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Relationship between Socio-economic Characteristics of Sugarcane Growers with Their Knowledge and Adoption Level of IPM Practices

Mohit Kumar [a,b*], H. C. Singh [c] and S. N. Singh [d]

[a] Eternal University, Baru Sahib (HP.)-173101, India.
[b] Department of Agricultural Extension, Chandra Shekhar Azad University of Agriculture and Technology, College of Agriculture, Kanpur-208002, India.
[c] College of Agricultural Engineering and Technology, Campus Etawah (CSAUA&T Kanpur)-206001, India.
[d] KVK, Sohna, Siddharthnagar- 272193 (U.P.), India.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

This investigation was conducted in two districts (Namely Saharanpur and Muzaffarnagar) of Western Uttar Pradesh which were selected purposely. A total number of 240 Sugarcane growers were selected through random sampling from sixteen villages. The structured schedule was developed keeping in view the objectives and variables to be studied. Correlation coefficient (r) between different variables and knowledge. Out of 17 variables studied, the variables i.e. education, occupation, annual income, material possession, economic motivation, and risk

**Corresponding author: E-mail: mohitmayapur404@gmail.com;*

motivation extent of contact were found highly significant and positively correlated with knowledge extent. The variable like age, caste, type of family, housing pattern, social participation and communication media possession, the extent of contact, scientific orientation, and experience in Sugarcane cultivation was found positively correlated with knowledge extent.
Correlation coefficient (r) between different variables and adoption. Among the 17 variables studied, the variables viz. occupation, annual income, and material possession were found highly significant and positively correlated with the level adoption. The variables like education and economic motivation were found significant and positively correlated with adoption extent. Caste, housing pattern, social participation, communication media possession, the extent of contact, scientific motivation, risk motivation, and experience in sugarcane cultivation positively correlated with extent of adoption.

Keywords: Adoption; knowledge; correlation; dependent & independent variables, etc.

1. INTRODUCTION

Sugarcane is a tropical and subtropical crop known for its tall, slender stalks filled with sweet juice. It belongs to the family Poaceae, and is scientifically known as Saccharum officinarum [1,2]. Sugarcane is primarily grown for its high sugar content, which is used in the production of sugar, molasses, and various sugar-based products. Since the beginning of time, India's economy has been impacted by sugarcane, a significant cash crop. It serves as the primary raw material for the manufacturing of sugar, which annually brings in a sizeable sum of foreign currency for the national exchequer [3]. After the textile industry, the sugar sector is the second-largest agro-based sector [4,5]. The onslaught of numerous insect pests, diseases and weeds from the time of planting till crop harvest is the main cause of the low yield of sugarcane in Haryana. Sugarcane plantations have reportedly been harmed by up to 200 different types of insect pests at various stages. Although the fact that pesticides are widely used, they cause major crop losses [6,7]. Uncontrolled pesticide use has resulted in a number of serious drawbacks, including the recurrence of pests, the spread of secondary pests, the emergence of pest resistance, and hazardous residues [8]. The remedy stays in integrated pest management techniques, which will offer a reasonable and acceptable foundation for pest control in sugarcane [9,10].

“The majority of farmers were unknowing of the biological insect pest control [11,12]. Education, landholding, socioeconomic status, extension contact, media exposure, risk orientation, economic motivation, and change proneness were among the ten personal characteristics investigated that were found to have a positive and significant correlation with the level of knowledge of overall IPM practises among sugarcane growers [13-16]. It is important to inform farmers about the value of sugarcane crops and various IPM practices by using appropriate extension strategies” [17,18].

Therefore, the present study has been undertaken to study the relationship between Socio-economic characteristics of Sugarcane growers with their Knowledge and Adoption level of IPM practices The objectives of the study are:

i. To study socio-economic characteristics of sugarcane growers with their knowledge regarding Integrated Pest Management.
ii. To study socio-economic characteristics of sugarcane growers with their adoption level regarding Integrated Pest Management.

2. METHODOLOGY

Out of 26 districts of Western Uttar Pradesh, Saharanpur and Muzaffarnagar were purposively selected based on their agricultural production and productivity. From each district, two community development blocks were randomly taken, and from each community development block, four villages were randomly nominated, and from each village, 15 respondents were selected randomly and sugarcane cultivators population were identified from the every village. Through the use of a random sample technique, 240 sugarcane growers were elected from the list. A pre-tried interview plan was used to help get the data. Correlation coefficient analysis has been completed following the acquisition of data for the study of the relation between independent and dependent variables.

2.1 Justification of Research Tools

Correlation coefficients was used to assess the relationships between pairs of variables.

i. To identify the relationship between socio-economic characteristics of sugarcane growers with their knowledge and adoption level of sugarcane growers regarding Integrated Pest Management.

2.2 Standard Deviation

Standard deviation is the square root of mean of the squares of all deviations, the directions being measured from the arithmetic mean of the distribution. It is commonly developed by symbol sigma (σ).

$$\text{S.D. } (\sigma) = \sqrt{\frac{\sum d^2}{n}}$$

Where,

σ = Standard deviation
d = Deviation of variables mean
n = Total number of items

2.3 Correlation Coefficient (r)

The following formula can be used to calculate the product movement correlation coefficient (r), which is a measure of the reciprocal relationship between two variables (x and y), where relationship is quantified.

$$r = \frac{\sum (X-\bar{X})(Y-\bar{Y})}{\sqrt{\sum (X-\bar{X})^2 . \sum (Y-\bar{Y})^2}}$$

Where,

r = correlation coefficient
X= value of x independent variables
$\bar{X}$ = mean of X independent variables
Y = value of Y dependent variables
$\bar{Y}$ = mean of Y dependent variables

Sampling designs and selection of the respondents

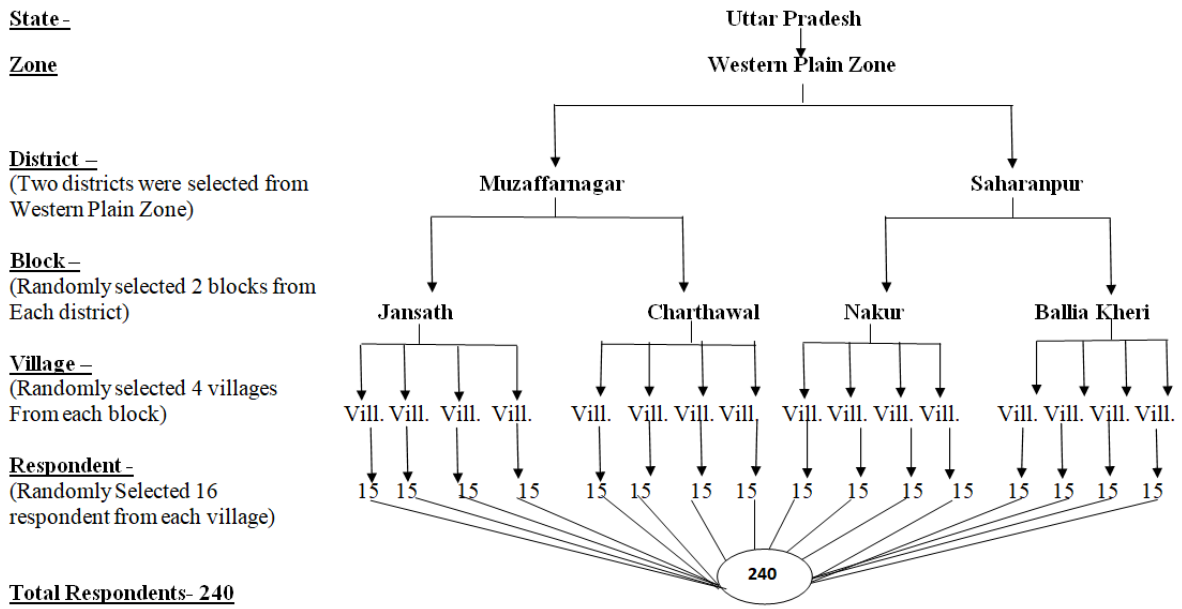

Fig. 1. Sampling procedures for selection of respondent for present study

3. RESULTS AND DISCUSSION

Table-1 shows that the independent variables and their measurement (Mean score, standard deviation) of sugarcane growers regarding IPM practices. Out of 17 socio-economics variables, the annual income (Mean score, 283612.5), material possession (M.S, 15.74), and extent of contact (M.S, 70.87) were ranked as first, second and third respectively followed by age (M.S, 43.71), risk motivation (M.S, 18.81), scientific motivation (M.S, 18.37), economic motivation (M.S, 16.64), communication media possession (M.S, 11.84), experience in Sugarcane cultivation (M.S, 9.15), size of family (M.S, 5.0), landholding (M.S, 3.71), housing pattern (M.S, 3.0), education (M.S, 2.43), occupation (M.S, 2.26), caste (M.S, 2.0), type of family (M.S, 1.48) and social participation (M.S, 1.46) were ranked as fourth, fifth, sixth, seventh, eighth, nineth, tenth, eleventh, twelwth, thirteenth, fourteenth, fifteenth, sixteenth and seventeenth, respectively.

Table-2 indicates that out of 17 variables studied, the variables i.e. education, occupation, annual income, material possession, economic motivation, and risk motivation extent of contact were found highly significant and positively correlated with knowledge extent. The variables like age, caste, type of family, housing pattern, social participation and communication media possession, the extent of contact, scientific orientation, and experience in Sugarcane cultivation were found positively correlated with knowledge extent of sugarcane growers regarding Integrated Pest Management practices. Size of family and landholding were found negatively correlated with knowledge extent.

Those variables which showed the positive and significant relationship had direct influence over knowledge extent about IPM practices in sugarcane crop. This means that if the values of these variables increase, the extent of knowledge of sugarcane growers regarding IPM practices will also increase.

Table- 3 focuses that out of 17 variables studied, the variables i.e. occupation, annual income, and material possession were found highly significant and positively correlated with adoption extent. The variables like education and economic motivation were found significant and positively correlated with adoption extent. Caste, housing pattern, social participation, communication media possession, the extent of contact, scientific motivation, risk motivation, and experience in sugarcane cultivation positively correlated with the adoption extent of sugarcane growers regarding IPM practices. The variable like age, type of family, size of family, and landholding was found negatively correlated with adoption extent.

Table 1. Measurement of various independent variables of sugarcane growers regarding Integrated Pest Management practices

Sr No.	Variables	Mean score	Standard deviation	Minimum	Maximum	Rank
1.	Age	43.71	10.61	27	70	IV
2.	Education	2.43	1.24	0	5	XIII
3.	Caste	2.00	0.41	1	3	XV
4.	Type of family	1.48	0.50	1	2	XVI
5.	Size of family	5.00	2.75	2	18	X
6.	Housing pattern	3.00	0.06	2	3	XII
7.	Land holding	3.71	1.91	1	15	XI
8.	Occupation	2.26	0.44	2	3	XIV
9.	Annual income	283612.5	139501.4	91000	765000	I
10.	Social participation	1.46	1.06	0	3	XVII
11.	Material possession	81.79	15.74	42	124	II
12.	Communication media possession	11.84	4.57	4	29	VIII
13.	Extent of contact	70.87	11.96	44	99	III
14.	Economic motivation	16.64	2.04	12	21	VII
15.	Scientific motivation	18.37	2.25	13	23	VI
16.	Risk motivation	18.81	2.15	14	24	V
17.	Experience in Sugarcane cultivation	9.15	3.10	4	15	IX

Table 2. Correlation coefficient (r) between socio-economic characteristics of sugarcane growers with their knowledge regarding integrated pest management

S. No.	Independent variables	Correlation coefficient
1.	Age	0.0485
2.	Education	0.2748**
3.	Caste	0.0706
4.	Type of family	0.0243
5.	Size of family	-0.0476
6.	Housing pattern	0.0404
7.	Land holding	-0.0582
8.	Occupation	0.3943**
9.	Annual income	0.2146**
10.	Social participation	0.0305
11.	Material possession	0.2292**
12.	Communication media possession	0.0139
13.	Extent of contact	0.0424
14.	Economic motivation	0.3243**
15.	Scientific motivation	0.1123
16.	Risk motivation	0.2287**
17.	Experience in Sugarcane cultivation	0.0493
	***Significant at 0.05% probability level*	*0.129*
	****** *Significant at 0.01% probability level*	*0.168*

Table 3. Correlation coefficient (r) between socio-economic characteristics of sugarcane growers with their adoption regarding integrated pest management practices

S. No.	Independent variables	Correlation coefficient
1.	Age	-0.0584
2.	Education	0.1301*
3.	Caste	0.0194
4.	Type of family	-0.0790
5.	Size of family	-0.0697
6.	Housing pattern	0.0775
7.	Land holding	-0.0198
8.	Occupation	0.4119**
9.	Annual income	0.2439**
10.	Social participation	0.00021
11.	Material possession	0.3545**
12.	Communication media possession	0.0893
13.	Extent of contact	0.0518
14.	Economic motivation	0.166112*
15.	Scientific motivation	0.052751
16.	Risk motivation	0.111684
17.	Experience in Sugarcane cultivation	0.004958
	***Significant at 0.05% probability level*	*0.129*
	****** *Significant at 0.01% probability level*	*0.168*

Those variables which showed the positive and significant relationship had direct influence over adoption extent about IPM practices in sugarcane crop. It meant that if the values of these variables increase, the adoption extent of sugarcane growers regarding IPM practices will also increase.

4. CONCLUSION

The results indicate that out of the 17 variables investigated, the variables i.e. education, occupation, annual income, material possession, economic motivation, and risk motivation, the extent of contact were found highly significant

and positively correlated with knowledge extent. The rest of the variables were positively or negatively correlated with knowledge as per the present study we need to increase correlation with knowledge. Those variables which showed the positive and significant relationship had direct influence over knowledge extent about IPM practices in sugarcane crop. It meant that if the values of these variables increases, the knowledge extent of IPM practices will also increase. The results also enlighten the out of 17 variables studied, occupation, annual income, and material possession were found highly significant and positively correlated with the adoption extent. Those variables which showed the positive and significant relationship had direct influence over adoption extent about IPM practices in sugarcane crop. It meant that if the values of these variables increase, the adoption extent of IPM practices will also increase.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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