



# Assessment of Farmer Knowledge Level about Recommended Production Technology in Maize (*Zea mays*) Crop

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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 research work was conducted in the Darbhanga and Bhagalpur district of Bihar to assess the knowledge level of farmers about recommended maize production technology. The ex-post facto research design was used. Three villages are purposefully chosen for each district and a total of 210 respondents were selected randomly. Results shown that the majority of respondents (40.5%) fall into the 40–54-year age group followed by most the respondents have educational background up to the level of senior secondary. It was observed that most the respondents have farming experience range of 9 -14 years followed by BAO (Block Agriculture Officer) is the most preferred extension exposure by the respondents, most of the respondents had the membership of panchayat. The average knowledge level of respondents is determined by knowledge test which

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contains question regarding different cultivation practices of maize further data from result revealed that the average knowledge level in planting time, soil and land preparation, method of sowing, seed rate and spacing, irrigation management, insect- pest management is higher in Bhagalpur respondents compare to Darbhanga district respondents. Average knowledge level in insect -pest management is low in both districts compare to other cultivation practices.

**Keywords:** Maize production; knowledge; purposefully; interview schedule; knowledge test; spearman's correlation; socioeconomic profile etc.

## 1. INTRODUCTION

Maize, belonging to the Poaceae family, is globally recognized as the Queen of Cereals because of its considerable genetic yield potential. Originating in Central America and Mexico, maize is able to flourish in a variety of agro-ecological situations, which makes it exceptional in its ability to adjust to a wide range of circumstances. In India, maize is a commonly grown crop, with Andhra Pradesh and Karnataka being the main states where it is grown. Maize is also grown in the states of Jammu, Kashmir, and the North East. Bhagalpur has a 26,641-hectare maize crop area with a 140948 metric tonne annually output, whereas Darbhanga has an 8491-hectare maize crop area with a 33082 metric tonne annual production [1]. The intensity of increased maize varieties chosen on plots managed by men, women and households which make their own decisions [2]. The adoption of technology and the benefit cost ratio of improved seed were significantly higher among the improved seed users compared to the local seed users, but the level of technology adoption was not satisfactory for improved seed [3]. The plant protection measure had a significant negative effect on wheat production. Human labor was the major key determinants in barley production, while the bullock labor and plant protection measures were the major determinants in the production of bajara (*Pennisetum glaucum* L.) [4].

## 2. MATERIALS AND METHODS

The research design employed for the present study was the Ex-post-facto research design. For the purpose of carrying out the current investigation, both random and purposive sampling techniques were used. Bhagalpur and Darbhanga districts of Bihar was selected purposefully. Purposefully chosen blocks from each district include Naugachia in Bhagalpur and Bahadurpur in Darbhanga. Three villages are purposefully chosen from each block, totaling six villages from two blocks. A total of 210

respondents are chosen at random from 6 villages, with 35 respondents drawn at random from each village. The analysis of data was done by using frequency, percentage, mean, standard deviation, weighted mean, spearman's correlation.

Knowledge is defined as the technical information that the respondents have regarding the methods used to cultivate the maize crops. A group of items known as questions for a knowledge test were developed. From BAU Sabour's kisan dairy, questions were developed that related to various maize growing practices answers to these queries are of an objective nature and pertain to maize farming methods. The accuracy of the response was assessed in relation to the prepared responses, classed as accurate or wrong, and given a score of 1 or 0. The total of each respondent's correct answers to all of the test items was used to compute their knowledge score.

Knowledge Index =

$$\frac{\text{Actual obtained knowledge score}}{\text{Maximum possible obtained knowledge score}} \times 100$$

## 3. RESULTS AND DISCUSSION

### 3.1 Socio-Economic profile of the Farmers

**Age:**

The findings on the age of the respondents are presented in the Table 1. The data from table revealed that 40.5% of respondents belongs to the age group of 40-54 years, followed by 31.4% of the respondents belongs to the age group of 55-69 years, 22.9% of respondents belong to 25-39 years age group, 5.2% of respondents to the age group of 70-79 years and no respondents belongs to the age group of 80 and above. The study's findings concur with those of [5]. where they found that majority of respondents belongs the age group of 30- 40 years [6].

**Table 1. Distribution of respondents according to their age**

S.NO.	Age	District				Pooled	
		Bhagalpur n <sub>1</sub> =105		Darbhanga n <sub>2</sub> =105		n= 210	
		F	%	f	%	f	%
1.	25-39	22	21.0	26	24.8	48	22.9
<b>2.</b>	<b>40-54</b>	<b>49</b>	<b>46.7</b>	<b>36</b>	<b>34.3</b>	<b>85</b>	<b>40.5</b>
3.	55-69	32	30.5	34	32.4	66	31.4
4.	70-79	2	1.9	9	8.6	11	5.2
5.	80 and above	00	00	00	00	00	00
Total		105	100.0	105	100.0	210	100.0
SD		10.40690		12.71696		11.65538	
Mean		48.1810		50.6095		49.3952	
CV		21.64		25.11		23.58	

**Table 2. Distribution of respondents according to the level of education**

S.NO.	Education	District				pooled	
		Bhagalpur n <sub>1</sub> = 105		Darbhanga n <sub>2</sub> =105		n= 210	
		f	%	f	%	f	%
1.	Illiterate	3	2.9	6	5.7	9	4.3
2.	Functional literate	13	12.4	10	9.5	23	11.0
3.	Primary (1-5 <sup>th</sup> class)	4	3.8	7	6.7	11	5.2
4.	Upper primary (6-8 <sup>th</sup> class)	6	5.7	8	7.6	14	6.7
5.	Secondary (9-10 <sup>th</sup> class)	27	25.7	29	27.6	56	26.7
<b>6.</b>	<b>Senior secondary (11-12<sup>th</sup> class)</b>	<b>38</b>	<b>36.2</b>	<b>31</b>	<b>29.5</b>	<b>69</b>	<b>32.9</b>
7.	Graduate	14	13.3	13	12.4	27	12.9
8.	Graduate and above	00	00	1	1.0	1	0.5
Total		105		105		210	100

### 3.2 Education Level of Respondents

The results about the respondents' education level are shown in Table 2 the data revealed that majority (32.9%) of the respondents have received education up to Senior secondary level, followed by 26.7% up to Secondary level, 12.9% have received education level up to Graduate level, 11.0% respondents have functionally literate followed by 6.7 received education up to upper primary level, 5.2% respondent have primary level of education, 4.3% respondent are illiterate and only 0.5% respondent possess graduation and above level of education. The results of the classification of education levels are consistent with those of [7]. The result from the study factors influencing farmers' adoption of improved technologies in maize production in kujearea council of FCT-abuja, Nigeria revealed that 27% of farmers had secondary level of education [8].

### 3.3 Institutional Membership of Respondents

The distribution of respondents as per their institutional membership is presented in Table 3. It was found that 46.2% respondents are panchayat members followed by 29.5% of respondents which were members of jeevika, FPO members (28.6%) and co-operatives 8.1%.

### 3.4 Farming Experience of Respondents

The findings on the farming experience of respondents are presented in Table 4 the data revealed that majority (21.9%) of respondents have 9 – 14 years of farming experience followed by 15 -20 years farming experience (19.5%), 27

– 32 years farming experience (17.1%), 21 -26 years farming experience (12.9%), 3 – 8 years farming experience (10.5%), 33 – 38 years farming experience (8.1%), 39 – 44 years farming experience (6.2%), and only 3.8% of respondents have more than 45 years of farming experience. Researchers found that the average farming experience of respondents was 24.4 years [9]. On average, farmers had 12 years of hybrid maize farming experience in the study of Factors influencing hybrid maize farmers' risk attitudes and their perceptions in Punjab Province, Pakistan [10].

### 3.5 Extension Exposure of Respondents

The results of extension exposure are shown in Table 5. A four-point scale was employed, and the weighted mean was computed using the various values given to the various replies. The most recent ranking was determined using the weighted mean. It was revealed from the table that BAO (Block Agriculture Officer) rank first with weighted mean 1.45, followed by SMS (Subject Matter Specialist) ranked second with weighted mean 1.16, Ag. university ranked third with weighted mean 0.96, SHG (Self-help group) ranks fourth with weighted mean 0.9, ATM (Assistant Technology Manager) rank fifth with weighted mean 0.46. Kisansalahkar ranks sixth with weighted mean 0.41and BTM (Block Agriculture Officer) ranks last with weighted mean 0.39. Addition to this, spearman's rank correlation was employed to assess the strength and direction of the relationship between two ranked variables with value 0.607. Assistant agriculture officers most frequently contacted by the respondents [11].

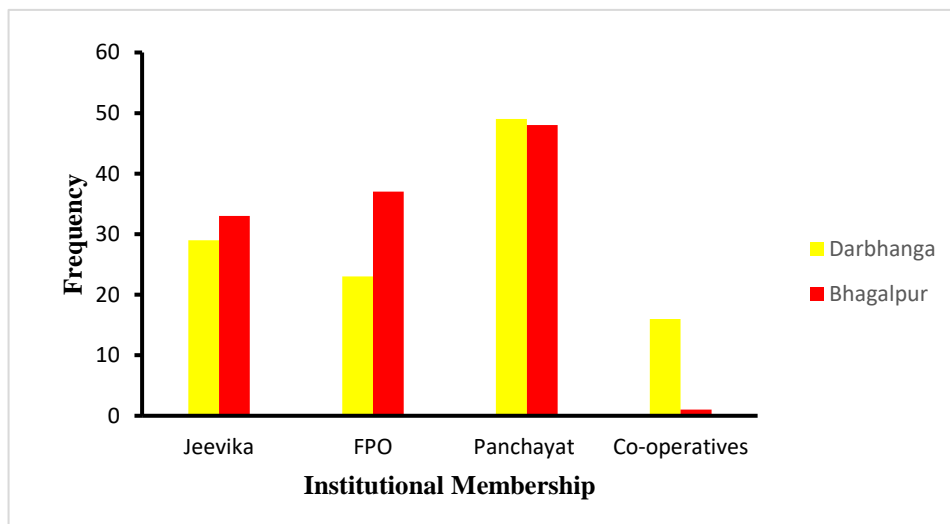


Fig. 1. Distribution of respondents as per their institutional membership

**Table 3. Distribution of respondents as per their institutional membership**

S.NO.	Institutional Membership	District				Pooled	
		Darbhangan <sub>1</sub> = 105		Bhagalpurn <sub>2</sub> = 105		n= 210	
		f	%	f	%	f	%
1.	Jeevika	29	27.6	33	31.4	62	29.5
4.	FPO	23	21.9	37	35.2	60	28.6
5.	Panchyat	49	46.7	48	45.7	97	46.2
6.	Co-operatives	16	15.2	1	1.0	17	8.1

**Table 4. Distribution of respondents as per their farming experiences**

S.NO.	farming experiences	District				pooled	
		Darbhanga n <sub>1</sub> = 105		Bhagalpurn <sub>2</sub> = 105		n= 210	
		F	%	f	%	f	%
1.	3-8 years	10	9.5	12	11.4	22	10.5
2.	9-14 years	19	18.1	27	25.7	46	21.9
3.	15-20 years	17	16.2	24	22.9	41	19.5
4.	21-26 years	13	12.4	14	13.3	27	12.9
5.	27-32 years	17	16.2	19	18.1	36	17.1
6.	33-38 years	11	10.5	6	5.7	17	8.1
7.	39- 44 years	9	8.6	2	1.9	13	6.2
8.	45 and above	9	8.6	1	1.0	8	3.8
TOTAL		105	100.0	105	100.0	210	100.0
SD		13.02742		9.90017		11.84128	
MEAN		24.4857		19.2095		21.8476	
CV		53.2		51.5		54.19	

**Table 5. Distribution of respondents as per extension exposure**

S. NO	Extension exposure	District														Weighted mean	Rank
		Darbhanga n <sub>1</sub> = 105					Bhagalpur n <sub>2</sub> = 105					Pooled n= 210					
		never f %	occasionally f %	frequently f %	regular f %	Rank	never F%	Occasionally f %	frequently f %	regular f %	Rank	never f %	occasionally f %	frequently f %	regular f %		
1.	Kisan salahkar	58.1 (61)	41.9 (44)	00	00	VI	60.0 (63)	40.0 (42)	00	00	VI	59.0 (124)	41.0 (86)	00	00	0.41	VI
2.	SMS	21.9 (23)	43.8 (46)	28.6 (30)	5.7 (6)	II	21.0 (22)	50.5 (53)	21.9 (23)	6.7 (7)	II	21.4 (45)	47.1 (99)	25.2 (53)	6.2 (13)	1.16	II
3.	Ag. university	23.8 (25)	61.0 (64)	11.4 (12)	3.8 (4)	IV	22.9 (24)	61.0 (64)	11.4 (12)	4.8 (5)	III	23.3 (49)	61.0 (128)	11.4 (24)	4.3 (9)	0.96	III
4.	ATM	48.6 (51)	51.4 (54)	00	00	V	59.0 (62)	41.0 (43)	00	00	V	53.8 (113)	46.2 (97)	00	00	0.46	V
5.	BTM	58.1 (61)	41.9 (44)	00	00	VI	62.9 (66)	37.1 (39)	00	00	VII	60.5 (127)	39.5 (83)	00	00	0.39	VII
6.	BAO	20.0 (21)	25.7 (27)	45.7 (48)	8.6 (9)	I	21.0 (22)	22.9 (24)	42.9 (45)	13.3 (14)	I	20.5 (43)	24.3 (51)	44.3 (93)	11.0 (23)	1.45	I
7.	SHG	24.8 (26)	40.0 (42)	35.2 (37)	00	III	44.8 (47)	41.0 (43)	14.3 (15)	00	IV	34.8 (73)	40.5 (85)	24.8 (52)	00	0.9	IV

(SMS- Subject Matter Specialist, ATM – Assistant Technology Manager, BTM-BlockTechnology Manager, BAO - Block Agriculture Officer, SHG- Self-help group)

**Table 6. Distribution of respondents according to their knowledge level in maize**

S.No.	Production technology of maize cultivation	Knowledge level of Darbhanga farmersn <sub>1</sub> = 105	Knowledge level of Bhagalpur farmersn <sub>2</sub> = 105	knowledge level of total respondentsn=210
1.	Planting time	2.54	2.76	2.65
2.	Soil and land preparation	3.05	3.24	3.14
3.	Method of sowing, seed rate and spacing	3.17	3.30	3.24
4.	Nutrient management and seed treatment	3.34	3.30	3.31
5.	Irrigation management	2.98	3.047	3.01
6.	Weed management	2.23	2.13	2.17
7.	Insect-pest management	1.52	1.78	1.65
8.	Disease management	2.82	2.28	2.56
9.	Harvesting practices	3.21	2.82	3.01

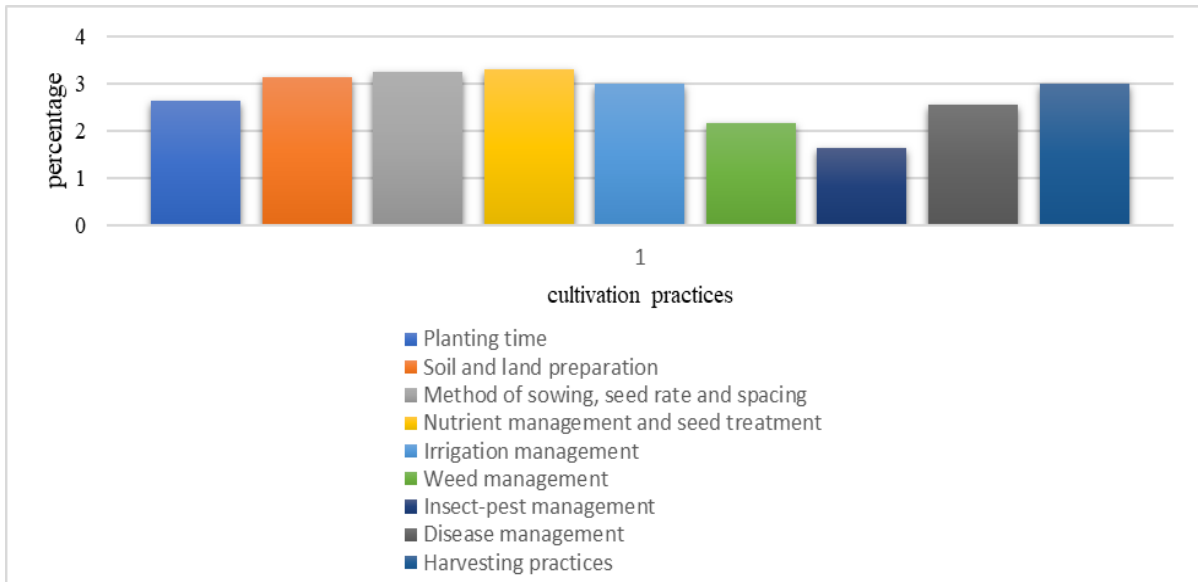


Fig 2. Distribution of respondents according to their knowledge level in maize

### 3.6 Knowledge Level of Respondent about Maize Production Technologies

Result of the study on knowledge level in maize of respondents is presented in the Table 6. The result from the knowledge level of respondents shows that the average knowledge in plant time is 2.54% in Darbhanga district respondents and 2.76% in Bhagalpur district respondents, method of sowing, seed rate and spacing is 3.17% in Darbhanga and 3.30% in Bhagalpur district followed by nutrient management and seed treatment average knowledge level with 3.34% in Darbhanga district and 3.30% in Bhagalpur district, 3.05% of knowledge level in Soil and land preparation of Darbhanga district respondents and 3.24% in Bhagalpur district respondents, 2.98 % of knowledge level in Irrigation management in Darbhanga district and 3.047% in Bhagalpur district, 2.82% level of knowledge in disease management in Darbhanga district and 2.28% in Bhagalpur district, 2.23% knowledge level in weed management of Darbhanga district respondents and 2.13% in Bhagalpur district, 1.52% knowledge level in insect-pest management in Darbhanga district respondents and 1.78% in Bhagalpur district respondents, 3.21% knowledge level in harvesting practice among Darbhanga district respondents and 2.82% in Bhagalpur. Almost same maize cultivation practices was taken to know the knowledge level of respondents [12-14].

### 4. CONCLUSION

It can be concluded from the findings of this study that majority (40.5%) of respondent belongs to the age group of 40 -54 years followed by 32.9% respondents possess senior secondary level of education, 46.2% respondents are having panchayat institutional membership, BAO (Block Agriculture Officer) is most preferred extension contact and 21.9% are having 9 -14 years of farming experience. Result of the study on knowledge level in maize of respondents is presented in the Table 6. The Result from the knowledge level of respondents shows that the average knowledge in method of sowing, seed rate and spacing is 3.24% followed by nutrient management and seed treatment average knowledge level with 3.31%, 3.14% of knowledge level in Soil and land preparation, 3.01% of knowledge level in Irrigation management and in harvesting practices, 2.65% knowledge level in planting time, 2.56% level of knowledge in disease management, 2.17% knowledge level in weed management and 1.65% knowledge level in insect-pest management. Further it is concluded that average knowledge level in planting time, soil and land preparation, method of sowing, seed rate and spacing, irrigation management, insect- pest management is higher in Bhagalpur respondents compare to Darbhanga district respondents and average knowledge level in nutrient management and seed treatment, weed management, disease management and harvesting practices is higher among Darbhanga district respondents compare

to Bhagalpur district respondents. Average knowledge level in insect -pest management is low in both districts compare to other cultivation practices.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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