding that education was having a positive influence on the adoption of IPM technology i.e., level of education was directly proportional to the adoption of IPM technologies. Similar results are found by

Hussain et al. (2011), who revealed that education was one of the important influential factors for IPM adoption among cotton growers in Punjab. The results are also similar with Borkhani et al. (2013), with analyzing the data with multiple regression, education was found to be significant factor for adoption of IPM technologies.

Among high adopters 66.66 per cent have taken high school education, followed by 60.41 per cent, 50 per cent of medium and low adopters respectively. The college and above level of education was seen among 16.66 per cent of higher adopters, 12.25 per cent of medium adopters and no low adopters taken the education at college and above college level.

At overall level analysis of the sample farmers, there were 18.57 per cent of illiterates, 10 per cent of farmers educated up to primary school level, 60 per cent of them had educational qualification up to high school level, and 11.42 per cent of the sample farmer had completed education at college and above level.

Farm size

The farm size in low, medium and high technology adoption group was 2.37, 2.47, and 4.2 ha respectively with overall farm size was 2.45 ha. It indicate that adoption of IPM technology is directly proportional to farm size.

. **Farming experience**

The farming experience of low, medium and high IPM technology adopters was 26, 22 and 16 years respectively. Overall farming experience was estimated to be 23 years. It can be concluded that farming experience was inversely proportional to IPM adoption technology. Contrast result was obtained by Noonari et al. (2015), whose findings revealed that farming experience of farmers and IPM were positively related (with 1 per cent increase in farming experience of farmers, probability of adopting of IPM increases by 3.246 per cent) among cotton growers in Sindh, Pakistan.

. **IPM experience**

The IPM experience of high IPM technology adopter was more than medium and low IPM adopter. Overall IPM experience was 2.82 years. For medium and high IPM adopter groups experience was 2.82 and 2.91 years respectively. On the other hand, the IPM experience of low adopters was just 1 year, which indicated that the low adopters have

initiated use of IPM technology from current year only. Thus, it is concluded that adoption of IPM technology is directly proportional to IPM experience. This result was in support with Noonari et al. (2015), whose findings revealed that farming experience of farmers and IPM were positively related (with 1 per cent increase in farming experience of farmers, probability of adopting of IPM increases by 3.246 per cent) among cotton growers in Sindh, Pakistan.

Annual income

The annual income was high in case of high IPM technology adopter than medium and low IPM technology adopters. So it is concluded that annual income is directly proportional to IPM technology adoption. Which means that high technology adopters were earning more income due to adoption of IPM technology than low and medium technology adopters.

Conclusion

1. In study area, 14.28 per cent, 68.57 per cent and 17.14 per cent farmers were found to be low, medium and high IPM technology adopters.
2. Maximum i.e. 68.57 per cent farmers from the sample were categorized under medium IPM technology adopters.
3. The socio-economic characteristics of the cotton growers revealed that with increase in education level, IPM experience, and farm size, IPM adoption increases.
4. Annual income was more in case of high IPM technology adopter by ₹ 69566 with compared to low IPM technology adopter and that of medium adopter by ₹ 63468 with compared to low IPM technology adopter.

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