A correlation analysis and socio-economic attributes among maize growers of Surguja district of Chhattisgarh

ABSTRACT:The present study was carried out in the Surguja district of Chhattisgarh state. Data were collected from 120 respondents from 8 selected villages. In this study, necessary statistical tools and techniques were adopted. Most of the respondents had middle age group, scheduled tribe category, level of education varies from primary to graduate level, small size and joint family system, involved in agriculture with labour occupation, annual income and the contribution of maize in their annual income was also medium level, medium category of landholding, a large category of the area under the maize crop, maize was the main crop in both seasons for commercial purposes, productivity was medium level, low level of experience in maize cultivation, majority of respondents consumed maize as flour/ bread, corn and animal/poultry feed, the maximum number of respondents had membership in two or more organizations, while the overall social participation level of the respondents was moderate, Progressive farmers, Krishi Sangwari and RAEOs were observed as effective sources of information among maize growers. majority of the maize growers had tube wells as irrigation resources for maize cultivation, the majority of respondents were found in medium to a high level of knowledge about maize cultivation practice and their overall knowledge mean score was 79.49 per cent, majority of respondents had all types of inputs that were regularly available in their locality, majority of the respondents sold the produce to local/outside traders, cent-per-cent respondents adopted/chose the marketing channel as Producer-traders-wholesaler-retailer- consumer for their grain produce and majority of respondents did not have storage practice, due to sold their produce after harvesting. The family size, occupation, annual income, land holding, area under maize, productivity, farming experience and knowledge of maize production technology and marketing were found to be positive and highly significantly correlated with the extent of adoption at 0.01 level of probability. Other variables like education and source of irrigation were found to be positive and significantly correlated with the extent of adoption at 0.05 level of probability and the remaining variables as the contribution of maize to their annual income, Consumption pattern, social participation, Extension agency contact, Input availability and Storage were nonsignificant.

Key words: Socio-economic, respondents, kisanmitra, practice extension agencies.

1.Introduction: Maize is India's third most important food crop after rice and wheat. According to an advance estimate, it is cultivated in 9.86 mh (million hectares) (Directorate of Economics and Statistics,

DA&FW 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. 71.75 million ha of land is used to cultivate maize in Chhattisgarh, producing 134.16 mt of grain with a productivity of 1886 kg/ha. In CG, there is an annual average of 1200–1400 mm of rain. In addition to a 137 per cent cropping intensity.

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. 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 of studying the socio-economic profiles of maize growers of the Surguja district of Chhattisgarh.

2. Material and methods: The study was carried out in the Surguja district of Chhattisgarh State and Ambikapur block was randomly selected under the Surguja district and a total of 120 farmers were randomly selected from the 8 selected villages *i.e.* Khaliba, Thakurpur, Bakirma, Balsedi, Mendra Khurd, Sukhari, Sarganwa and Parsa. 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 has been examined and presented in Table -1:Age: The highest number of respondents (42.50%) 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. **Caste:** The analysis has examined the impact of caste. The highest number of respondents (52.50 %) were scheduled tribe category, followed by General 25.00 and other backward castes 22.50 per cent. **Education:** 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. **Size of family:** 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. **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 involved in only agriculture, agriculture with business 13.33 per cent andagriculture with

animal husbandry 12.50 per cent. About 05.00 per cent of respondents were involved in agriculture with service.

Social Participation: The table observed that the maximum number was 50.83 per cent of respondents 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 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. **Extension agencies contact:** The person is likely to consult a selection of sources to learn about the best ways to cultivate maize. Table 1 indicates the mean score and respondents' order of priority for several extension agencies regarding suggested maize crop cultivation practices. Table illustrates the preferences of respondents for information seeking. Among all sources of information, Progressive Farmer ranked 1st with a 2.15 highest mean score followed by Kisan Mitra ranked 2nd with a 2.14 mean score, RAEO ranked 3rd with a 2.13 mean score and Research Scientists ranked 4th with a 1.88 mean score. Private companies ranked 5th with a 1.80 mean score, KVK scientists ranked 6th with a 1.79 mean score, ADO 7th ranked with a 1.13 Mean score and BTM ranked 8th with a 1.10 mean score. Thus, it can be concluded that Progressive farmers Progressive farmer and Kisan Mitra were observed as effective sources of information among maize growers.

Annual income: An annual income helps projects overcome economic position and is an indicator of economic stability. The distribution of the respondents according to their annual income is presented in Table:2. The lowest average annual income was found to be Rs. 44571 of which Rs.26282 had contributed to the average annual income from maize where the percentage share was 59 per cent which was the highest shared to obtained.

Landholding: It is evident from Table 3. The highest number of respondents belonged to the category of medium landholding *i.e.*, 39.16 per cent followed by 29.16 per cent of respondents under the small category. About 18.33 per cent had marginal land holding and the remaining 13.13 per cent of respondents belonged to a large category of land holding. The overall average landholding of respondents was to be found 2.45 ha. Thus, it can be concluded from the table that maximum maize growers belong to a medium category of land holding in the study area.

Area under maize crop: The table explains 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.**Productivity:** 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 8445otl. and productivity was 46.14 qtl/ha observed.**Source of Irrigation:** Table 3, 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,itcanbeconcludedthatthemajorityofthemaizegrowershadtubewellas irrigation resources for maizecultivation.

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 7th ranked 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.

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 relationship between the extent of adoption and the socioeconomic attributes of maize growers. Correlation analysis:

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. 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.

4. Conclusions: Inthisstudy,aconclusionhasbeen drawn that the socio-economic profile of maize growers respondents found thatmost of the majority of the respondents belonged to the middle age group, scheduled tribe category, up to primary school level of education, as well as a small size of family and their occupational involvement in agriculture withlabour. The majority of respondents had an average annual income of 280383, whereas, mostly shared the contribution of maize to theirannualincome. The maximum number of the respondents belonged to a medium category of landholding and had a large category of the area under the maize crop. Productivity had a medium category with experience in maize cultivation. The majority of respondents consumed maize as flour/ bread. The maximum number of respondents had membership in two or moreorganizations, while the overall social participation while the overall social participation level of the respondents wasmoderate. themaizegrowershadtubewellsasthemainsourceof irrigation. It may be concluded that out of the total 17 variables, six variables were found nonsignificant, two variables had significance at 0.05 per cent level of probability and the remaining nine variables were found highly significant at 0.01 per cent level of probability.

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

SI. No.	Particular	Frequency	Percentage
1.	**Age**		
	Up to 35 years	35	30.00
	36 to 55 years	51	42.50
	Above 55 years	33	27.50
2.	**Caste**		
	Scheduled tribes	63	52.50
	Scheduled cast	0	0.00
	Other backward Caste	27	22.50
	General	30	25.00
3	**Education**		
	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.	**Family size**		
	Up to 5 members	56	46.67
	6 to 10 members	45	37.50
	Above 11 members	19	15.83
5.	**Family type**		
	Joint family	64	54.16
	Nuclear	56	46.66
6.	**Occupation**		
	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.	**Social Participation**		
	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.	**Social Participation Level**	**Frequency**	**Percentage**
	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.	**Extension agencies contact**	**Mean score**	**Rank**
	RAEO	2.13	III
	ADO	1.13	VII
	Research Scientists	1.88	IV
	BTM	1.10	VIII
	KVK Scientists	1.79	VI
	Kisanmitra	2.14	II
	Private company	1.80	V
	Progressive farmer	2.15	I
10.	**Farming experience**		
	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

SI. 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	44571.0	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	361328.0	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.

SI. No.	Category	Frequency	Percentage
1.	**Landholding**		
	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.	**Area under maize crop**		
	< 1.0 ha	38	31.66
	1.0 to 2.0 ha	31	25.84
	> 2.0 ha	51	42.50
3.	**Productivity**		
	< 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.	**Source of Irrigation**	**Frequency**	**Percentage**	
	Tube-well	103	85.83	
	Pond	6	5.01	
	Well	7	5.83	
	Canal	4	3.33	
5.	**Inputsavailability**	**Mean score**	**Rank order**	
	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	**Wet season**				
	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	**Dry Season**				
	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.

SI. 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 No. 6Correlation analysis of independent variables with adoption of recommended management practices of maize.

SI.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