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Adoption of maize technology in tribal district of Chhattisgarh

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Abstract

The present investigation was carried out in the Surguja district of Chhattisgarh and data were collected from 120 respondents from 8 selected villages. In this study, eight major heads of farm operation practices of maize cultivation were studied. Under the planting method head, the majority of respondents belonged to a fully adopted category in land preparation, seed treatment, seed rate, method of sowing and spacing. In variety and seed replacement heads, the majority of respondents belonged to a fully adopted category in variety and seed replacement. Under the manure and fertilizer head, the majority of respondents belonged to a fully adopted category in nitrogenous and phosphatic fertilizer and the maximum percentage of respondents belonged under the partially adopted category in potash and remaining practices zinc and manure application had a low level of adoption. Under the irrigation head, the majority of respondents belonged to a high level of adoption in the critical stage of irrigation. In plant protection measures practices head, most of the respondents belonged to a low level of adoption in pest and disease management due to less infestation. The data revealed that the overall extent of adoption mean score was found at 70.57 per cent and the majority of the respondents were moderate level of technological adoption.

Keywords: Improved farm practices, adoption, maize, farmers

Introduction

Maize (*Zea mays* L.) can grow in various agroclimatic conditions. Since it has the greatest genetic yield potential of all cereals, maize is called the "Queen of Cereals" throughout the world. For billions of people, 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 (FAOSTAT, 2020) [1].

Maize is the third most important food crop in India 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. It is frequently called the "miracle crop" because its yield potential is significantly higher than that of any other grain. Oil (4-5%) and protein (8-10%) are found in maize grains. In our nation, the need for maize is rising along with the demand for chicken feed. It is the crop that produces the most every day. According to some estimates, India could need to produce 55 million tonnes of maize to meet its needs for feed, poultry, pigs, and the agriculture industry. In the state of Chhattisgarh, maize is the second most important crop after rice for the production of food grains. In Chhattisgarh, there is an annual average of 1200-1400 mm of rain. In addition to a 137 per cent cropping intensity. In Kharif 2020-2021, the area covered by Chhattisgarh maize is 206.63 thousand hectares, and its productivity is 2789 kg/ha. The real potential can be realized and obtained by the adoption of hybrid maize with a full package of practices. Given the above fact, it was considered in this study and find out the actual adaptability of improved farm practices of maze cultivation among maize growers of the study area.

Materials and Methods

The study was carried out in Surguja district of Chhattisgarh State and Ambikapur block was randomly selected under 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.

Results and Discussion

The data presented in Table 1, shows that among the 29 selected practices of maize production technology, all the respondents had the extent of adoption under the level of adoption category as follows:

Table 1: Distribution of the respondents by their extent of adoption regarding improved practices of maize cultivation (no.120)

SI. No.	Particulars	Extent of adoption level (No)			Adoption mean score (%)
		Fully adopted (3)	Partially adopted (2)	Not adopted (1)	
A	**Sowing method**				
1.	Land preparation	112 (93.33%)	8 (6.66%)	0 (0%)	97.77 ^{h1}
2.	Method of sowing	75 (62.5%)	34 (28.33%)	11 (9.16%)	84.44^{h3}
3.	Spacing	61 (50.83%)	38 (31.66%)	21 (17.5%)	77.77^{h5}
4.	Seed rate	95 (79.16%)	20 (16.66%)	5 (4.16%)	91.66^{h2}
5.	Seed treatment	97 (80.83%)	7 (5.83%)	16 (13.33%)	89.16^{h4}
B	**Variety and seed replacement**				
6.	Variety	101 (84.16%)	5 (4.16%)	14 (11.66%)	89.44^{h1}
7.	Seed replacement	87 (72.5%)	26 (21.66%)	07 (5.83%)	88.88^{h2}
C	**Manures and fertilizer**				
8.	Manure application	8 (6.66%)	25 (20.83%)	87 (72.5%)	44.72^{m2}
9.	Nitrogenous fertilizer	104 (86.66%)	16 (13.34%)	0 (0%)	95.55^{h1}
10.	Phosphatic fertilizers	102 (85%)	18 (15%)	0 (0%)	95.00^{h2}
11.	Potassic fertilizers	45 (37.5%)	75 (62.5%)	0 (0.0%)	79.17^{h3}
12.	Zinc	28 (23.33%)	13 (10.83%)	79 (65.83%)	52.50^{m1}
D	**Cultural operation**				
13.	Thinning	14 (11.66%)	106 (88.33%)	0 (0%)	70.55^{h3}
A	Weed control				
14.	Manual	80 (66.66%)	34 (28.33%)	6 (5%)	87.22^{h2}
15.	Chemical	91 (75.83%)	18 (15%)	11 (9.16%)	88.88^{h1}
16.	Earthing up	30 (25%)	79 (65.83%)	11 (9.16%)	74.72^{h3}
E	**Irrigation**				
17.	Irrigation at critical stages	84 (70%)	12 (21.66%)	26 (10%)	87.77^{h2}
18.	Method of irrigation	99 (82.5%)	21 (17.5%)	0 (0%)	94.16^{h1}
F	**Plant protection measure**				
I	**Insect pest management**				
19.	Pink stem borer	0 (0%)	0 (0%)	120 (100%)	33.33^{L}
20.	Armyworm	68 (56.66%)	20 (16.66%)	32 (26.66%)	76.66^{h1}
21.	Corn caterpillar	2 (1.66%)	12 (10%)	106 (88.33%)	37.77^{m1}
22.	Shoot fly	0 (0%)	0 (0%)	120 (100%)	33.33 ^{L}
23.	White grub	0 (0%)	0 (0%)	120 (100%)	33.33 ^{L}
II	**Disease management**				
24.	Blight	0 (0%)	0 (0%)	120 (100%)	33.33 ^{L}
25.	Early blight	0 (0%)	0 (0%)	120 (100%)	33.33 ^{L}
26.	Stalk rot disease	0 (0%)	0 (0%)	120 (100%)	33.33 ^{L}
G	**Harvesting**				
27.	After maturity	120 (100%)	0 (0%)	0 (0%)	100^{h}
H	**Post-harvest operation**				
28.	Threshing	120 (100%)	0 (0%)	0 (0%)	100^{h}
29.	Storage	8 (6.66)	18 (15%)	94 (78.33%)	42.77^{m}
	Overall	-	-	-	70.57

Sowing methods

Maximum respondents (93.33%) had fully adopted the recommended land preparation followed by a partial level of adoption (6.66%) and none of the respondents had under not adopted category of adoption level. In the case of the method of sowing, the maximum number of respondents (62.5%) had a fully adopted category followed by 28.33 per cent a partially adopted category and a not adopted (9.16%). Similarly, the Maximum number of respondents (50.83%) had a fully adopted category followed by 31.66% had a partially adopted and 17.5 per cent had not adopted in recommended spacing. Maximum respondents (79.16%) had a fully adopted category followed by 16.66 per cent partially adopted and the remaining 4.16 per cent had not adopted the recommended seed rate. As regards seed treatment, 80.83 per cent of respondents had fully adopted followed by not adopted (13.33%) and partially adopted category (5.83%). Overall adoption mean score was found in land preparation (97.77%) which ranked given h1(high level) followed by seed rate (91.66%) ranked h2, seed treatment (89.16%) ranked h3, method of sowing (84.44%) ranked h4 and spacing (77.77%) had ranked h5.

Variety and seed replacement

A majority of respondents (84.16%) had fully adopted category followed by not adopted (11.66%) and partially adopted category (4.16%) regarding adoption of recommended variety. Similarly, for seed replacement, a maximum number of respondents (72.5%) had under the fully adopted category followed by partially adopted (21.66%) and 5.8 per cent had not adopted. Overall adoption mean score was found in variety (89.44%) which ranked given h1 followed by seed replacement (88.88%) had ranked h2.

Manure and fertilizers

A maximum percentage of respondents (72.50) had not adopted the category followed by (20.83%) partially

adopted and only 6.66 per cent responded fully adopted as per recommended manure application. In the case of Nitrogenous fertilizer, the maximum number of respondents (86.66%) had fully adopted followed by 13.34 per cent had partially adopted as per recommendations. Similarly, the maximum number of respondents (85%) were under the fully adopted category followed by partially adopted (15%) and none of the respondents were under the not adopted category in the application of Phosphoric fertilizers. Maximum respondents (62.50%) partially adopted the potassic fertilizer followed by the fully adopted category of respondents (37.5%). As regards Zinc application, 65.83 per cent of respondents had not adopted the zinc fertilizer followed by the fully adopted category (23.33%) and the remaining 10.83 per cent had partially adopted it. Overall highest adoption mean score percentage was found in Nitrogenous fertilizers (93.05%) followed by phosphoric fertilizers (92.77%) ranked h2, Potassic fertilizers (68.61%) ranked h3, and zinc (52.50%) ranked L1 and manure application (44.72%) had ranked L2.

Cultural operation

The majority of respondents (88.33%) were under the partially adopted category followed by the fully adopted category of respondents (11.66%) regarding the adoption of thinning practice and none of found under the not adopted category. In the case of weed control, the maximum number of respondents (66.66%) had fully adopted as per recommendation followed by partially adopted (28.33%) and 5 per cent not adopted category of respondents. Similarly, the maximum number of respondents (75.83%) had fully adopted the chemical weed control measures followed by the partially adopted category (15%) and not adopted (9.16%) the chemical weed control measures. Maximum respondents (65.83%) were partially adopted followed by fully adopted (25%)) and the remaining 9.11 per cent of respondents belonged to the not adopted category regarding earthing up. Overall highest adoption mean score was found in chemical (88.88%) which ranked given h1 followed by manual (87.22%) ranked h2, earthing up (74.72%) ranked h3 and Thinning (70.55%) stood ranked h4.

Irrigation

Maximum respondents (70%) had fully adopted irrigation in a critical stage of the crop as recommended followed by 21.66% partially adopted and 10 per cent responded were not adopted critical irrigation. Similarly, regarding the method of irrigation, the majority of respondents (82.5%) had fully adopted the method of irrigation as recommended followed by (17.5%) partially adopted. Overall highest adoption mean score was found in the method of irrigation (94.16%) which ranked h1 followed by critical irrigation (87.77%) ranked h2.

Insect pest management

The maximum number of respondents (56.66%) belonged fully adopted category in the control measures of armyworm followed by (26.66%) in the partially adopted category and 16.66 per cent not adopted in the control measures of corn caterpillars. In the case of the corn caterpillar control measure, the majority of respondents (88.33%) had not adopted followed by 10 per cent partially adopted and only 1.66 per cent were found to fully adopt the category of respondents under the control measures of corn caterpillar. Cen-per cent of respondents had not adopted the control measures in the case of pink stem borer, shoot fly and white grub. Overall adoption mean score percentage was only found in a high level under armyworm and the remaining other insects were to be found low level as well not adopted. There might be no infestation of pests in maize crops.

Disease management

Every respondent had not adopted the disease management practices under the control of blight, early blight and spacing Stalk rot disease. It might be due to no infestation in the study area.

Harvesting

Every respondent (100%) belonged to a high level of adoption regarding harvesting after maturity. Overall adoption mean score was found in (100%) harvesting after maturity which ranked given h.

Post-harvest operation

Every respondent (100%) belonged to a high level of adoption under the threshing operation of maize. In the case of storage, the maximum number of respondents (78.33%) had a low level of adoption followed by a medium level of adoption (15%) and a high level of adoption (6.66%). It might be due to maize growers selling their product after harvesting no more grains stored, they were few quantities of produce stored for their consumption as well as for poultry feed. Overall adoption mean score was found in (100%) threshing which ranked at a given higher level followed by a 42.77 per cent mean score found in storage, which was a medium level of adoption.

Thus, it can be concluded that 8 major heads of farm operation practices of maize cultivation were studied and observed that the overall adoption mean score per cent was 70.57 and ranged from 0.00 to 100 per cent recorded.

Table 2: Extent of Adoption of the respondents regarding improved practices of maize cultivation (n=120)

SI. No.	Extent of adoption	Frequency	Percentage
1.	Low level (< 58.5 score)	14	11.67
2.	Medium level (58.5-66.2 score)	95	78.17
3.	High level (>66.2 score)	11	9.16
	Total	120	100

$\bar{X}$ = 62.47, S.D. = 3.83

Table No. 2 shows the respondents classified into different groups based on their range of Adoption. It is clear from the data that most of the respondents' adoption level was moderate, which was 78.17 per cent. The adoption threshold was low among 11.67 per cent of the respondents. In contrast, only 9.16 per cent of respondents had a high threshold for adopting recommended maize production farming practices.

Conclusion

From the above research findings, it can be concluded that 8 major heads of farm operation practices (sowing method, Variety and seed replacement, manure and fertilizer, cultural

operation, irrigation, plant protection measure, harvesting, post-harvest operation) of maize cultivation were studied and observed that the overall adoption mean score per cent was 70.57 and ranged from 0.00 to 100 per cent recorded and the majority of the respondents had a medium level of adoption regarding recommended maize production technology.

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