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Relationship between Farmers' Characteristics and IPM Adoption in Sugarcane Cultivation in Sitapur (UP)

¹Jagatpal, ²RK Doharey and ¹Swatantra Pratap Singh

¹School of Agricultural Studies, Quantum University Roorkee, Haridwar, Uttarakhand, India

²Department of Extension Education, College of Agriculture, N.D.U.A. & T., Narendra Nagar (Kumarganj), Ayodhya, Uttar Pradesh, India

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Corresponding Author: Jagatpal

Abstract

The Khairabad Development Block in the Uttar Pradesh district of Sitapur served as the study's location to ascertain the relationship between the socioeconomic characteristics of sugarcane farmers. A total of 20 sugarcane farmers from each of the five villages that were randomly chosen from this development block comprised the sample of 100 respondents. The information was gathered from sugarcane growers using the personal interview technique and a preplanned interview schedule. There were positive significant and significant relationships between education (0.341894*), farm power (0.048407*), knowledge of marital status (0.07568**), land holding (0.066307**), institutional participation (0.239366**), transportation facility (0.046606**), material possession (0.213142*), Economic Motivation (0.204439*), and risk orientation (0.223787*) of farmers with the adoption level of Integrated Pest Management (IPM) practices in sugarcane cultivation, whereas marital status (0.10184), type of family (0.076437), size of family (0.047357), economic motivation (0.195065), scientific orientation (0.189226), and risk orientation (0.053617) with adoption were positively non-significant.

Keywords: Correlation, integrated pest management, sugarcane, and sugarcane growers

Introduction

Sugarcane farming serves as an important source of livelihood across the world. It is a member of the Gramineae family. Sugarcane is the world's largest crop. As per FAO data, around 26 million hectares of land across more than 90 nations were devoted to sugarcane cultivation in 2012, producing nearly 1.83 billion tons globally. India ranks as the world's leading sugarcane producer, followed by Brazil, China, Thailand, Pakistan, and Mexico.

Sugarcane is a weather-loving, fairly cloudy crop that is grown in tropical and subtropical climates. With a total cultivated area of 5.06 million hectares and a production of 356.56 million tonnes in 2014–15, 70% of India's sugarcane is grown in the subtropics, and the other 30% is grown in the tropics.

Uttar Pradesh, Maharashtra, Karnataka, Tamil Nadu, Andhra Pradesh, and Punjab are the principal states in India where sugarcane is grown; nevertheless, the climate in the north of the country is subtropical. In the northern area, Uttar Pradesh, Haryana, Punjab, Bihar, and Jharkhand are the principal sugarcane-producing states. Uttar Pradesh, covering more than 2,22,800 hectares under sugarcane cultivation, stands as the leading producer in the subtropical zone, yielding about 134.69 million tonnes of sugarcane. The highest sugarcane production in the subtropical region is found in Haryana. Sugarcane was grown on 1.44 lakh hectares of land in the Sitapur district in 2013–2014, producing 9.32 million tons with a yield of 64.68 tons/ha.

Integrated pest management (IPM) is a comprehensive ecological approach to pest control that uses the abilities, techniques, and methods of routine monitoring as well as monitoring of crop pests. IPM is a harmonious and compatible method for reducing pest populations below levels that cause economic harm by using all available pesticides, including chemical pesticides as a last resort. The theory behind IPM is to reduce agricultural losses to bring crops to life while considering environmental safety and human health.

For a long time, the concept of Integrated Pest Management (IPM) did not reach the grassroots level among farmers, even after being introduced as a solution to pest-related issues in modern agriculture. Initially, it was believed that farmers in developing nations, due to limited literacy, would struggle to understand and apply IPM practices. However, this assumption has proven incorrect, as farmers have successfully shown their ability to comprehend and implement IPM principles. The effectiveness of Farmer Field Schools (FFSs) across several Asian countries highlights that farmers readily adopt suitable technologies that respect their traditional knowledge, local conditions, and socioeconomic realities (Bergvinson, 2004) ^[1].

Methodology

The Sitapur district was purposely selected as it is a highly potential district for sugarcane crops. The Khairabad block in Sitapur district was purposely selected for this study out

of 19 community development blocks due to its proximity to the researcher's villages and ease of access. Five villages were purposively selected, and a list of all farmers in each selected village was created. A total of 100 farmers were selected as respondents through random sampling from each selected village. This study employed an ex-post facto research design. Considering the objectives of the study, the interview schedule was prepared, and respondents were interviewed at their homes and fields.

Twelve independent variables of the sugarcane growers were measured using the respective scales with due modification. Age was measured by collecting chronological age. Education, marital status, caste, family type, family size, land holding, occupation, annual income, institutional membership, material possession, and extension contact variables were measured using the scale developed by Trivedi and Pareek (1964). The economic, scientific, and risk orientation variables were measured using the scale developed by Supe (1969). Statistical tools such as percentage, mean score, standard deviation, and correlation coefficient (r) were employed to analyze the relationship between the dependent and independent variables.

Result and Discussion

Table 1: Correlation coefficient (r) between different independent variables and knowledge about integrated pest management practices in sugarcane crop.

S. No	Variables	Correlation Coefficient
1	Age	-0.02265
2	Education	0.55464**
3	Marital status	0.07568**
4	Caste	-0.0498
5	Type of family	-0.01179
6	Size of family	0.052861
7	Housing pattern	-0.10923
8	Land holding	0.066307**
9	Occupation	0.107418
10	Annual income	0.06958
11	Institutional participation	0.239366**
12	Transportation facility	0.046606**
13	Farm power	0.181668
14	Material possession	0.213142*
15	Economic motivation	0.204439*
16	Scientific	0.188188
17	Risk	0.223787*

Table-1 shows that out of the 17 variables studied, only five variables, namely, education, marital status, institutional membership, landholding size, and transportation facility, were strong and positive relationship with the level of IPM knowledge. The correlated variables, such as economic motivation, risk orientation, and material position, were found to be significant and positively correlated with the extent of knowledge about IPM. The five variables, family size, occupation, annual income, farm power, and scientific orientation, were positively correlated with the extent of knowledge about IPM. The variables age, caste, type of family, and housing pattern were negatively correlated with the extent of knowledge about IPM. The variables such as age, caste, family type, and housing pattern exhibited a negative correlation with the level of knowledge regarding IPM. Conversely, the factors that showed a positive and

significant association had a direct impact on the farmers' understanding of integrated pest management practices in sugarcane cultivation. In other words, as the values of these positively related variables rise, the level of knowledge about IPM practices in sugarcane also increases.

Table 2: Correlation coefficient (r) between different variables and the extent of adoption of integrated pest management practices in sugarcane crop.

S. No	Variables	Correlation Coefficient
1	Age	-0.12598
2	Education	0.341894*
3	Marital status	0.10184
4	Caste	-0.0572
5	Type of family	0.076437
6	Size of family	0.047357
7	Housing pattern	-0.11101
8	Land holding	-0.12311
9	Occupation	-0.10541
10	Annual income	-0.17312
11	Institutional membership	-0.01764
12	Transportation facility	-0.07687
13	Farm power	0.48407*
14	Material possession	-0.06412
15	Economic motivation	0.195065
16	Scientific	0.189226
17	Risk	0.053617

*Significant at 0.05% probability level

** Significant at 0.01% probability level.

Table-2 shows that out of the 17 variables studied, only two variables, education and farm power, had significant and positive correlations with the adoption of integrated pest management practices in sugarcane crop. Six variables, namely marital status, type of family, size of family, economic motivation, scientific orientation, and risk orientation, were positively correlated with the extent of IPM adoption. The nine variables age, caste, housing pattern, land holding, occupation, annual income, institutional membership, transportation facility, and material possession were found to be negatively correlated with the extent of IPM adoption. This indicates that a rise in the values of these variables leads to a higher level of adoption of integrated pest management practices in sugarcane cultivation.

Conclusion

The findings reveal a positive and significant association between various factors and the level of adoption of integrated pest management practices in sugarcane cultivation. There was a significant relationship between education (0.341894*), farm power (0.48407*), knowledge of marital status (0.07568*), land holding (0.066307**), institutional participation (0.239366**), transportation facility (0.046606**), material possession (0.213142*), Economic Motivation (0.204439*), risk orientation (0.223787*), and the adoption level of Integrated Pest Management (IPM) practices in sugarcane cultivation. However, there was no significant relationship between marital status (0.10184), type of family (0.076437), size of family (0.047357), economic motivation (0.195065), scientific orientation (0.189226), and risk orientation (0.053617).

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