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The level of adoption of various biotic stress management practices by sugarcane growers in Surajpur district of Chhattisgarh

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Abstract
The present study has been conducted on the level of adoption of various biotic stress management practices by sugarcane growers in Surajpur district of Chhattisgarh. 15 villages were selected randomly for the study in Surajpur district of Chhattisgarh. The Socio-personal characteristics of the respondents indicated that the majority (67.50%) belongs to middle aged group (36 to 55 years). With reference to source of information, about 97.50 per cent of the farmers had received the information from progressive farmers while 92.5 per cent received from radio. The study also revealed that more than half of the respondents were having medium economic motivation and adopted flatbed sowing method of sugarcane due to its simple and time saving quality. 69.93% farmers were found to be growing CO-62175 sugarcane variety with 68.34 per cent farmer in study area had medium level of farming experience i.e., 5-10 years.

Keywords: Motivation, adopted, biotic stress and progressive

Introduction

Sugarcane is the important cash crop of India and it is main source of farmer to earn money. As per Government's vision the yield of the farmer has to be doubled by 2022 and it is among highest priorities of the Government. The achievable objective of increasing farmer's income can be achieved by relying on modern and sustainable technologies, implementing them from lab to land and minimizing the constraints being faced by the farmers. Due to its ability to produce and store high levels of sucrose, sugarcane is considered as one of the main cash crops in the world.

Materials and Methods
Arithmetic mean
Mean scores for each category were calculated separately by the following formula:

$$\text{Arithmetic Mean } (\overline{X}) = \frac{\sum_{i=1}^{n} X_i}{n}$$

Where
X_i = ith score
n = Number of observations

Standard deviation
It is a measure of variability in a set of scores and was computed for the purpose of analysis and further categorization. The formula used for calculating standard deviation was as follows:

$$\sigma = \sqrt{\frac{\sum (X_i - \overline{X})^2}{n-1}}$$

Where
σ = Standard deviation
X_i = ith score value

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$\bar{X}$ = Arithmetic Mean

n = Total number of observations

MPS = Total obtained score/Maximum obtained score X 100

Mean percent score (MPS)

Based on the total scores obtained by the respondents, need mean score was worked out by using the following formula:

Result and Discussion

Distribution of respondents according to their overall level of adoption regarding biotic stress management practices of sugarcane

Table 1: Distribution of overall adoption regarding biotic stress management practices

Particulars	Frequency	Percentage %
Low (Up to 33.33%)	19	15.83
Medium (33.34-66.66%)	34	28.33
High (Above 66.66)	67	55.83
Total	120	100.00

The data regarding overall adoption regarding biotic stress management practices are presented in Table 1. The data clearly revealed that the majority of respondent (55.83%) had high level of adoption, followed by 28.33 per cent of them had medium level of adoption and only 15.83 per cent of them had low level of adoption. Kiran and Shenoy (2010), and Narbaria (2013) had found similar findings in their study.

Correlation coefficient and multiple regression analysis of independent variables with extent of adoption by sugarcane growers

Table 2: Correlation coefficient and multiple regression analysis of independent variables with extent of adoption by sugarcane growers

Independent variable	Correlation coefficient 'r' value	Partial regression 'b' value	Coefficient 't'- value
Age	0.0678	-0.0089	-0.1571
Education	0.1859	0.2768	2.782**
Caste	0.1478	-0.2037	0.4832
Occupation	0.1863	-0.0751	-0.2391
Size of land holding	0.0811	0.2473	1.9734*
Annual income	0.1708	-0.3728	1.1542
Credit acquisition	0.1589	2.9812	2.4731**
Land type used for sugarcane cultivation	0.1452	0.5647	1.7215
Labour use	0.1467	-0.2345	0.5321
Sources of information	0.1443	0.5569	1.7324*
Economic motivation	0.1572	-2.453	-1.325
Planting method	0.2522*	2.4325	2.1453**
Varieties	0.2183	-0.158	0.613
Knowledge of plant- protection measures of sugarcane	0.2826	0.2535	3.347**
Experience of sugarcane farming	0.0688	0.0368	0.5842

** Significant at 0.01 level of probability, Multiple R^2 = 0.4793, *Significant at 0.05 level of probability, F value = 2.43, Intercept content (a) = 17.45

To determine the correlation and regression analysis of selected independent variables with extent of adoption by sugarcane growers. The analysis was done and results are given in table 2. The finding revealed that out of 15 independent variables, only 4 variables i.e. education, credit acquisition, planting method and knowledge of plant-protection measures of sugarcane were found positive and highly significantly correlated with extend to adoption by sugarcane growers whereas variable size of land holding and sources of information was found positive and significantly correlation at 0.05 level of probability. The other variables like age, caste, occupation, annual income, land type used for sugarcane cultivation, labour use, economic motivation, varieties and experience of sugarcane farming showed statistically non-significant relationship with extent of adoption by sugarcane growers. The maximum positive results were found in knowledge of plant- protection measures of sugarcane which is highly significant i.e. 3.347 at 1% level of significance and highly negative result was found in economic motivation.

Adoption of biotic stress management practices as perceived by the sugarcane growers

The constraints as perceived by the farmers in adoption of modern agricultural technologies are given in Table 3, 4 and 5. The constraints are categorized in some categories like, pecuniary constraints, infrastructural constraints, knowledge and awareness constraints.

Pecuniary constraints

Table 3: Distribution of sugarcane growers according to their pecuniary constraints

Constraints	Frequency	Percentage	Rank
High cost of plant protection chemicals	14	11.67	III
High cost of tolerant/resistant varieties	17	14.17	II
Lack of subsidy from govt. on IPM control measures	79	65.83	I
Availability of credit	10	8.33	IV

From the Table 3, it is observed that majority of respondents (65.83%) perceived Lack of subsidy from govt. on IPM control measures, followed by high cost of tolerant/resistant varieties (14.17%) and high cost of plant protection chemicals (11.67%). It was found that availability of credit as not a matter of big concern as only 8.33 per cent of respondent reported.
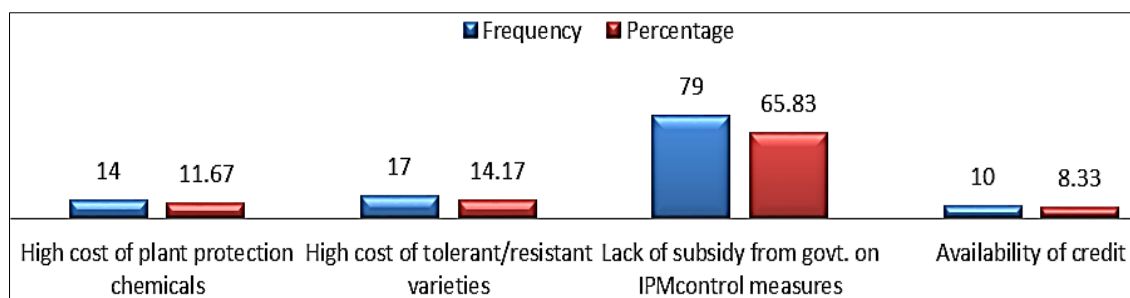

Fig 1: Distribution of sugarcane growers according to their pecuniary constraints

Infrastructural constraints

The data revealed from the Table 5 that majority of respondents (68.33%) perceived Non-availability of bio-control agents, followed by Lack of training on IPM practices (14.17%), non-availability of technical guidance on the use of IPM practices (10.00%) was found quite low, lack of water scarcity or electricity was perceived poor constraints for which 7.50 per cent responses.

Table 4: Distribution of sugarcane growers according to infrastructural constraints

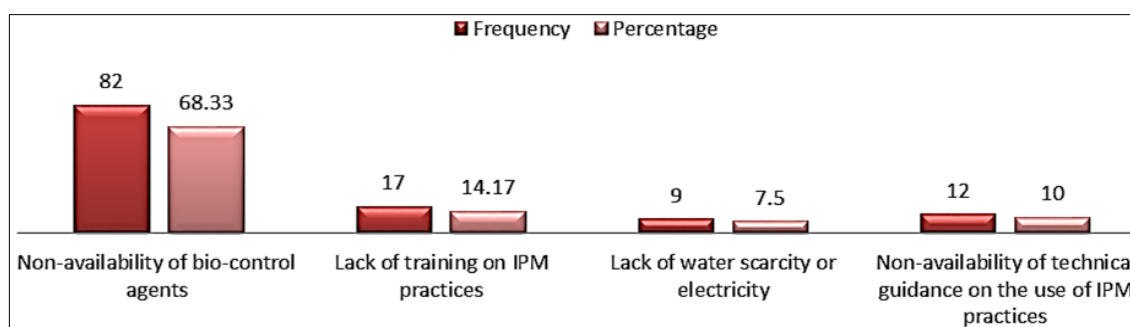| Constraints	Frequency	Percentage	Rank
Non-availability of bio-control agents	82	68.33	I
Lack of training on IPM practices	17	14.17	II
Lack of water scarcity or electricity	9	7.50	IV
Non-availability of technical guidance on the use of IPM practices	12	10.00	III

Fig 2: Distribution of sugarcane growers according to infrastructural constraints knowledge and awareness constraints

Table 5: Distribution according to constraints related to knowledge and awareness

Constraints	Frequency	Percentage	Rank
Lack of awareness on biological pest control	65	54.17	I
Lack of ETL for use of chemical pesticides	9	7.50	IV
Inadequate demonstration on IPM technologies	17	14.16	III
Lack of knowledge about effect on crop	29	24.17	II

From the Table 5, it is observed that majority of respondents (54.17%) perceived lack of awareness on biological pest control measures, followed by lack of knowledge about effect on crop (24.17%), inadequate demonstration on biotic control practices (14.16%) and lack of ETL for use of chemical pesticides (5.50%).

It can be concluded from the study that lack of subsidy from govt. on IPM control measures, Non-availability of bio-control agents, lack of awareness on biological pest control measures, high cost of tolerant/resistant varieties, lack of knowledge about effect on crop etc., are the major constraints perceived by the respondents in the study area.

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