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A study on extent of adoption of recommended production technologies by maize growers in Koppal district of Karnataka

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Abstract
The present investigation was conducted in koppal district of Karnataka state with an objective to analyse adoption level of recommended maize production technologies among the maize growers. Ex-post facto research design was followed for the study and the data were collected by personally interviewing the selected 120 respondents with the help of structured interview schedule. Results of the study revealed that a nearly half of the small farmers had low (48.33%) and high (28.33%) level of adoption, followed by medium level of adoption (23.34%). On the other hand, in case of big farmers, more than one-third of respondents had medium (35.00%) and low (33.33%) level of adoption followed by high level of adoption (31.67%). When the pooled sample was considered 40.83 per cent, 30.00 per cent and 29.17 per cent of maize growers possessed low, high and medium level of adoption respectively. The probable reason for low level adoption of the technologies by the maize growers may be due to incorrect knowledge of the respondents regarding recommended maize production technologies, lack of knowledge about improved practices, lack of motivation and conviction to use innovations and non-availability of critical inputs at right time.

Keywords: adoption, production technologies, maize growers

Introduction
Maize is one of the most important cereal crops in India. It has very high yield potential and it is called as "Queen of the cereals". Maize is versatile crop grown over a range of agro–climatic zones. Maize is principally a rainy season crop but grown in all three season Kharif, Rabi and Summer. In a country like India, where majority of the population depends on vegetarian diet, maize offers a good source of energy. Maize has a great importance as a food and fodder crop for human as well as animal and it is also useful for industrial purposes. Maize crop furnishes huge quantities of green fodder, grown throughout the year and can be fed to cattle at any stage of growth. Sweet corn as fodder for milch animal increase fat percentage in the milk. In industrial production or manufacture of starch, syrup, alcohol, acetic acid, glucose, sugar, milk, paper, rayon, plastic, textile, adhesive, dyes, synthetic rubber, raisins, artificial leather and shoe polish ect.. The acreage under maize crop increased, but as compared to acreage, the yield has not been increased. The average yield after following all the recommended practices is expected to be 45 to 50 q/ha, (Annual report 2019, AICRP on Maize) [1] but average productivity of maize crop in Karnataka in general and Koppal district in particular is low mainly because of non-adoption or low adoption and low knowledge about recommended cultivation practices of maize by the farmers. There is a need to increase maize yield, it is therefore, necessary to create awareness among farmers about improved cultivation practices and motivate them for adoption of recommended improved cultivation practices. The present research paper focuses on the extent of adoption of recommended production technologies by maize growers which was actually studied in the main research study. The main study is on the knowledge level, yield gap and extent of adoption of recommended production technologies by maize growers would provide better insight into constraints faced and suggestions made by them which would help in improvement of extent of adoption of new production technologies for increasing production and productivity of maize.

Research Methodology
Koppal district was selected purposively, because of its highest area under maize cultivation. It is one of the major producers of maize in Karnataka and also maize cultivation is being taken

up in almost all the taluks of the district. Koppal district has seven taluks, out of which Koppal and Yalburga taluks were selected purposively considering the highest area and production. "Ex-post facto" research design was used in the present investigation. The data collection was done by personal interview method with the help of the structured interview schedule. The data collected from all the respondents were coded, scored and tabulated. Keeping in view of the objectives of the study, the data were subjected to different statistical measures and software was used for analysis.

Results and Discussion

1. Extent of adoption of recommended production technologies by small and big farm maize growers

The data in Table 1 shows that, nearly cent per cent of both small and big farm maize growers had adopted fully the practices of land preparation followed by thinning. Regarding practices which were not adopted by nearly cent per cent of both small and big farm growers were seed treatment/soil application of biofertilizer and top dressing of nitrogen. Since, the farmers are having good experience in farming as they follow basic activities like land preparation and thinning. While, seed treatment/soil application of biofertilizer and top dressing of nitrogen are not adopted by both small and big farm maize growers this might be due to lack of knowledge and not knowing importance of biofertilizer application and top dressing.

A great majority of both small (95.00%) and big farm maize growers (73.33%) have not adopted mechanization for harvesting and threshing. Majority of both small (95.00%) and big farm maize growers (96.67%) have not used UAS hybrids for sowing. Majority of the small (83.33%) and big farm maize growers (65.00%) had not adopted chemical weed management technology. Majority of the small (71.67%) and big farm maize growers (63.33%) have not adopted Turcicum leaf blight management technology, more than (51.67%) of small and (26.67%) of big farm maize growers have not adopted army worm management, Three-fourth (75.00%) of the small farm maize growers and more than two-fifth (43.33%) of the big farm maize growers have not adopted application of micronutrient practice. The possible reason for the above trend may be that, as sowing is taken in early in the area during that period as UAS hybrids are not available in the area. Further, UAS hybrids are not available in RSK's at subsidized rate in the area. Apart from this, maize is mainly grown under rainfed condition in the district, hence, farmers are not ready to invest more on plant protection chemicals, weedicides and top dressing which involves more risk. A great number of both small and big farm maize growers have not adopted micronutrient application. Farmers have not realised the importance of micronutrient application and they lack awareness about the micronutrients.

Cent per cent of both small and big farm maize growers have partially adopted the practices like time of sowing and basal dose application of fertilizer. As per the recommendations the sowing of maize should be taken during May-June in kharif season but due to uncertain rainfall in Koppal district the sowing is taken as the rainfall arrives by the farmers. In the study area, irrespective of small and big farm maize growers, they have not applied recommended quantity of fertilizer. Lack of knowledge and lack of conviction about the recommended nutrient application may be the reasons for partial adoption.

Nearly half of both big (53.33%) and small farm maize growers (55.00%) have partially adopted recommended spacing. A good number of both small (81.67%) and big (73.33%) farmers had partially adopted intercropping practice. Since the crop is mainly grown under rainfed situation in the district, farmers follow closer spacing to maintain optimum plant population. Significant percentage of farmers are growing red gram as intercrop in maize field.

A larger proportion of both small (95.00%) and big farm maize growers (96.67%) use private hybrids for maize cultivation. A great majority of both big (96.67%) and small farm maize growers (71.67%) have partially adopted the practice seed treatment with insecticide/ fungicide. The possible reason may be that, private hybrids are more popular and easily available at RSK's with the subsidized rate at the required time for the farmers. Lack of awareness about seed treatment and lack of knowledge about the quantity of chemical used for treatment are the reason for partial adoption of seed treatment practice. Majority of both big (93.33%) and small farm maize growers (91.67%) had partially adopted recommended seed rate. Because, in the study area the crop is mainly grown under rainfed situation and farmers are not ready to take risk at germination stage. Hence, higher seed rate is used.

Table 1: Extent of adoption of recommended production technologies by small and big farm maize growers

(n=120)

Sl. no	Recommended Technologies	Small farm maize growers (n_1=60)						Big farm maize growers (n_2=60)					
		Full adoption		Partial adoption		No adoption		Full adoption		Partial adoption		No adoption	
		f	%	f	%	f	%	f	%	f	%	f	%
1	Land preparation	60	100.00	00	00.00	00	00.00	60	100.00	00	00.00	00	00.00
2	Time of sowing	00	00.00	60	100.00	00	00.00	00	00.00	60	100.00	00	00.00
3	Hybrids/ Varieties												
	a. Use of UAS hybrids/ varieties	03	05.00	00	00.00	57	95.00	02	03.33	00	00.00	58	96.67
	b. Use of Private hybrids/ varieties	57	95.00	00	00.00	03	05.00	58	96.67	00	00.00	02	03.33
4	Recommended Seed rate	05	08.33	55	91.67	00	00.00	04	06.67	56	93.33	00	00.00
5	Seed treatment with insecticide/fungicide	03	05.00	43	71.67	14	23.33	02	03.33	58	96.67	00	00.00
6	Seed treatment / soil application of biofertilizer	00	00.00	01	1.67	59	98.33	00	00.00	00	00.00	60	100.00
7	Spacing	27	45.00	33	55.00	00	00.00	28	46.67	32	53.33	00	00.00
8	Intercultivation	52	86.67	08	13.33	00	00.00	45	75.00	15	25.00	00	00.00
9	Nutrient management												
	FYM	44	73.33	07	11.67	09	15.00	52	86.67	08	13.33	00	00.00

	Basal dose	00	00.00	60	100.00	00	00.00	00	00.00	60	100.00	00	00.00
	Top dressing	00	00.00	00	00.00	60	100.00	00	00.00	00	00.00	60	100.00
10	Application of Micronutrient	03	05.00	12	20.00	45	75.00	06	10.00	28	46.67	26	43.33
11	Thinning	55	91.67	05	08.33	00	00.00	56	93.33	04	06.67	00	00.00
12	Inter cropping	11	18.33	49	81.67	00	00.00	16	26.67	44	73.33	00	00.00
13	Crop rotation	53	88.33	07	11.67	00	00.00	57	95.00	03	05.00	00	00.00
14	Chemical weed management	00	00.00	10	16.67	50	83.33	00	00.00	21	35.00	39	65.00
15	Army worm management	00	00.00	29	48.33	31	51.67	00	00.00	44	73.33	16	26.67
16	Turcicum leaf blight management	00	00.00	17	28.33	43	71.67	00	00.00	20	33.33	40	63.33
17	Mechanization for harvesting and threshing for harvesting and thresing	00	00.00	03	05.00	57	95.0	00	00.00	16	26.67	44	73.33
18	Timely harvesting and threshing	53	88.33	07	11.67	00	00.00	60	100.0	00	00.00	00	00.00

2. Extent of adoption of recommended production technologies by maize growers

A glance at Table 2 indicates that, cent per cent of maize growers have fully adopted land preparation and thinning practice. Practices which are partially adopted by cent per cent of maize growers were time of sowing and basal dose application of fertilizers. Other practices which are adopted partially by maize growers were recommended seed rate (92.50%), seed treatment with fungicide (84.17%), inter cropping (77.50%), and army worm management (60.83%) nitrogen. This might be due to, since the crop is grown under rainfed condition to get optimum yield high seed rate and intercropping are followed in the study area because they are not ready to take risk in rainfed farming. However, they practice thinning operation at later stages.

Majority of the maize growers had fully adopted timely harvesting and threshing (94.17%), crop rotation (91.67%), use of private hybrids (95.83%), thinning (92.50%), intercultivation (80.83%) and application of FYM (80.00%). These practices are simple, most important and crucial operations in production. Hence, majority of the farmers adopted these practices.

A significant percentage of maize growers have not adopted seed treatment/soil application of biofertilizers (99.17%), top dressing of nitrogen (100.00%), use of UAS hybrids (95.83%), mechanization for harvesting and threshing (84.17%) and chemical weed management (74.17%) and Turcicum leaf blight management (69.17%). This may be due to poor knowledge about recommended technologies, non-availability of biofertilizer in time, risk involved in application of nitrogen in rainfed situation and non-availability of UAS hybrids in the RSK's and local traders leads to non-adoption.

Table 2: Extent of adoption of recommended production technologies by maize growers

(n=120)

Sl. No	Recommended technologies	Full adoption		Partial adoption		No adoption	
		f	%	f	%	f	%
1	Land preparation	120	100.00	00	00.00	00	00.00
2	Time of sowing	00	00.00	120	100.00	00	00.00
3	Hybrids						
	a. Use of UAS hybrids	05	04.17	00	00.00	115	95.83
	b. Use of private hybrids	115	95.83	00	00.00	05	04.17
4	Recommended seed rate	09	07.50	111	92.50	00	00.00
5	Seed treatment with insecticide/fungicide	05	04.17	101	84.17	14	11.66
6	Seed treatment/soil application of biofertilizer	00	00.00	01	0.83	119	99.17
7	Spacing	55	45.83	65	54.17	00	00.00
8	Intercultivation	97	80.83	23	19.17	00	00.00
9	Nutrient management						
	a. FYM	96	80.00	15	12.50	09	07.50
	b. Basal dose application	00	00.00	120	100.00	00	00.00
	c. Top dressing	00	00.00	00	00.00	120	100.00
10	Application of micronutrients	09	07.50	40	33.33	71	59.17
11	Thinning	111	92.50	09	07.50	00	00.00
12	Inter cropping	27	22.50	93	77.50	00	00.00
13	Crop rotation	110	91.67	10	08.33	00	00.00
14	Chemical weed management	00	00.00	31	25.83	89	74.17
15	Army worm management	00	00.00	73	60.83	47	39.17
16	Turcicum leaf blight management	00	00.00	37	30.83	83	69.17
17	Mechanization for harvesting and threshing for harvesting and threshing	00	00.00	19	15.83	101	84.17
18	Timely harvesting and threshing	113	94.17	07	05.83	00	00.00

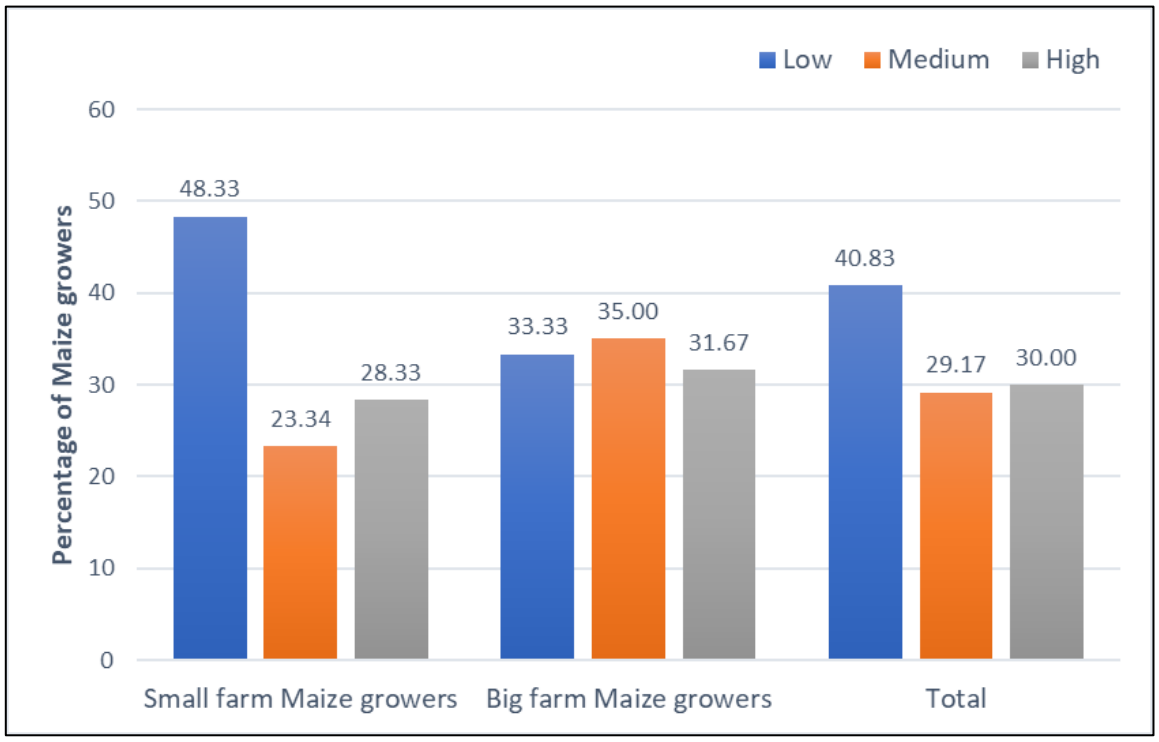

Fig 1: Overall adoption of recommended production technologies by Maize growers

Table 3: Overall adoption of recommended production technologies by maize growers

(n=120)

Adoption level	Small farm maize growers (n_1=60)		Big farm maize growers (n_2=60)		Total (n=120)	
	F	%	f	%	f	%
Low	29	48.33	20	33.33	49	40.83
Medium	14	23.34	21	35.00	35	29.17
High	17	28.33	19	31.67	36	30.00
Mean=20.15 SD= 2.83						

3. Overall adoption of recommended production technologies by maize growers

A close look at Table 3 reveals the overall adoption of technologies by small and big farm maize growers. A majority of small farmers had low (48.33%) to high (28.33%) level of Adoption, followed by medium level of Adoption (23.34%). On the other hand, in case of big farmers, majority of respondents had medium (35.00%) to low (33.33%) level of Adoption followed by high level of Adoption (31.67%). When the pooled sample was considered 40.83 per cent, 30.00 per cent and 29.17 per cent of maize growers possessed low, high and medium level of Adoption respectively. Low level of Adoption (48.33%) was found in case of small farmers compared to big farmers (33.33%) (Fig.1).

The probable reason may be that, lack of knowledge about improved practices, lack of motivation and conviction to use innovations and non-availability of critical inputs at right time. The possible reasons for low level Adoption of the technologies by the respondents may be due to incorrect knowledge of the respondents regarding recommended maize production technologies. This clearly showed that there was immense scope for intensified extension efforts to increase the maize production as well as productivity. This brings to focus the need for strengthening the extension efforts by the concerned extension agency to increase the knowledge and enhance the rate of adoption of recommended production technologies and ultimately reducing yield gap. The findings of the study were in agreement with the findings of Suresh (2009) [5] and Yogita *et al*. (2011) [7].

Conclusion

In order to harvest better yield of the crop, adoption of recommended production technologies by the maize growers is essential. Even with the advancement of improved technology in maize cultivation, it has been observed that either the same has not reached to the field or farmers are reluctant to use this technology. The recommended maize production technologies are being communicated to the maize growers through various extension programmes and activities. However, a wide gap still exists between available technologies and their adoption by the maize growers. Thus, technological gap seems to be a major problem in the way of increasing maize production in India in general and Koppal District of Karnataka in particular. The results revealed that a majority of big farm maize growers had adopted more number of recommended cultivation practices of maize compared to small farmers. Hence, the extension functionaries need to intensify their efforts in increasing the knowledge and adoption level of small farm maize growers particularly through adopting suitable extension strategies and providing critical inputs in time at subsidized rate.

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