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Association Between Socio-Economic Profile and Adoption Level of Improved Maize Cultivation Practices by Maize Growers in Saran District of Bihar

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ABSTRACT

Maize is considered as the third most important food crop among the cereals in India and contributes to nearly 9% of the national food basket. It has the highest yield potential among cereals to be ultimately called as "Queen of Cereals". It has also been declared in the United Nations that 2023 will be celebrated as "International Year of Millets". Taking this into consideration, the study was conducted in Saran district of Bihar to find out the extent of adoption of improved cultivation practices of maize by maize growers. Saran district of Bihar was selected purposively considering large population of maize growers there. A total of 120 maize farmers were selected using simple random sampling method. The data were collected through a pre-structured interview schedule and later appropriate statistical analysis was done to find out the meaningful result. With respect to socio-economic profile, it was observed that majority of the farmers belonged to middle aged group (55.83%), had education upto middle school (25.83%), having primary occupation solely as agriculture (62.50%), had land holding size of 2.5-5 acres (60.83%), having high farming experience (50.00%),had medium level of annual income i.e., 50k-1lakh (45.00%). Majority of the respondents fell under the category of having medium level of extension contacts (44.17%), had low social participation (46.67%),having medium level of mass media exposure (60.00%), had medium level of innovativeness (45.00%), had high decision making ability (37.50%) and high risk bearing capacity (39.17%). It was also found that majority of the farmers belonged to the category having medium level of adoption of improved cultivation practices (65.83%). The independent variables such as education, farming experience, extension contacts, social participation, mass media exposure, sources of information, innovativeness, decision making ability were significantly associated with level of adoption at 5% level of significance while occupation, annual income, size of land holding, risk bearing capacity and economic motivation were found to be associated with adoption level at 1% level of significance.

Keywords Adoption level, Improved cultivation

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practices, Level of significance, Pre structured interview schedule, Random sampling.

INTRODUCTION

Agriculture plays an important role in India's economy. It contributes one-third of the country's national income, provides food for the growing population, supplies raw materials to many industries, makes bulk of the export-earnings and generates employment for nearly seventy percent of the working population of the country. India is the home of various food grains, pulses and few oilseed crops like cotton, castor, groundnut, mustard. Maize possesses the highest yield potential among the cereals that is why it is known as Queen of cereals and is one of the most ancient and important commercial crop (Shah *et al*. 2016). In India, maize occupies the third most important food crops following rice and wheat (Dass *et al*. 2012).

Maize was originated in Mexico and Central America. It grows well in various agro-ecologies and is unparalleled to any other crop due to its ability to adapt in diverse environments. It has emerged as a crop of global importance owing to its multiple end uses as a human food and livestock feed and serves as an important component for varied industrial products.

Maize in India, contributes nearly 9% in the national food basket (Murdia *et al*. 2016). In addition to staple food for human being and quality feed for animals, maize serves as a basic raw material as an ingredient to thousands of industrial products that includes starch, oil, protein, alcoholic beverages, food sweeteners, pharmaceutical, cosmetic, film, textile, gum, package and paper industries. In 2020, maize production for India was 28,500 thousand tones. Maize production of India increased from 5,101 thousand tones in 1971 to 28,500 thousand tones in 2020 growing at an average annual rate of 4.55% (Economic survey 2020-21).

India has the second highest population in the world. To feed the growing population of the India and to ensure food security, increasing the total area under maize crops and improving per hectare productivity of maize crop paves the way to increase agricultural production (Naylor *et al*. 2010). In order to improve the productivity of the maize, new technologies and scientific method of cultivation should be adopted for efficient and effective production. In addition to this, constraints experienced by the farmers in the adoption of the technology and practices in maize cultivation could be understood and solutions can be brought to promote maize cultivation.

Farmers are expected to adopt the maize varieties suitable for their region and all the agronomic practices recommended for those varieties in order to realize the maximum yield gains expected from them. The improved maize seeds have potentials of giving high yields, tolerate drought and resist pests.

Indian farmers are becoming more and more conscious of new agricultural technology and moving toward from the age-old, traditional to scientific farming. The forces of tradition, however, still continue to influence the rate of change resulting in a different adoption of various innovations introduced among the farming communities. It has been observed that even cultivators with sound economic condition, social trading and some formal education are sometimes indifferent to adoption of some the newly evolved strains (Singh *et al*. 2013). It seems probable that profit motive alone may not necessarily be the only incentive to motive farmers to adopt improved cultivation practices (Rogers 1976). In order to increase the crop yields, the level of adoption of improved farm practice has to enhance. Knowledge of the recommended technologies is a pre-requisite to adoption process. This is a clear indication of the fact that though India has competent agricultural research and extension systems, yet the adoption of technologies by farmers are far from satisfactory. The differential rate of adoption of farm technologies by farmers is generally attributed to some of the personal and socio-economic characteristics of farmers (Awotide *et al*. 2016).

Saran district lies in the Middle-Gangatic Plain with subtropical climate characterized by hot summer, wet monsoon and dry winter. The average annual rainfall is 1140 mm which makes the situation very conducive for practising maize cultivation. Maize occupies a prominent position in both *kharif* and *rabi*

season due to its versatile uses.

Significance of the study

This study would be useful for the stakeholders, policy makers, governmental and non- governmental agencies, cooperatives and other inventories which are working for the development of agriculture and reduction of poverty.

The study reveals the gap in the knowledge and adoption level of the farmers. It is possible to evolve strategies to overcome the problems faced by the farmers. It has wider scope and the study will give location specific solutions to the problems pertained in the study area. So, this study was more important to solve the location specific problems.

Limitations of the study

1. The findings of the study are based on individual research work and may have limited generalization.

2. The present study was carried on limited number of farmers. Hence the finding will not be generalized and applicable only to the research area.

3. The study was restricted to only a few variables due to limited time and resources. The variables were measured by putting questions to each maize growers.

MATERIALS AND METHODS

The present study was conducted in the Saran district of Bihar. The farmers prominently and actively participate in maize cultivation. There are 20 blocks in Saran district, out of which two blocks namely Sonepur and Dighwara were purposively selected for study because of large number of maize cultivators there.Two Gram Panchayats form each block were selected randomly for the study. Kalyan Pur and Bharpura from Sonepur block while Akilpur and Rampur Ami from Dighwara block were selected. Out of each Gram Panchayat three villages were randomly selected. The villages were Karam Chak, Khemi Chak, Baijalpur from Kalyan Pur Gram, Panchayat, Chausia, Bharanpura, Chakdaria from Bharpura Gram Panchayat, Babhangawan, Batrauli, Chatra from Akilpur Gram Panchayat and Jaitipur, Kakariya, Mathurapur from Rampur Ami Gram Panchayat. Finally out of each village, 10 respondents were selected randomly for the research study. Descriptive research design was used for this study. The data were collected through a pre-structured interview schedule and later appropriate statistical analysis by using proper statistical tools such as frequency, percentage, arithemetic mean, standard deviation, multiple regression analysis, Pearson's product moment correlation coefficient were used to interpret the data and for drawing logical conclusion.

RESULTS AND DISCUSSION

Despite the fact that a large number of farmers are practising maize cultivation, the improved production technique has not been adopted in to all of the practises indicated in the package to the same level. The purpose of this study was to determine the attitude and extent to which certain technologies proposed by the research system were adopted. The many ways of technology used in the maize cultivation program were examined in this study and are provided in a table along with the extent to which they have been adopted by maize growers.

The results in Table 1 depicts that majority of the respondents belonged to middle aged group i.e., 55.83%, had middle school education i.e., 25.83%,

Table 1. Socio–economic profile of the respondents.

Sl. No.	Independent variables	Category	Frequency	Percentage
1	Age	Young(18-35 years)	28	23.34
		Middle(36-55 years)	67	55.83
		Old (Above 55years)	25	20.83
2	Education	Illiterate	11	09.17
		Functionally literate	12	10.00
		Primary school education	25	20.83
		Middle school education	31	25.83
		High school education	13	10.83
		Intermediate	19	15.84
		Undergraduate	09	07.50
3	Occupation	Agriculture alone	75	62.50
		Agriculture + Business	14	11.67
		Agriculture + Labor	25	20.83
		Agriculture + Services	06	05.00
4	Land holding size	Up to 2.5 acres	26	21.67
		2.5 to 5 acres	73	60.83
		More than 5 acres	21	17.50

Table 1. Continued.

Sl. No.	Independent variables	Category	Frequency	Percentage
5	Family size	Small	54	45.00
		Medium	45	37.50
		Large	21	17.50
6	Farming experience	Low	34	28.33
		Medium	26	21.67
		High	60	50.00
7	Annual income	Low (< Rs 50,000)	35	29.17
		Medium (Rs 50,001-Rs 1,00,000)	54	45.00
		High (>Rs 1,00,000)	31	25.83
8	Material possession	Low	78	65.00
		Medium	33	27.50
		High	09	07.50
9	Extension contacts	Low	41	34.16
		Medium	53	44.17
		High	26	21.67
10	Social participation	Low	56	46.67
		Medium	45	37.50
		High	19	15.83
11	Mass media exposure	Low	28	23.33
		Medium	72	60.00
		High	20	16.67
12	Source of information	Government extension officials	65	54.17
		Private extension staffs	19	15.83
		KVK	02	01.67
		Neighbors/Friends	15	12.50
		Fellow farmers	11	09.16
		Social media	08	06.67
13	Innovative-ness	Low	54	28.33
		Medium	34	45.00
		High	32	26.67
14	Decision making ability	Low	32	26.67
		Medium	43	35.83
		High	45	37.50
15	Risk orientation	Low	29	24.17
		Medium	44	36.67
		High	47	39.17
16	Economic motivation	Low	39	32.50
		Medium	51	42.50
		High	30	25.00

practised agriculture as their main occupation (62.50%), had land holding size of 2.5 to 5 acres (60.83%), had small family size i.e., 45.00%, having high farming experience (50.00%). Regarding annual income, majority of the farmers had medium level of income range (50001-1 lakh) i.e., 45.00%, had medium level of extension contacts (44.17%), had low social participation (46.67%), had medium level of mass media exposure i.e., 60.00%. Majority of them relied upon government extension officials as their main source of information i.e., 54.17%, had medium level of innovativeness (45.00%), had high decision making ability (37.50%), had high level of risk orientation i.e., 39.17% and belonged to the group having medium level of economic motivation (42.50%).

Table 2. Distribution of respondents regarding adoption of improved cultivation practices.

Sl. No.	Cultivation practices	Response					
		Fully adopted		Partially adopted		Not adopted	
		f	%	f	%	f	%
1	HYV sown	18	15.00	79	65.83	23	19.17
2	Sowing time: October - November February - March	21	17.50	68	56.67	31	25.83
3	Sowing by hand	15	12.50	79	65.83	26	21.67
4	Seed treatment	09	7.50	84	70.00	11	9.17
5	Seed rate	11	9.17	67	55.83	42	35.00
6	Source of seed material a)Private shop b)Government centers c)From agriculture research Station	25	20.83	84	70.00	11	9.17
7	Method of sowing followed : a)Hand dibbling b)Broadcasting c)Seed driller	29	24.17	72	60.00	19	15.83
8	Proper spacing	08	6.67	89	74.17	23	19.17
9	Chemical fertilizer and manure management (per hectare) a)FYM b)Nitrogen c)Phosphorus d)Potassium	12	10.00	73	60.83	35	29.17
10	Inter cropping	10	8.33	85	70.83	25	20.83
11	Weed management: Hand weeding Pre planting Post planting	07	5.83	93	77.50	20	16.67

Adoption level of the farmers on improved maize cultivation practices

Results portrayed in Table 2 shows that majority of

Table 3. Distribution of respondents according to their overall adoption level.

Sl. No.	Category	Frequency	Percentage
1	Low (<18.26)	15	12.50
2	Medium (18.26-29.54)	79	65.83
3	High (>29.54)	26	21.67
	Total	120	100.00

the respondents partially adopted HYV sowing i.e., 65.83%, partially adopted recommended sowing time i.e., 56.67%, partially adopted recommended seed treatment (70.00%), partially followed recommended seed rate (55.83%). Majority of the farmers fell in the category having partially acquiring seed material from suggested sources i.e., 70.00%, partially followed suggested method of sowing i.e., 60.00% partially adopted recommended spacing (74.17%), partially followed recommended chemical and fertilizer management practices (60.83%), partially followed intercropping (70.83%) and partially followed recommended weed management techniques (77.50%).

From Table 3, it is evident that majority i.e., 65.83% of the maize growers had medium level of adoption of improved maize production technologies followed by 21.67% of the farmers having high level of adoption and 12.50% of the farmers having low level of adoption of improved maize production technologies.

From the Table 4, it can be indicated that socio-economic characteristics like education, farming experience, extension contacts, social participation, mass media exposure, sources of information, innovativeness and decision making ability are significantly associated with level of adoption at 5% level of significance while occupation, annual income, size of land holding, risk bearing capacity and economic motivation are found to be associated with adoption level at 1% level of significance.

Table 4. Association between the independent variables and adoption level of the respondents.

Sl. No.	Characteristics	'r' value	Regression co-efficient	Standard error	t-value
X_1	Age	-0.551	-0.22	0.140	0.873
X_2	Education	0.012*	1.326*	0.596	0.031*
X_3	Occupation	0.054*	0.880**	2.373	0.508**
X_4	Family size	0.354	5.408	7.942	0.499
X_5	Annual income	0.041*	4.065**	5.590	0.471**
X_6	Size of land holding	0.027*	6.372**	0.000	0.131**
X_7	Farming experience	0.030*	-3.805*	1.774	0.037*
X_8	Material possession	0.857	-2.986	0.000	0.620
X_9	Extension contacts	0.022*	3.863*	1.894	0.047*
X_{10}	Social participation	0.045*	3.465*	1.682	0.045*
X_{11}	Mass media exposure	0.036*	2.435*	1.623	0.127*
X_{12}	Sources of information	0.019*	2.674*	1.143	0.096*
X_{13}	Innovativeness	0.101**	2.519*	1.374	0.073*
X_{14}	Decision making ability	0.035*	0.450*	3.465	0.056*
X_{15}	Risk bearing capacity	0.041*	4.065**	5.590	0.471**
X_{16}	Economic motivation	0.027*	6.372**	0.000	0.131**

$R^2 = 0.56$, F=3.489, a= 151.677.
NS = Not significant, * = Significant at 5%, ** = Significant at 1%.

CONCLUSION

It is concluded from the present study that majority of respondents were middle aged and their education was upto middle school level. Majority of the respondents possessed middle level of innovativeness and economic motivation and high level of decision making ability and risk orientation. The respondents were mostly utilizing government extension officers as their source to get the information on improved maize cultivation. The overall attitude of the respondents was found under medium level. The overall adoption of the respondent was found between medium levels. The study inferred that majority of the maize farmers expressed major problems such as lack of availability of hybrid seeds, lack of training program and lack of proper information at time. Hence, the government should provide awareness and should conduct demonstrations regarding the above said problems.

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