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Research Article

ASSESSMENT OF PERCEIVED KNOWLEDGE OF BT. COTTON GROWERS ABOUT INTEGRATED PEST MANAGEMENT TECHNOLOGY

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ABSTRACT

Gujarat is the second largest cotton producing state of India. In Gujarat state Saurashtra region is also has major area under cotton crop. However, it is interesting to note that cotton, which occupies only five per cent of the total cultivable land consume more than 55 per cent of the pesticides used. Present study was carried out to know the knowledge level of Bt. cotton growers about integrated pest management practices in Rajkot district of Saurashtra region with one-fifty Bt. cotton growers. Finally, fifty-two statements were produced towards cotton growers for measuring his knowledge about IPM practices. Majority (66.00 per cent) of Bt. cotton growers were from medium knowledge followed by high level of knowledge about integrated pest management practices in Bt. Cotton. In case of association between knowledge level of Bt. cotton growers and their personal, socio economic characteristic, out of seven socio-economic characteristics, age was negative and significant associated with the knowledge of Bt. cotton growers. While size of land holding was non-significant related with knowledge, remaining all characteristics like, education, annual income, cotton yield index, training received, extension participation and scientific orientation were positive and significant association with the knowledge of Bt. cotton growers. Therefore, due weightage given to the above positive and significant related characteristic of cotton growers to achieve higher knowledge about IPM practices and better management of pest resulting higher income of cotton growers.

INTRODUCTION

India is the pioneer country for the commercial cultivation of hybrid cotton. Cotton is one of the principal commercial crops and has been one of the main sources of India's economic growth and foreign exchange earner. Since launch of "Technology Mission on Cotton" by Government of India in February 2000 significant achievements have been made in increasing yield and production through development of high yielding varieties, appropriate transfer of technology, better farm management practices, increased area under cultivation of Bt. cotton hybrids etc. All these developments have resulted into a turnaround in cotton production in the country since last 6/7 years. The yield per hectare which was stagnant at about 300 kg/ha for more than 10 years, has increased substantially and reached a level of 489 kg/ha in cotton season 2012-13. The 1st commercial hybrid - Hybrid 4 (H-4) was released in 1970 from Main Cotton Research Station of Gujarat Agricultural University.

Cotton is one of the important commercial crops grown in the country. It plays a vital role in the national economy by contributing to 29.80 per cent of India's agricultural gross domestic production. It is exported directly as lint and indirectly as textile accounting to 33.00 percent exports (Anon., 2009). Gujarat, Maharashtra, Rajasthan, Madhya Pradesh, Andhra-Pradesh and Karnataka are leading cotton growing states in India. The average area and production of cotton is 92.60 lakh hectares and 322 lakh bales, respectively (Anon., 2009).

Gujarat is the second largest cotton producing state of India. In Gujarat state Saurashtra region is also has major area under cotton crop. However, it is interesting to note that cotton, which occupies only five per cent of the total cultivable land consume more than 55 per cent of the pesticides used in India. Excessive and indiscriminate use of chemical pesticides has leads to several complications such as resistance development, resurgence, secondary pest outbreak, toxicity to beneficial organism, residue in food, feed, fodder etc. and above all environmental pollution. The Bt.cotton crop is attacked by a number of insect, pests, diseases, nematodes and weeds. Yield losses due to the pests range from 15-25 per cent. The approach to overcome these ill effects of pesticides to a certain extent is Integrated Pest Management practices. The IPM approach is gaining importance and is being increasingly adopted in country. Keeping above points in mind the study was undertaken with the following specific objectives:

Objectives

1. To describe the personal and socioeconomic characteristics of the cotton growers

2. To study the knowledge of cotton growers about IPM practices
3. To explore the relationship between characteristics and their knowledge of IPM practices
4. To find out the constraints faced by cotton grower in adoption of IPM practices

MATERIALS AND METHODS
Selection of respondents
The study was conducted in Krishi Vigyan Kendra, Junagadh Agricultural University, Pipalia (Rajkot-2) operational area of Saurashtra region. Out of seven operational talukas, three talukas were purposively selected viz. Dhoraji, Upleta and Jam kandorana for the study and five villages were selected from each of taluka. Thus, total 15 villages selected from three talukas and 10 respondents were selected randomly from each village, total 150 respondents were selected for the study.

Measurement of extent knowledge
For measuring the knowledge of respondents about integrated pest management, the teacher made knowledge test was developed and used. A set of fifty-five objective questions was prepared by referring related review of literature and in consultation with field experts. The objective questions were prepared in which the responses can be recorded as yes/no, correct/incorrect, identification of pest etc. The set of questions was circulated to Department of Agril. Entomology and department of agril. Extension, JAU, Junagadh for addition, alteration and deletion of the questions. The anomalies in the questions were rectified by making necessary correction for finalising the knowledge test final schedule. Finally, a set of fifty-two objective questions was kept in the schedule while exercising the matter to measure the knowledge of respondents. A unit score was given to correct answer and total score obtained by individual respondents for all the statement was calculated. With the help of mean and standard deviation the respondents were categorized as low, medium and high level of knowledge.

RESULTS AND DISCUSSION
Characteristics of Respondents:
The data presented in Table 1.1 indicated that majority (61.33 per cent) of the respondents were from the middle age group followed by 22.67 and 16.00 per cent of the respondents were from old and young age group respectively. This might be due to that young age farmers moved towards urban area for other business and especially male elder were the respected members and they possess decision making power about all family matters and farming. This finding was in conformity with the findings of Chaudhari (2009). While in case of education that is presented in Table 1.2, majority 37.33 per cent of the respondent were educated up to primary level whereas,

28.67 per cent of the respondents were educated up to secondary level, 13.33 per cent of the respondents were educated up to higher secondary, 15.35 per cent respondents were graduate and 5.33 per cent respondents were illiterate.

The data presented in Table 1.3 revealed that about 50.67 per cent of respondents were from medium size of land holding whereas, 30.67 and 18.67 per cent respondent's possessed large and small size of land holding respectively. The data in Table 1.4 represented about annual income, indicated that 60.67 per cent of cotton grower were from medium annual income group while 29.33 per cent and 10.0 per cent of the cotton growers were from the high and low annual income group, respectively. This finding was in agreement with the findings of Christian (2001). This might be due to that cotton is a cash, irrigated crops and farmers are getting assured good yield. Therefore, majority respondents viz, 60.67 and 29.33 percent fall in the category of medium annual income group followed by high income groups.

The data regarding cotton yield index represented in Table: 1.5 on the basis of data it is clear that 64.67 per cent respondent were from medium cotton yield index followed by 21.33 and 14.0 per cent respondents were from high and low cotton yield index respectively. The reason behind this might be that in study area, respondents were progressive farmers as compare to other area. Table.2.6 data inferred that majority 72.0 per cent of the respondents belong to received less training while 10.67 per cent respondents had received more training followed by 17.33 per cent respondents had untrained about on IPM strategies in Bt. Cotton.

The results in Table 1.7 indicate that majority (72.67 per cent) of the cotton growers had medium extension participation; followed by 14.67 and 12.67 per cent respondents had high and low extension participation, respectively. This might be due to that the programmes related to agriculture are not regularly attended by the farmers. Table 1.8 revealed that majority 62.67 per cent respondents had medium scientific orientation whereas 19.33 and 18.0 per cent respondents had high and low scientific orientation respectively.

Knowledge level of cotton growers about IPM
Table 2 indicated that all the respondents perceived their general knowledge level on IPM strategies, were 66.0 per cent of the cotton growers was medium. Whereas, 23.33 per cent had low and 10.67 per cent had high knowledge about integrated pest management practices in Bt. cotton, respectively. This might be due to fact that the cotton growers had medium social participation, medium extension contact and medium adoption index. These facts had favourably helped to cotton growers in getting more knowledge about IPM in Bt. Cotton. This finding was supported by Gadhvi (2008) and Chaudhari (2009).

Table. 1. Distribution of respondents according to their personal, socio-economic characteristics.

N=150

Sl. No.	Characteristics	Frequency	Percentage
1.1	**Age**		
	Young age (up to 35 years)	24	16.00
	Middle age (36 to 55 years)	92	61.33
	Old age (above 55 years)	34	22.67
1.2.	**Education**		
	Illiterate	8	5.33
	Primary (up to 8th std.)	56	37.33
	Secondary (9 to 10th std.)	43	28.67
	Higher Secondary (11th to 12th std.)	20	13.33
	Graduate (above 12th std.)	23	15.33
1.3.	**Size of land holding**		
	Small size (up to 1ha)	28	18.67
	Medium size (1to 2 ha)	76	50.67
	Big size (above 2 ha)	46	30.67
1.4.	**Annual income**		
	Low (up to Rs. 50,000)	15	10.00
	Medium (Rs. 50,001 to 1,00,000)	91	60.67
	High (above Rs. 1,00,000)	44	29.33
1.5.	**Cotton yield index**		
	Low cotton yield index (below 62.72)	21	14.00
	Medium cotton yield index(between 62.72 to 92.72)	97	64.67
	Low cotton yield index (more than 92.72)	32	21.33
1.6.	**Training received**		
	Untrained (0 score)	26	17.33
	Less trained (> mean)	108	72.00
	More trained (< mean)	16	10.67
1.7.	**Extension Participation**		
	Low extension participation (below 5.48)	19	12.67
	Medium extension participation (between 5.48 to 10.82)	109	72.67
	High extension participation (more than 10.82)	22	14.67
1.8.	**Scientific orientation**		
	Low scientific orientation (below 19.21)	27	18.00
	Medium scientific orientation (between 19.21 to 30.52)	94	62.67
	High scientific orientation (above 30.52)	29	19.33

Table. 2. Distribution of respondents according to their knowledge level with respect to IPM practices.

N = 150

Sl. No.	Knowledge level	Frequency	Percentage
1	Low level of knowledge (below 23.86 score)	16	10.67
2	Medium level of knowledge (23.86 to 40.60 score)	99	66.00
3	High level of knowledge (above 40.60 score)	35	23.33

Relationship between characteristics of respondents and their knowledge about IPM

The correlation co-efficient was computed to ascertain the association between cotton growers level of knowledge and their selected characteristics. The data in Table 3 revealed that there was negative and significant association between cotton growers knowledge about IPM strategies and their age. The direction of association was negative and significant which indicated that cotton growers knowledge increased significantly with decrease in their age. This might be happened because a great majority respondents fall in medium to young age group. Size of land holding is non significance associated with cotton growers' knowledge about IPM practices. This might be due to the fact that, irrespective size of land holding, almost all cotton growers needed to acquire the technical know-how equally. Remaining all characteristics of cotton growers like education, annual income, cotton yield index, training received, extension participation and scientific orientation

were positively and significantly associated with knowledge of IPM strategies of cotton growers. It's proved that increasing IPM knowledge with increasing the positively associated characteristics. This might be due to that majority of farmers were educated up to primary level and had contact with extension functionaries also take participation in krishimela, training etc and get scientific knowledge.

Table. 3. Correlation coefficient between cotton growers level of knowledge and their selected characteristics.

N = 150

Sl. No.	Name of selected characteristics	"r" value (df=148)
1	Age	-0.4527**
2	Education	0.5079**
3	Size of land holding	0.1205^{NS}
4	Annual income	0.1910*
5	Cotton yield index	0.3577**
6	Training received	0.4549**
7	Extension participation	0.3269**
8	Scientific orientation	0.5462**

* Significant at 0.05 (r=0.160)
**Significant at 0.01 (r=0.209)
NS=Non Significant

Constraints faced by cotton growers in adoption of Integrated Pest Management practices

The constraints were kept open ended. The responses were recorded in the schedule itself. The frequency for each constraint was worked out and the mean was calculated. The data was converted in to percentage. A rank was assign to each constraint and presented.

Table. 4. Constraints faced by cotton growers in adoption of IPM practices

N=150

Sl. No.	Constraints	Percentage	Rank
1	Time being results of IPM practices	76.67	II
2	Non availability of IPM component	60.00	V
3	Complexity of cotton pest	48.33	VIII
4	Chemical control gives quick results	82.22	I
5	Less awareness about adverse effect of chemical pesticides	51.11	VII
6	Use of high dose of chemicals in initial stage of spraying	65.56	IV
7	Long duration strategies	70.00	III
8	Misinterpretation of IPM strategies by input dealers	54.44	VI
9	Small holding difficult to use community base IPM strategies	45.56	IX
10	Inadequate knowledge of IPM	31.67	XI
11	Lack of skill labour and high wages	41.11	X
12	Diversified weather condition	22.78	XII

It is obvious from the Table 4 majority of the cotton growers expressed chemical control gives quick results (82.22 %), Time being results of IPM practices (76.67%),

Long duration strategies (70.00%), Use of high dose of chemicals in initial stage of spraying (65.56 %), Non availability of IPM component (60.00%), Misinterpretation

of IPM strategies by input dealers (54.44%) and Less awareness about adverse effect of chemical pesticides (51.11%).

Other general constraints faced by cotton grower in adoption of IPM strategies were : Complexity of cotton pest (48.33%), Small holding difficult to use community base IPM strategies (45.56), Lack of skill labour and high wages (41.11%), Inadequate knowledge of IPM (31.67%) and Diversified weather condition (22.78%).

From above discussion, it could be concluded that more number of cotton growers faced the problem of chemical control gives quick results (rank first), Time being results of IPM practices (rank second), Long duration strategies (rank third), Use of high dose of chemicals in initial stage of spraying (rank fourth), Non availability of IPM component (rank fifth), Misinterpretation of IPM strategies by input dealers (rank seventh) and Less awareness about adverse effect of chemical pesticides (rank eighth).

CONCLUSION

It can be concluded that majority of Bt.cotton growers belong to middle age, educated up to primary level, medium size of land holding and had medium annual income. Most of cotton growers in study area had medium yield index, medium extension participation and medium scientific orientation with less trained category. Bt.cotton growers received their needed information about IPM practices most often from agro input dealer, friends/relative, neighbour and from SAU/KVK scientist. Knowledge of IPM of cotton growers was positively associated with characteristics like, education, yield index, training received, extension participation and scientific orientation while age and size of land holding was negative and non-significance association with their knowledge of IPM practices. Over all knowledge of Bt. cotton growers about IPM practices was medium level but adoption of IPM practices was seriously constrained by chemical control gives quick results, IPM practices has time being and long duration strategies. To increase the knowledge of cotton growers they should be facilitated with technical know-how and motivated to participate in extension activities.

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