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Research Article

Level of knowledge and adoption about recommended maize production technology

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SUMMARY : This investigation was undertaken in Kanker district of Chhattisgarh to assess the level of knowledge and adoption of maize growers about recommended maize production technology. 120 farmers were considered as respondents for this study. Respondents were interviewed through personal interview. Collected data were analyzed with the help of suitable statistical methods. The analysis of the results showed that maximum (62.50%) respondents had medium level of knowledge regarding recommended maize production technology and 61.66 per cent of the respondents had medium level of adoption regarding recommended maize production technology.

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BACKGROUND AND OBJECTIVES

Maize (*Zea mays*) is one of the most important crops in world agricultural economy grown over an area of 159 million hectares with a production of 817 million tonnes. In India, it is an important crop next only to rice and wheat and has an acreage around 8.36 million ha with a production of 16.72 million tonnes. India ranks fourth in area and sixth in production of maize. As it has yield potential far higher than any other cereal, it is sometimes referred to as the miracle crop or the 'Queen of Cereals (Anonymous, 2011). The consumption pattern for maize produced in India at present includes poultry feed 52 per cent, human food 24 per cent, animal feed 11 per cent, starch 11 per cent, brewery 1 per cent and seed 1 per cent (Sain Dass *et.al.*, 2007). In our country with the growth in demand of poultry feed the demand for maize is also going up. It is the crop with the highest per day productivity. Some estimates indicate that India may have to produce 55 million tonnes of maize to meet its requirement for human consumption, poultry, piggery, pharma industry and fodder by 2030. Maize crop is cultivated in Chhattisgarh in 179,900 ha area and its productivity is1, 805 kg per ha (Krishi Dairy, I.G.K.V., 2012). Kanker district of Chhattisgarh state is one of the largest maize growing areas. The total geographical area of Kanker district is 6, 43,373 ha and net shown area is 2, 14,122 ha coupled with 105.8 per cent cropping intensity.

Rogers (1995) stated that knowledge is of three types namely awareness knowledge, how to knowledge and principle knowledge. In the present study awareness and knowledge was studied and study is confined, as the technical information possessed by the respondents about recommended maize production technology. The same was measured by constructing a teacher made knowledge scale. Wilkening (1953) described the adoption of a specific practice is not the result of a single decision to act but series of actions and meaningful decisions. This is a tremendous task, which need dedicated and skilled workers to produce the desirable impact of adoption of about recommended maize production technology. Implementation of any improved scientific technology in practical field depends on the adoption behavior of the individual who wants to implement. Adoption of a specified practice is not the result of a single decision to act but series of

actions and thought decisions. According to Rogers (1995), "adoption process is the mental process through which an individual passes from hearing about an innovation to final adoption". Adoption has been the central point of research endeavors in the field of extension education. But in real sense, adoption is a very complex phenomenon and is affected by a number of overt and covert factors in the real field situation.

The present study was undertaken with specific objectives to assess the level of knowledge and extent of adoption about recommended maize production technology among the tribal farmers of Chhattisgarh.

RESOURCES AND METHODS

The present study was carried out in Kanker district of Chhattisgarh state during 2008. Kanker district has 7 blocks, out of which, 4 blocks namely Bhanupratappur, Antagarh, Narharpur, Koyaliberha were selected purposively because maize crop is grown by the maximum number of farmers in these blocks. A list of maize growers of the selected blocks were obtained from the office of the agricultural department of Kanker district and three villages were selected randomly from each block hence a total number of 12 villages namely Badetopal, Kodagaon, Kalgaon, Shalhe, Dumarkot, Iragaon, Pakhanjur, Devpur, Koygaon, Narharpur, Sarona and Devgaon were selected for this study. 10 farmers from each village were selected randomly. In this way a total of 120 farmers were considered as respondents for this study. Respondents were interviewed through personal interview. Prior to interview, respondents were taken in to confidence by revealing the actual purpose of the study and full care was taken in to consideration to develop good rapport with them. For the data collection well designed and pre-tested interview scheduled were used. Collected data were analyzed by the help of various statistical tools *i.e.* frequency, percentage, mean, standard deviation, correlation and regression, etc.

The Knowledge test was composed of items called questions for constructing the knowledge tests of all the package of practices of maize production technology. A set of questions was developed and discussed with the subject matter specialist in the disciplines of advisory committee and then finalized. Total no. of questions was 10.

A device was developed to measure the level of knowledge for farmers regarding selected technologies those recommended for maize crop, a teacher made scale was used with some modifications. The responses of respondents regarding knowledge was obtained into three-point continuum as under:

Categories	Score
Incomplete knowledge	0
Partial knowledge	1
Complete knowledge	2

Further, the respondents were classified into three categories by using following formula:

K. I. = Mean ($\overline{X}$) ± S.D. (Standard Deviation)

Categories	Score
Low level of knowledge (< $\overline{X}$ - S.D.)	Up to 11
Medium level of knowledge (in between $\overline{X}$ ± S.D.)	11 to 14
High level of knowledge (> $\overline{X}$ + S.D.)	14 and above

To measure the extent of adoption, the list of recommended important practices was prepared and responses for the each practice was obtained into three-point continuum as under:

Categories	Score
Not adopted	0
Partially adopted	1
Fully adopted	2

The researcher ascertained the extent of adoption in terms of selected practices of maize production technologies adopted. The respondents were classified into three categories by using following formula:

Categories	Score
Low level of adoption (< $\overline{X}$ - S.D.)	Up to 7
Medium level of adoption (in between $\overline{X}$ ± S.D.)	8 to 9
High level of adoption (> $\overline{X}$ + S.D.)	10 and above

A.I. = Mean ($\overline{X}$) ± S.D. (Standard Deviation)

OBSERVATIONS AND ANALYSIS

The observations of the present study as well as relevant analysis have been summarized under the following heads:

Level of knowledge:

The data presented in Table 1 indicate that the majority of the respondents (62.50%) had medium level of knowledge regarding recommended maize production technology, whereas 20.00 per cent and 17.50 per cent respondents were having high and low level of knowledge, respectively. Kirar

Table 1 : Distribution of respondents according to their overall level of knowledge (n =120)

Sr. No.	Level of knowledge	Frequency	Per cent
1.	Low (up to 11 score)	21	17.50
2.	Medium(11-13 score)	75	62.50
3.	High (above 13 score)	24	20.00
	Total	120	100

$\overline{X}$ = 12.28 S.D. = 1.88

Table 2: Distribution of respondents according to their practice wise level of knowledge regarding maize production technology (n =120)

Sr. No.	Practices	Level of knowledge					
		Low		Medium		High	
		F	(%)	F	(%)	F	(%)
1.	Selection of land	07	(5.83)	52	(43.33)	61	(50.84)
2.	Preparation of land	08	(6.66)	53	(44.16)	59	(49.18)
3.	Selection of seed	12	(10.00)	60	(50.00)	48	(40.00)
4.	Seed treatment	62	(51.67)	40	(33.33)	18	(15.00)
5.	Use of chemical fertilizer	22	(18.33)	56	(46.67)	42	(35.00)
6.	Weed control	61	(50.83)	51	(42.50)	08	(6.67)
7.	Insect control	65	(54.17)	46	(38.33)	09	(7.50)
8.	Disease control	69	(57.50)	38	(31.67)	13	(10.83)
9.	Storage facility	72	(60.00)	38	(31.67)	10	(8.33)
10.	Time of harvesting and method of cutting	12	(10.00)	58	(48.33)	50	(41.67)

F = Frequency % = Per cent

and Mehta (2009) also found almost similar findings in their study which is related to rice crops.

Table 2 reveals that the respondents were having low level of knowledge regarding selected practices of maize production technology as follows. 60 per cent respondents had low level of knowledge about storage facility followed by disease control (57.50%), insect control (54.17%), seed treatment (51.67%), weed control (50.83%), use of chemical fertilizer (18.33%), about selection of seed (10.00%) and about harvesting time and method of cutting both (10.00%), preparation of land (06.66%) and about selection of land (05.83%) had low knowledge.

With respect to medium level of knowledge, the respondents had knowledge among them on following manner regarding selected practices *i.e.*, regarding selection of seed (50.00%) followed by time of harvesting and method of cutting (48.33%), use of chemical fertilizer (46.67%), preparation of land (44.16%), selection of land (43.33%), weed control (42.50%), insect control (38.33%), seed treatment (33.33%) and about disease control and storage facility both (31.67%).

However, under high level of knowledge group, the respondents had knowledge about the selected practices of maize production technology as follows.

Maximum respondents (50.84%) had high level of knowledge regarding selection of land followed by preparation of land (49.81%), time of harvesting and method of cutting (41.67%), selection of seed (40.00%), use of chemical fertilizer (35.00%), seed treatment (15.00%), about disease control (10.83%), storage facility (8.33%), insect control (7.50%) and only 6.61 per cent respondent had high level of knowledge about weed control. Pandey (2002) reported almost similar findings regarding extent of knowledge.

Extent of adoption:

Overall extent of adoption:

It is clearly indicated from the Table 3 that 61.66 per cent respondents had medium level of adoption about maize production technology, whereas 20.84 and 17.50 per cent of them having high and low level of adoption, respectively.

Table 3 : Distribution of respondents according to their overall extent of adoption regarding recommended maize production (n =120)

Sr. No.	Extent of adoption	Frequency	Per cent
1.	Low (up to 7 score)	21	17.50
2.	Medium (8 to 9 score)	74	61.66
3.	High (above 9 score)	25	20.84
	Total	120	100

$\overline{X}$ = 9.05 S.D. = 1.63

Practice wise extent of adoption:

Data presented in Table 4 shows that among the 10 selected practices of maize production technology, all the respondents had the extent of adoption under low level of adoption category as fallows.

Maximum number of the respondents had level of adoption regarding insect control (70.83%), followed by disease control (69.16%), storage facility (68.33%), weed control (60.83%), seed treatment (60.00%), use of chemical fertilizer (27.50%), preparation of land (24.17%), selection of seed (20.00%), selection of land (19.17%), and time of harvesting and method of cutting (15.83%).

While under medium level of adoption category, it was found that maximum respondents had extent of adoption towards selection of seed (48.33%) followed by time of harvesting and method of cutting (46.67%), use of chemical fertilizer (43.33%), preparation of land (42.50%), selection of land (39.16%), weed control (34.17%), seed treatment (31.67%), storage facility (25.84%), insect control (25.00%), and disease control (22.50%).

Whereas, under high level category, maximum number of the respondents had the extent of adoption about selection of

Table 4 : Distribution of respondents according to their practice wise extent of adoption regarding maize production technology (n =120)

Sr. No.	Practices	Extent of adoption					
		Low		Medium		High	
		F	(%)	F	(%)	F	(%)
1.	Selection of Land	23	(19.17)	47	(39.16)	50	(41.67)
2.	Preparation of Land	29	(24.17)	51	(42.50)	40	(33.33)
3.	Selection of seed	27	(20.00)	58	(48.33)	38	(31.67)
4.	Seed treatment	72	(60.00)	38	(31.67)	10	(08.33)
5.	Use of chemical fertilizer	33	(27.50)	52	(43.33)	35	(29.17)
6.	Weed control	73	(60.83)	41	(34.17)	06	(05.00)
7.	Insect control	85	(70.83)	30	(25.00)	05	(04.17)
8.	Disease control	83	(69.16)	27	(22.50)	10	(08.33)
9.	Storage facility	82	(68.33)	31	(25.84)	07	(05.83)
10.	Time of harvesting and method of cutting	19	(15.83)	56	(46.67)	45	(37.50)

Figure in parenthesis shows the percentage F = Frequency % = Per cent

land (41.67%) followed by time of harvesting and method of cutting (37.50%), preparation of land (33.33%), selection of seed (31.67%), use of chemical fertilizer (29.17%), seed treatment and disease control both (8.33%), storage facility (5.83%), weed control (5.00%) and insect control (4.17%). Singh and Varshney (2010) and Sahu *et al.* (2010) reported almost similar findings regarding extent of knowledge.

It can be concluded from the study that maximum respondents belonged to low level adoption category, reason might be due to their low level of education, lack of knowledge and poor economic status.

Correlation analysis of independent variables with extent of adoption of recommended maize production technology:

Correlation co-efficient between the selected characteristics of the respondents with adoption of recommended maize production technology among maize growers was also worked out and the values of correlation coefficient are presented in Table 5. It can be seen from the table that out of all selected characteristics, *viz*., education, land holding and level of knowledge were found to be positive and highly significant correlated with adoption at 0.01 level of probability.

Whereas, the variables like occupation, annual income, credit acquisition, innovative proneness and extension contact were found to be positively and significantly related with adoption at 0.05 level of significance.

The other variables *viz.*, age, caste, size of family, economic motivation, weighing accuracy, support price, distance of market from the village and mediator interference showed non significant relation with extent of adoption of recommended maize production technology.

It can be concluded that the respondents have higher education, large land holding, more knowledge, good occupation, more annual income, take credit from credit agencies, more extension contact and more innovative proneness, increases the extent of adoption among the respondents.

Table 5 : Correlation analysis of independent variables with extent of adoption regarding maize production technology

Sr. No.	Independent variables	Correlation co-efficient (r)
		Adoption
1.	Age	0.039 NS
2.	Education	0.178 **
3.	Caste	0.139 NS
4.	Size of family	-0.023 NS
5.	Social participation	0.1081NS
6.	Occupation	0.179 *
7.	Annual income	0.183 *
8.	Land holding	0.232 **
9.	Credit acquisition	0.177 *
10.	Extension contact	0.178 *
11.	Information source	0.116 NS
12.	Weighing accuracy	0.008 NS
13.	Support price	0.071 NS
14.	Distance of market from village	0.121 NS
15.	Mediators interference	0.157 NS
16.	Economic motivation	-0.105 NS
17.	Innovative proneness	0.181*
18.	Level of knowledge	0.541**

* and ** indicate significance of values at P=0.05 and 0.01, respectively
NS= Non-significant

Multiple regression analysis of independent variables with extent of adoption of recommended maize production technology:

The result of regression analysis is presented in Table 6. The result of multiple regression analysis is revealed that out of 18 independent variables, *viz*., education, credit acquisition, extension contact, distance of market from the village, and

Table 6: Multiple regression of independent variables with extent of adoption of maize production technology

Sr. No.	Independent variables	Regression co-efficient (b)	't' value
1.	Age	0.153 NS	1.359
2.	Education	0.307**	1.114
3.	Caste	0.182*	0.895
4.	Size of family	-0.202*	0.810
5.	Social participation	0.011 NS	0.075
6.	Occupation	0.089 NS	0.991
7.	Annual income	0.220*	1.530
8.	Land holding	0.197*	1.117
9.	Credit acquisition	0.279**	1.590
10.	Extension contact	0.242**	1.662
11.	Information source	0.034 NS	0.471
12.	Weighing accuracy	-0.039 NS	0.224
13.	Support price	0.063 NS	0.427
14.	Distance of market from village	0.295**	1.839
15.	Mediator interference	0.113 NS	0.536
16.	Economic motivation	-0.025 NS	0.818
17.	Innovative proneness	0.026 NS	0.940
18.	Level of knowledge	0.462**	6.679

* and ** indicate significance of values at P=0.05 and 0.01, respectively; $R^2 = 0.532$ F value of R = 14.080 NS=Non-significant

level of knowledge contributed highly significant at 0.01 per cent level of probability whereas caste, size of family, annual income and land holding, were found significantly with adoption at 0.05 per cent level of significance. As evident from the significant 't' value of these variables. All these four variables *viz.*, education, caste, size of family, annual income, land holding, credit acquisition, extension contact, distance of market from the village and level of knowledge were 0.307, 0.182, -0.202, 0.220, 0.197, 0.279, 0.242, 0.295 and 0.462 unit changes, respectively with adoption of recommended maize production technology.

Conclusion:

From the above research findings it can be concluded that the maximum number of the respondents had medium level of knowledge and extent of adoption regarding recommended maize production technology. Among the selected characteristics *i.e*. education, occupation, annul income, landholding, credit acquisition, extension contact, information source, innovative proneness and level of knowledge was found to have positive and significant correlation with extent of adoption among the maize growers.

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