

## Original Research Article

# Correlates of Study on Personal Attributes of Farmers with the Adoption of Integrated Nutrient Management Practices of Bt Cotton Growers

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## ABSTRACT

### Keywords

Adoption, Bt cotton, Integrated nutrient management Practices, growers, Availability of inputs

The present study was conducted in Yavatmal district in Vidarbha region of Maharashtra State with a random sample of 150 Bt cotton growers to find out the correlation between the socio-economic, psychological and communication characteristics of the respondents with the adoption of integrated nutrient management practices. The findings of the study revealed that relatively higher proportion of Bt cotton growers (44.00%) were belonged to the middle age group of 36 to 50 years, (30.00%) were educated up to middle school level, 47.33 per cent cotton growers had semi medium land holding, with annual income below Rs. 1,14,000/- as reported by 85.33 per cent of the Bt cotton cultivators. It was further found that 62.07 per cent of the cotton growers belonged to medium level of mass media exposure. The analysis of correlation study revealed that variables like annual income, availability of inputs, mass media exposure, scientific orientation, economic motivation and knowledge had established positive and significant influence on adoption of integrated nutrient management practices by Bt cotton growers.

## Introduction

Cotton is important cash crop in India. About 15 million farmers in the country spread across 10 states engaged in cotton cultivation over 10 million hectares area. India ranks third in global cotton production after USA and China. India accounts for approximately 25.00 percent of world's total cotton area and 16 percent of global cotton production. Per hectare yield of cotton in India is recorded as 300 kg per hectare against world average of 580 kg per hectare. Pest and diseases attack, limited irrigation, vulnerability of monsoon, application of quality inputs are affecting yield significantly. (Gandhi & Namboodiri, 2009).

Bt cotton is a genetically engineered crop hence it is referred transgenic cotton. This Bt cotton contains a toxic protein inducing gene from soil born bacterium *Bacillus thuringiensis* (Bt) resulting the crop to produce toxin consequences of this seen in decrease of bollworms infestation, reduced of insecticides, increased productivity, better quality of cotton. In India, Bt cotton was released in the year 2002 by Genetic Engineering Approval Committee (GEAC) and resulted into drastic reduction in cultivation of conventional cotton. There was an exponential increase in Bt cotton area accounting for a staggering 92 per cent of the total cotton area in India. The

production increased 31.20 million bales during 2010- 11 (Anon., 2014). Still the production and productivity of cotton crop was recorded to low as compare to the national and global average figure.

The reasons for low productivity of cotton are the fluctuation in the rainfall pattern, lack of proper application of fertilizer doses, excessive use of pesticides etc. Lot of research work was carried out in the agricultural universities, cotton research institutes though majority of the farmers of this region are lag behind from use of improved technology. Various improved cultivation practices viz. recommended seed rate, spacing, seed treatment, application of proper fertilizer dose, irrigation schedule, intercultural operations, plant protection measures, integrated nutrient management were recommended by the agriculture scientists.

Integrated nutrient supply/management (INS) aims at maintenance or tuning of soil fertility and supply of nutrients to crop at optimum level for desired crop productivity through optimization of plant nutrients in an integrated manner. Requirement of nutrients is largely depend upon the root system and its mining ability, the availability of nutrients in the soil. The production and productivity of crop depend upon the use of quality inputs, cultivation practices and nutrient management.

The current production and productivity of cotton depicts the technological gap in knowledge and adoption. To boost up the cotton production in the region, the farming community needs to be aware about technological development and adoption of the same. So it was felt necessary to measure adoption level of integrated nutrient management practices by Bt cotton growers. The present study was carried out with the following objectives.

1. To study the socio-economic, psychological and communication characteristics of Bt cotton growers.
2. To understand the relationship between selected characteristics of Bt cotton growers and their adoption of integrated nutrient management practices.

### **Materials and Methods**

The present study was conducted by using descriptive type of research design applying ex-post facto approach. The study was carried out purposively Yavatmal tehasil of Yavatmal district as the tahasil covered highest area under the Bt cotton. After brief consultation with Taluka Agricultural Officer and data available 10 villages from tehasil under study were selected purposively on basis of maximum area. 15 Bt cotton growers as respondents from each village selected randomly which constitute a sample size of 150 respondents.

Rogers and Shoemaker (1971) defined adoption as a decision to continue full use of an innovation. In this study, a teacher made adoption test was developed to measure the adoption of improved integrated nutrient management practices by Bt cotton growers.

For ascertaining the adoption level of respondents, the 23 items of questions applicable for the adoption were prepared, the responses were elicited on three point continuum namely, complete adoption, partial adoption and non-adoption of integrated nutrient management practices with score of 2, 1 and 0 respectively. The raw score was converted into the adoption index by using following formula:

$$\text{Adoption index} = \frac{\text{Actual obtained adoption score}}{\text{Maximum obtainable adoption score}} \times 100$$

The respondents were categorized into low, medium and high level of adoption on the basis of mean  $\pm$  S.D. An interview schedule was developed for data collection and appropriate statistical tools like frequency, percentage and ranking techniques, coefficient of correlation were used for analysis of data.

## **Results and Discussion**

### **Profile characteristics of Bt cotton growers**

Understanding the profile of Bt cotton growers would help to know the characteristics of the farmers affecting the adoption of improved technology or crop cultivation practice. Hence the data related to the profile was tabulated, percentage worked out and presented in Table 1.

The study revealed that slightly over two fifth of the respondents (44.00%) were between 36-50 years of age. Further, 34.67 per cent of farmers belonged to the old age group followed by 21.33 per cent were from young age group category.

About one third of the Bt cotton growers (30.00%) under study were educated up to middle school followed by 23.34 per cent were attained college level education while (21.33%) and (20.00%) were had primary level and high school level education respectively. Only 5.33 per cent of the farmers in study area were found in illiterate category.

With respect to the land holding; nearly half of the respondents i.e. 47.33 per cent were had semi-medium land holding while 30.00 per cent of the respondents were owned medium pattern of land holding i.e. (4.01 to 10.00 ha). Around 10.00 per cent of the respondents were had small and marginal category of land holding. Meager

respondents i.e. only 1.34 per cent of the respondents possessed large land holding.

The data incorporated in Table 1 clearly show that majority of the farmers i.e., 85.33 per cent were had annual income up to Rs. 1,14,000/-, while only 12.00 per cent farmers were found to be in the income group between Rs. 1,14,001 to Rs. 2,16,000/- per annum. Only 1.33 per cent of the respondents were earned above Rs. 4,00,000/- per annual.

It is revealed that most of the Bt cotton growers (62.67%) had medium contact with various mass media sources for seeking information about improved crop cultivation practices; followed by little more than one fifth of the Bt cotton growers (21.33%) who had low access to mass media. Only 16.00 per cent of the Bt cotton growers had high mass media exposure.

It is evident from Table 1 that relatively higher proportion of the Bt cotton growers (67.33%) were having medium level of extension contact followed by about equal percentage of the Bt cotton growers i.e. around (16.00%) had low and high level of extension contact.

The scientific orientation refers to the degree to which respondents are oriented towards the use of scientific methods. Nearly 64.00 per cent of Bt cotton cultivators were had medium level of scientific orientation, followed by (22.67%) and (13.33%) belong to low and high level of scientific orientation respectively.

The data in the Table 1 indicate that around (60.00%) of the Bt cotton growers were had medium level of economic motivation while 24.67 and 16.00 per cent of the Bt cotton growers were belonged to low and high level of economic motivation respectively.

**Table.1** Distribution of Bt cotton growers with respect to their personal attributes

Sr. No	Category	Frequency	Percentage
	<b>Age</b>		
1	Young	32	21.33
2	Middle	66	44.00
3	Old	52	34.67
	<b>Education</b>		
1	Illiterate	08	05.33
2	Primary school	32	21.33
3	Middle school	45	30.00
4	High school	30	20.00
5	College	35	23.34
	<b>Land holding</b>		
1	Marginal	14	09.33
2	Small	18	12.00
3	Semi-medium	71	47.33
4	Medium	45	30.00
5	Big	02	01.34
	<b>Annual income (Rs.)</b>		
1	Up to 1,14,000	128	85.33
2	1,14,001 to 2,16,000	18	12.00
3	2,16001 to 3,08,000	2	1.33
4	3,08,001 to 4,00,000	0	0.00
5	Above4,00,000	2	1.33
	<b>Mass media exposure</b>		
1	Low	32	21.33
2	Medium	94	62.67
3	High	24	16.00
	<b>Extension contact</b>		
1	Low	24	16.00
2	Medium	101	67.33
3	High	25	16.67
	<b>Scientific orientation</b>		
1	Low	34	22.67
2	Medium	96	64.00
3	High	20	13.33
	<b>Economic motivation</b>		
1	Low	37	24.67
2	Medium	89	59.33
3	High	24	16.00

**Table.2** Distribution of Bt cotton growers according to their overall adoption

Category	Frequency	Percentage
Low adoption	27	18.00
Medium adoption	95	63.33
High adoption	28	18.67
<b>Total</b>	<b>150</b>	<b>100.00</b>

**Table.3** Correlation of profile characteristics with extent of adoption of INM practices

Independent variable	Correlation coefficients 'r' value
Age	0.020
Education	0.188
Land holding	0.231*
Annual income	0.443**
Area under cotton crop	0.230*
Availability of inputs	0.653**
Mass media exposure	0.462**
Extension contact	0.151
Scientific orientation	0.489**
Economic motivation	0.426**
Knowledge	0.547**

\* significant at 0.05 level of probability

\*\* significant at 0.01 level of probability

### **Adoption level of Bt cotton growers about integrated nutrient management practices**

The data in Table 2 was analyzed to assess the overall adoption level of integrated nutrient management practices by Bt cotton growers they were accordingly categorized. Adoption is a process by which the respondent ready to adopt improved technology to some extent after thorough knowledge and awareness about the same. It could be observed from Table 2 that majority of the respondents (63.33%) had medium level of adoption followed by high (18.67%) and low (18.00%) level of adoption of integrated nutrient management practices by the Bt cotton cultivars. Further it is concluded that majority of the

respondents belongs medium level of adoption category. This reflects the fact that medium level of adoption may be due to high awareness among the cotton growers, and their active and frequent contact with extension agencies and use of information source to get acquainted with improved crop production technology. Our findings were supported by the findings of Landge(2001) and Bodake (2003).

### **Relationship between selected characteristics of Bt cotton growers and their adoption level**

The adoption about new farm practice or technology is mostly influenced by personal, socio-economical, psychological and

communication characteristics of individuals. For this reason the coefficient of correlation (r) for independent variable was worked out and data are presented in Table 3

Among the eleven characteristics studied variables studied, six characteristics namely annual income, availability of inputs, mass media exposure, scientific orientation, economic motivation and knowledge were found to have highly significant correlation with the adoption level whereas land holding and area under cotton crop was positively correlated at 0.05 level of probability. Thus the annual income, availability of inputs, mass media exposure, scientific orientation and economic motivation highly influenced the adoption of integrated nutrient management practices. Further it was noticed that the correlation between age, education and extension contact with adoption was found to be non-significant. It shows that age, education and extension contact had no influence over the adoption of integrated nutrient management practices of Bt cotton. The results were confirmed by the findings of Borkar (2000).

In conclusion, majority of the Bt cotton growers were in middle age, having middle school level education and semi medium type of land holding with annual income below Rs. 1,14,000/-. The respondents were medium level of extension contact, scientific orientation and economic motivation. The result further revealed that majority of the Bt cotton growers were had medium adoption level with respect to integrated nutrient management practices. The analysis of

correlation of selected characteristics likemass media exposure, annual income, and availability of inputs, scientific orientation, economic motivation and knowledge were positively and significantly correlated with the adoption of integrated nutrient management practices for Bt cotton.

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