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# **Socio-economic Profiles of Maize Growers in Surguja District, Chhattisgarh, India**

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## **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**

The present study was carried out in the Surguja district of Chhattisgarh state. Data were collected from 120 respondents from 8 selected villages. The results indicate that most of the respondents belonged to the middle age group, had a tribal category, had different level of education from primary to higher education level, were small size and had a joint family system, engaged in agriculture with labour activity, had an annual income and also the contribution of maize to their annual income was medium level, medium category of land ownership and large category of area under the maize cultivation, maize was the main commercial crop in wet and dry seasons, productivity of maize was medium level, low experience in cultivation, the majority of respondents consumed maize as flour/ bread, corn and animal/poultry feed, maximum respondents belonged in

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two or more organizations membership with moderate participation, Progressive farmers, Krishi Sangwari and RAEs were major sources of technology information, tube wells were main source of irrigation, medium to a high level of knowledge of maize cultivation, regular available agricultural inputs, produce sold to local/outside traders, every respondents adopted the marketing channel as Producer-traders-wholesaler-retailer- consumer for their grain produce and did not adopt storage practice. The association of family size, occupation, annual income, land ownership, maize acreage, productivity, farming experience, knowledge of maize technology, marketing, education and source of irrigation were found positive and significantly correlated with the extent of adoption of maize technology. And remaining variables like the contribution of maize to their annual income, consumption pattern, social participation, extension agency contact, inputs availability and Storage practices were found nonsignificant association.

**Keywords:** Socio-economic; respondents; kisan mitra; farm practice; extension agency.

## 1. INTRODUCTION

Maize (*Zea mays* L.) is called the "Queen of Cereals" throughout the world and maize is an important grain that can be used as food, fodder, fuel and industrial raw material. Currently, more than 170 countries collectively produce about 1147.7 million metric tons of maize in an area of 193.7 million hectares, with an average productivity of 5.75 tons/hectare (Anonymous. (2020)). Maize is India's third most important food crop after rice and wheat. According to an advance estimate, it is cultivated in 9.86 m h (million hectares) (Agricultural Statistics at a Glance 2021). In India, maize is used as human food (23%), poultry feed (51%), animal feed (12%), industrial (starch) products (12%), beverages and seeds (each 1%). goes. In the state of Chhattisgarh, maize is the second most important crop after rice for the production of food grains. 205.21 thousand ha of land is used to cultivate maize in Chhattisgarh with a productivity of 3020 kg/ha (Anonymous. (2023)).

Chhattisgarh has three distinct agroclimatic zones, each with enormous potential for agricultural development. The climates of the two northern hills and the Bastar Plateau are the most suitable for growing maize crops out of these three zones (Sinha, S. K. et al, 2019). Northern Hills; includes the districts of Surguja, Surajpur, Balrampur, Korea, Jashpur, Raigarh and Dharamjaigarh Tehsil of Raigarh. Surguja district is the leading maize-growing district of the state. The state has very good potential for maize but the productivity is very low due to the cultivation of open-pollinated varieties (OPVs), improper input management practices and ignorance of the improved technology of maize as well as some constraints and barriers. The real potential can be realized and obtained by the adoption of hybrid maize with a full package of

practices. In this context, the present study was undertaken to study the socio-economic profiles of maize growers and their association with the adoption of improved farm practices of maize in the Surguja district of Chhattisgarh.

## 2. MATERIALS AND METHODS

The study was carried out in the Surguja district of Chhattisgarh state and out of a total 5 blocks of the district, Ambikapur block was randomly selected and also 8 villages were selected randomly namely; Khaliba, Thakurpur, Bakirma, Bapsedi, Mendra Khurd, Sukhari, Sarganwa and Parsa. A Maize growers list of each selected village was prepared and 15 farmers from each growers list were randomly selected as the respondents. Thus, 120 respondents were finally selected and collected the data with the help of a well-developed structured interview schedule.

## 3. RESULTS AND DISCUSSION

The socio-personal and socio-economic attributes of maize growers have been examined and presented in Table 1. The study indicates that a maximum of 42.50 per cent of respondents belonged to the middle age group followed by the young age group (30.00%) and the remaining 27.50 per cent were in the old age group respectively. The data shows that the young and middle respondents were interested in maize cultivation. Further, the study indicates that most of the respondents (52.50 %) were scheduled tribe category, followed by General 25.00 and other backward castes 22.50 per cent. The highest number of respondents belonged to the primary school category which is 30.00 per cent followed by 16.67 per cent belonging to the illiterate category whereas 15.83 per cent of respondents belonged to the higher secondary category.

About 14.17 per cent had Middle school and high school categories and the remaining 9.16 per cent of the respondents had college and above level of education. Similarly, 46.67 per cent of respondents had up to 5 members of the family followed by 37.50 per cent belonging to 6 to 10 members of the family and the remaining 15.83 per cent of them had the above 11 members of the family. Concerning occupation, the data revealed that 43.33 per cent of the respondents were involved in agriculture work with labour followed by 25.83 per cent engaged in only agriculture, agriculture with business 13.33 per cent and agriculture with animal husbandry 12.50 per cent. About 05.00 per cent of respondents were involved in agriculture with service. Data concluded that most of the respondents were dependent on farming occupations. Further in social participation, a majority of respondents (50.83%) had membership in two or more organizations followed by 33.33 per cent of respondents who had membership in one organization. About 9.17 per cent of respondents were not a member of any organization and the remaining 5.83 per cent of the respondents belonged to office bearers. Table 1 depicts the level of social participation, 84.17 per cent of the respondents belonged medium level followed by 9.16 per cent from a low level and the remaining 6.67 per cent belonged to a high level of social participation. Further, under extension agency contact, the person is likely to consult a selection of sources to learn about the best ways to cultivate maize. The study indicates that the mean score and respondents' order of priority for several extension agencies regarding suggested maize crop cultivation practices. The Table 2 illustrates the preferences of respondents for information seeking. Among all sources of information, Progressive Farmer ranked 1<sup>st</sup> with a 2.15 highest mean score followed by Kisan Mitra ranked 2<sup>nd</sup> with a 2.14 mean score, RAEO ranked 3<sup>rd</sup> with a 2.13 mean score and Research Scientists ranked 4<sup>th</sup> with a 1.88 mean score. Private companies ranked 5<sup>th</sup> with a 1.80 mean score, KVK scientists ranked 6<sup>th</sup> with a 1.79 mean score, ADO 7<sup>th</sup> ranked with a 1.13 Mean score and BTM ranked 8<sup>th</sup> with a 1.10 mean score. Thus, it can be concluded that Progressive farmers Progressive farmer and Kisan Mitra were considered as effective sources of information among maize farmers and supported findings of Bawa et al, 2014, Lamichhane et al., 2015, Onwuaroh et al 2021 and K. Vihi et al 2018.

**Concerning annual income:** it helps projects improve their economic status and is an indicator of economic stability. The distribution of respondents according to their annual income is shown in Table 2. The lowest average annual income was Rs. 44571.00, of which Rs.26282.00 contributed to the average annual income from maize, the percentage share being 59 per cent, which was the highest share obtained.

**With regards to landholding:** This can be seen from Table 3, most of the respondents belonged to the category of medium-sized landowners *i.e.*, 39.16 per cent followed by 29.16 per cent of respondents in the small category. About 18.33 per cent of respondents had marginal land ownership and the remaining 13.13 per cent of the respondents belonged to the major landownership category. The overall average landholding of respondents was 2.45 ha. Thus, it can be concluded from the study that maximum maize growers belong to a medium category of land holding in the study area. Further area under maize crop, the study indicates that the maximum number of respondents came under more than 2.0 ha which is 42.50 per cent followed by 25.84 per cent from the 1.0 to 2.0 ha category. About 31.66 per cent of respondents belonged to less than 1 ha category of the area under maize crop. Thus, it can be concluded that the maximum number of respondents was more than the 2.0 ha category of the area under the maize crop. The average grass maize cropped area per family was calculated as 1.76 ha. Similarly, under the productivity of maize crop, Table 3 revealed that out of the total respondents, the maximum respondents 47.50 per cent had 40 to 50 qt/ha productivity followed by 32.50 per cent had more than 50 qt/ha productivity and 20 per cent of respondents had less than 40 qt/ha productivity of maize crops. The total production of 120 respondents in 210.69 ha of total maize cropped area in both wet and dry seasons was 84450t. and productivity was 46.14 qtl/ha observed. Regarding the source of irrigation, data revealed that 85.83 per cent of the maize growers had tube wells as the main source of irrigation, followed by 5.83 per cent had wells, 5.01 per cent of the respondents had ponds and the remaining 3.33 per cent had canals as irrigation resources. Thus, it can be concluded that the majority of the maize growers had tube well as irrigation resources for maize cultivation.

Regarding input availability, input availability was operationally defined as the degree of availability

of different inputs used by the maize growers for the cultivation of their maize crop. Table 3, shows the preferences of respondents for input availability. Among all sources of FYM, Seed, Nitrogenous, Phosphoric, potassic, insecticide, weedicide and fungicide. Seed ranked 1st with 2.92 highest mean score followed by insecticide ranked 2nd with a 2.90 mean score, FYM ranked 3rd with a 2.83 mean score, weedicide

ranked 4th with a 2.81 mean score, Potassic ranked 5th with a 2.78 mean score, Phosphoric ranked 6th with a 2.69 mean score, Nitrogenous ranked 7th with a 2.50 Mean score and lowest ranked 8th was Fungicide with a 2.10 mean score. Thus, it can be concluded from a study that the majority of respondents had all types of inputs that were regularly available in their locality.

**Table 1. Socio-personal and socio-economic attributes of respondents**

Sl. No.	Particular	Frequency	Percentage
1.	<b>Age</b>		
	Up to 35 years	35	30.00
	36 to 55 years	51	42.50
	Above 55 years	33	27.50
2.	<b>Caste</b>		
	Scheduled tribes	63	52.50
	Scheduled cast	0	0.00
	Other backward Caste	27	22.50
	General	30	25.00
3	<b>Education</b>		
	Illiterate	20	16.67
	Primary school	36	30.00
	Middle school	17	14.17
	High school	17	14.17
	Higher secondary	19	15.83
	Graduate and above	11	9.16
4.	<b>Family size</b>		
	Up to 5 members	56	46.67
	6 to 10 members	45	37.50
	Above 11 members	19	15.83
5.	<b>Family type</b>		
	Joint family	64	54.16
	Nuclear	56	46.66
6.	<b>Occupation</b>		
	Agriculture	31	25.84
	Agriculture + Labour	52	43.33
	Agriculture + Service	6	05.00
	Agriculture + Animal Husbandry	15	12.50
	Agriculture + Business	16	13.33
7.	<b>Social Participation</b>		
	No participation	11	9.17
	Member of one organization	40	33.33
	Member of two or more organization	61	50.83
	Office bearer	8	6.67
8.	<b>Social Participation Level</b>	<b>Frequency</b>	<b>Percentage</b>
	Low (Up to 1.8)	11	9.16
	Medium (1.9 – 3.2)	101	84.17
	High (3.2 and above)	8	6.67
9.	<b>Extension agencies contact</b>	<b>Mean score</b>	<b>Rank</b>
	RAEO	2.13	III
	ADO	1.13	VII
	Research Scientists	1.88	IV
	BTM	1.10	VIII
	KVK Scientists	1.79	VI

Sl. No.	Particular	Frequency	Percentage
	Kisan mitra	2.14	II
	Private company	1.80	V
	Progressive farmer	2.15	I
10.	<b>Farming experience</b>		
	Up to 10 years	71	59.16
	11 to 20 years	28	23.33
	above 21 years	21	17.5

**Table 2. Distribution of respondents according to their annual income**

Sl. No.	Category	F	%	Average annual income	Average annual income from Maize	Percentage Share of Maize on Total annual income
1.	Up to Rs. 60,000	7	5.83	44571.	26282	59
2.	Rs. 60,000 to 1,20,000	14	11.67	92785.0	48372	52
3.	Rs 1,20,000 to 2,40,000	30	25.00	178233.0	66240	37
4.	Rs. 2,40,000 to 5,00000	61	50.83	361328	102082	28
5.	More than Rs. 5,00000	8	6.67	725000	181203	25

Overall average annual income = 280383.0; Average annual income from maize = 84836.0

**Table 3. Distribution of respondents according to their size of land holding, area under maize crop, productivity of maize, source of irrigation and inputs availability in their locality**

Sl. No.	Category	Frequency	Percentage
1.	<b>Landholding</b>		
	Marginal farmer (up to 1 ha)	22	18.33
	Small farmer (1.01 to 2 ha)	35	29.16
	Medium farmer (2.01 to 4 ha)	47	39.16
	Large farmer (above 4 ha)	16	13.33
	Average: 2.45 Landholding		
2.	<b>Area under maize crop</b>		
	< 1.0 ha	38	31.66
	1.0 to 2.0 ha	31	25.84
	> 2.0 ha	51	42.50
3.	<b>Productivity</b>		
	< 40 (qt/ha)	24	20.00
	40-50 (qt/ha)	57	47.50
	>50 (qt/ha)	39	32.50
	Total production (qtl.) = 8445		
	Total maize area (ha) = 210.69 ha		
	Average Productivity (q/ha.) = 40.34		
4.	<b>Source of Irrigation</b>	<b>Frequency</b>	<b>Percentage</b>
	Tube-well	103	85.83
	Pond	6	5.01
	Well	7	5.83
	Canal	4	3.33
5.	<b>Inputs availability</b>	<b>Mean score</b>	<b>Rank order</b>
	Seed	3.00	I
	FYM	2.83	III
	N fertilize	2.50	VII
	P fertilizer	2.69	VI
	K fertilizer	2.78	V
	Insecticide	2.90	II
	Herbicide	2.81	IV
	Fungicide	2.10	VIII

**Table 4. Distribution of respondents according to their area under different crops grown in dry and wet seasons**

S.no.	Season/crops	F	%	Area (ha)	%
1	<b>Wet season</b>				
	Maize	120	100.00	142.86	48.47
	Paddy	120	100.00	126.11	42.79
	Black gram	24	20.00	5.37	1.82
	Groundnut	35	29.17	11.84	4.01
	Pigeon pea/vegetables	18	15.00	8.56	2.90
	Total			294.74	
2	<b>Dry Season</b>				
	Maize	76	63.33	67.83	56.53
	Cauliflower	25	20.83	5.62	4.68
	Cabbage	36	30.00	6.32	5.27
	Mustard	16	13.33	8.62	7.18
	Potato	22	18.33	25.89	21.58
	Pea	28	23.33	16.24	13.53
	Wheat	24	20.00	21.89	18.24
	Garlic/Ginger	18	15.00	2.67	2.23
	Onion	26	21.67	17.28	14.40
	Leafy veg.	27	22.50	3.56	2.97
	Total			175.92	
	Cropping Intensity (%) =	159.68			

**Table 5. Distribution of respondents according to their Domestic form of consumption pattern of maize crop**

Sl. No.	Product	Frequency	Percentage
1.	Corn	115	95.83
2.	Popcorn	57	47.50
3.	Flour/bread	117	97.50
4.	Boiled grain	48	40.00
5.	Animal / Poultry feed	74	61.67

**Table 6. Correlation analysis of independent variables with adoption of recommended management practices of maize**

Sl. No.	Independent variable	Coefficient of correlation "r" value Adoption
1.	Education	0.181 *
2.	Family size	0.235 **
3.	Occupation	0.322 **
4.	Annual income	0.317 **
5.	Contribution of maize to their annual income	0.068 NS
6.	Land holding	0.283 **
7.	Area under maize	0.224 **
8.	Productivity	0.277 **
9.	Farming experience	0.237 **
10.	Consumption pattern	0.120 NS
11.	Social participation	0.122 NS
12.	Extension agencies contact	-0.096 NS
13.	Source of irrigation	0.182 *
14.	Knowledge of maize production technology	0.377**
15.	Input availability	0.106 NS
16.	Marketing	0.241 **
17.	Storage	0.050 NS

\*Correlation is significant at the 0.05 level, \*\* Correlation is significant at the 0.01 level

**Major crops and their area among the respondents:** Table 4. contains information about respondents who cultivate various crops as well as their cropped areas. The results showed that all of the respondents were farming maize and paddy. Approximately 48.47 per cent of the net cropped area during the wet season was under maize cultivation, followed by 42.79 per cent of the cropped area under paddy cultivation and the remaining 8.74 per cent was occupied by ground nut, black gram, pigeon pea and vegetable to the overall cultivated area of the kharif season. During the dry season, it was found that the farmers were cultivating maize in 56.53 per cent of the net cultivated area which was cultivated by 63.33 per cent of total respondents followed by 18.33 per cent of respondents potato cultivation in 21.58 per cent area, 20 per cent of respondents practising wheat cultivation with 18.24 per cent of the area. Onion and pea accounted for 14.40 and 13.53 per cent of the cultivated area, cultivated by 21.67 and 23.33 per cent respondents respectively followed by 13.33 per cent of respondents cultivated mustard with 7.18 per cent of the net cultivated area, 30 per cent of respondents cultivated cabbage with 5.27 per cent of net cultivated area. About 20.83, 22.50, 15 per cent of respondents were adopting cauliflower, leafy vegetables and ginger/garlic with 4.68, 2.97 and 2.23 per cent of net cultivated area respectively. Based on the above findings, it may be concluded that maize was the main crop during the wet and dry seasons for commercial purposes.

**Consumption pattern of maize crop:** Table 5 shows that the majority (97.50%) of respondents had consumed flour/bread followed by corn, animal /poultry feed, popcorn and boiled grain with their percentages observed as 95.83, 61.67, 47.50 and 40.00 respectively. It can be concluded that the majority of respondents consumed maize as flour/ bread followed by corn and animal/poultry feed for their domestic use. The present study is supported by the findings of Ahirwar & Khan (2019) and Kumari et al., (2017).

The relationship between the extent of adoption and the socio-economic attributes of maize growers. The correlation coefficient between the selected characteristics of the respondents and with adoption of recommended maize production technology among maize growers was also worked out and the values of the correlation coefficient are presented in Table 6. It can be seen from the table that out of all selected characteristics viz. family size, occupation,

annual income, land holding, area under maize, productivity, farming experience, knowledge of maize production technology and marketing were found to be positive and highly significant correlated with adoption at 0.01 level of probability and supported findings of Darandale et al 2011 and Ezike et al 2024. Whereas, the variables like education and source of irrigation were found to be positively and significantly correlated with the adopted 0.05 level of significance. The other variable contribution of maize to their annual income, Consumption pattern, social participation, Extension agencies contact, Input availability and Storage showed a nonsignificant correlation with the extent of adoption of recommended maize production technology and similar findings of Anand et al., (2019).

#### 4. CONCLUSION

In this study, it was concluded that the socio-economic profile of the maize grower respondents surveyed revealed that most of the majority of the respondents belonged to the middle age group, the scheduled tribe category, including up to primary education, as well as a small family and their professional involvement in the agriculture with workers. The majority of respondents had an average annual income of Rs. 280383.00, with the contribution of maize to their annual income. The largest number of the respondents belonged to a middle category of landownership and had a large category of land under maize cultivation. The productivity of maize was a medium level of yield obtained by respondents who had a moderate level of experience in corn cultivation. The majority of respondents consumed corn as flour/ bread. Most of the respondents were members of two or more organizations, indicating moderate social participation. Corn growers used tube-wells as the main source of irrigation and medium to a high level of knowledge of maize cultivation, regular available agricultural inputs, and produce sold to local/outside traders, every respondent adopted the marketing channel as Producer-traders-wholesaler-retailer- consumer for their grain produce and did not adopt storage practice.

The relationship of family size, occupation, annual income, land holding, area under maize, productivity, farming experience, knowledge of maize technology, marketing, education and source of irrigation were found positive and significantly correlated with the extent of adoption of maize technology. And remaining



variables like the contribution of maize to their annual income, consumption pattern, social participation, extension agency contact, inputs availability and Storage were found nonsignificant association.

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## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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