Farmers' attitude towards modern maize production in Dinajpur Sadar upazila

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ABSTRACT

The vital determination of the study was to determine the farmers' attitudes towards modern maize production. The study was carried out in the Chehelgazi unions of Sadar upazila under Dinajpur District. Ninety-two farmers were selected as sample from an updated list of 920 farmers involved in maize production. Data were collected by a pre-tested interview schedule during September to October 2017. Simple and direct questions with different scales were used to obtain information. The co-efficient of correlation (r) was computed to explore the relationships between the nine selected characteristics of the farmers and their attitude towards modern maize production. About three-fourths (73.9%) of the farmers had highly favorable attitude towards modern maize production, while 26.1% moderately favorable attitude and none of them had slightly favorable attitude towards modern maize production. Correlation analyses indicated that among nine selected characteristics, education, farm size, cosmopoliteness, and extension media contact of the farmers had significant positive relationships with their attitude towards modern maize production. However, age, family size, area under maize production, annual income and training received had no significant relationships with their attitude towards modern maize production. 'Cost of modern maize production is high than other crops' (78.3%) emerged as the 1st ranked problem and last ranked (25.0%) perceived problem mentioned by the farmer was 'Lack of knowledge on hybrid maize variety' expressed by the farmers. The vital (56.5%) suggestion cited by the farmers was 'organizing more training program for the farmers' and 'Application of IPM technique' (28.3%) was last suggestion.

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Introduction

In Bangladesh, rice is the primary food crop, and the crop subsector dominates the agriculture sector. In Bangladesh, 38.42 million metric tons of food crops were produced in the Financial Year 2014–15, of which 34.71 million metric tons were produced by rice alone. This represents the state of rice farming in Bangladesh. Compared to rice, 2.36 million metric tons and 1.34 million metric tons, respectively, were produced of maize and wheat (BBS, 2016). Bangladesh is producing more food overall, but because food crops are not produced in a varied manner, the nation still confronts serious challenges to food security. People suffer because of the nation's extraordinarily high prevalence of both acute and chronic malnutrition, particularly among women and children (Rich *et al.*, 2015). Certain

specialized food crops become scarce due to a lack of agricultural diversification, forcing the nation to import them from outside (Chowdhury *et al.*, 2013). For instance, in the Financial Year 2015–16, Bangladesh imported 2.79 million metric tons of food crops (BBS, 2016).

In light of this, it is becoming clearer that a true breakthrough in crop diversification is required to improve Bangladesh's economy (Baksh, 2003). Despite being a relatively new crop in Bangladesh, maize may be useful to ameliorate this condition (Rahman *et al.*, 2013). A few thousand hectares of land were farmed for modern maize cultivation in the 1970s and 1980s (Ali *et al.*, 2009). Researchers and the government recognized Bangladesh's potential for maize production with

the foundation of BARI (Bangladesh Agricultural Research Institute) in 1976 (Ali *et al.*, 2008). With the exception of the rainy season, maize may be produced nearly year-round on the fertile alluvial soil of the nation, according to CIMMYT (2009).

After 2000, maize became a profitable cash crop, especially for farmers in Bangladesh's northwest and north, where demand for the commodity was enormous and still growing. As a result, the area used for maize cultivation has grown rapidly from 72 thousand acres in the Financial Year 2003–04 to 804 thousand acres in the Financial Year 2014–15 (BBS, 2015). When compared to the other two primary cereal crops, wheat and boro (irrigated) rice, maize has an advantage due to its greater yield rate and profitability (BBS, 2012). The high output of contemporary maize agriculture, with a national mean yield of about 6.58 tons/hectare, is guaranteed by the widespread use of fertilizer and sophisticated irrigation systems (BBS, 2012).

In actuality, though, there aren't many research of this kind in our nation about contemporary maize production. Thus, in Bangladesh, where this research is being conducted, hybrid maize is mostly produced in the winter (Rabi) season (November through March), following the harvest of transplanted aman rice. Furthermore, during the post-winter (Kharif) season (February–May), mostly following the potato harvest, additional land is being planted for maize (Ali *et al.*, 2009). After that, farmers in the Dinajpur District grow maize using one of the two cropping patterns mentioned above throughout the Rabi and Kharif seasons. In the research region, maize is also grown under a different cropping pattern that involves harvesting wheat or mustered crops. However, this pattern is negligible given the extremely small land coverage and output level. As a result, our study mostly ignored the other pattern and focused on the current maize output throughout the Rabi and Kharif seasons. It is notable to notice that in these two cropping patterns, farmers combine various levels of inputs, and as a result, productivity differs dramatically. Regarding these concerns, the researcher thought there was a need to perform research on "Farmers' Attitude towards Modern Maize Production in Dinajpur Sadar Upazila". The study was directed with the following objectives to: i) determine the attitude of farmers towards maize cultivation; ii) explore the relationship between selected characteristics of the farmers with their attitude towards maize cultivation; and iii) identify the problems faced by the farmer in maize cultivation and their probable suggestions to overcome those problems.

Methodology

Locale of the study

The current study was conducted in the Dinajpur district's Chehelgazi union of Sadar Upazila. The Dinajpur district is divided into 13 upazilas. Sadar upazila is a significant agricultural upazila that cultivates rice, wheat, maize and vegetables extensively. The majority of the population works in agriculture. The locale of the research is located at latitudes 25°30′ to 25°45′ north and longitudes 88°30′ to 88°45′ east. This upazila is bordered to the north through Khansama and Kaharole upazila within side the Dinajpur district, to the south through West Bengal, to the east through Chirirbandar upazila, and the west through Biral upazila.

Population and sample

Dinajpur Sadar upazila of Dinajpur district became purposively decided on because of the investigator`s familiarity with the area, language and way of life of the people. There are ten unions in Sadar upazila amongst which the Chehelgazi union became decided on with the aid of using random sampling procedure. The Chehelgazi Union includes 29 villages. From 29 villages, 6 villages have been decided on with the aid of using random sampling procedure. An up to date listing of 920 maize farmers from six villages became gathered from upazila agriculture workplace of Sadar upazila of Dinajpur district. Out of them, a pattern of ninety-two farmers (10%) became decided on with the aid of using random sampling method. Simultaneously, a reserve listing of nine farmers became made so that you can use the sampled farmers in case of non-availability. The detailed distribution of population and sample is shown in Table 1.

Table 1. Village wise distribution of the population and sample.

Name of the village	Population	Sample	Reserve list
Kornai	130	13	1
Katapara	180	18	2
Hajipara	150	15	1
Ekbarpur	185	19	2
Mostofabud	125	12	1
Noshipur	150	15	2
Total=	920	92	9

Research instrument

The questions and statements contained in the schedule were simple, direct and without issue understandable thru manner of the respondents. The schedule contained a closed form of questions. A draft interview schedule has become prepared in advance than using the same for collection of information. The draft schedule turned into pre-examined, and 10 respondents have been determined on from the located area. This pre-test facilitated the researcher to find out faulty questions in the draft schedule and important corrections, additions and modifications have been made afterwards in the schedule based on the pre-test results.

Measurement of focus issue

Farmers' attitude towards modern maize production was the focus issue. This focus issue was measured by Likert scale (Likert, 1932). Ten statements on various aspects of modern maize production finally selected and asked to the respondents. The number of positive statements was 5 and negative statements were also 5. The positive and negative items were organized randomly in the schedule in order to facilitate the respondents' real attitudes to be revealed. The respondents have been asked to suggest for each statement whether or not or now no longer they strongly agree, agree, undecided, disagree and strongly disagree with a corresponding score of 5, 4, 3, 2 and 1 for the positive statements and vice-versa for the negative statements.

The score of a farmers' attitude towards positive and negative statements of modern maize production was computed by summing his/her responses to all the items. Hence, scores of the respondents could range from 10 to 50 where 10 indicate a highly unfavorable attitude and 50 highly favorable attitudes towards maize production. Besides, Rank Order (RO) was prepared by calculating the Attitude Index (AI). The following formula were followed in calculating AI:

Attitude Index (AI) for positive statements = $F_{SA} \times 5 + F_A \times 4 + F_U \times 3 + F_D \times 2 + F_{SD} \times 1$

Where,

F_{SA}= Frequency of respondents stated 'strongly agreed'
F_A= Frequency of respondents stated 'agreed'
F_U= Frequency of respondents stated 'undecided'
F_D= Frequency of respondents stated 'disagreed'
F_{SD}= Frequency of respondents stated 'strongly disagreed'
Attitude Index (AI) for negative statements = $F_{SA} \times 1 + F_A \times 2 + F_U \times 3 + F_D \times 4 + F_{SD} \times 5$

Where,

F_{SA}= Frequency of respondents stated strongly agree
F_A= Frequency of respondents stated agree
F_U= Frequency of respondents stated undecided
F_D= Frequency of respondents stated disagree
F_{SD}= Frequency of respondents stated strongly disagree

The Attitude Index (AI) value may want to variety from 92 to 460. This indicates that 92 to begin with much less favorable and 460 indicated notably favorable attitude.

Measurement of selected characteristics of the farmers

Nine characteristics of the respondents namely age, education, family size, farm size, area under maize production, annual income, training received, cosmopoliteness, and extension media contact were considered as independent variables of this study. The selected characteristics were measured were measured following ordinary processes.

Measurements of problems and suggestions in modern maize production

The farmers asked to say problems of present day maize production and additionally asked to say the possible solution of those problems. In this case, an open-ended question developed to collect information. Then, the stated problems and suggestions ranked on the premise of the variety of frequencies within side the respective areas.

Data processing and analysis

First, the accrued data had been coded, concise and controlled for analysis. All probably mistakes and contradictions were removed to authenticate the data. Then the accrued records had been analyzed with computer-primarily based totally software - SPSS (Statistical Package for Social Sciences) version 22, and tables and graphs had been organized with MS Excel (Microsoft Excel 2010).

Results and Discussion

Farmers' attitude toward maize production

The attitude of farmers towards modern maize production scores ranged from 20 to 46, whereas the expected scores ranged from 10 to 50. The mean of the farmer's attitude being 37.91 with a standard deviation of 5.73. Based on the detected attitude scores, the farmers were classified into three categories: "slightly favorable" (≤17), "moderately favorable" and (18-34), "highly favorable" (>34).
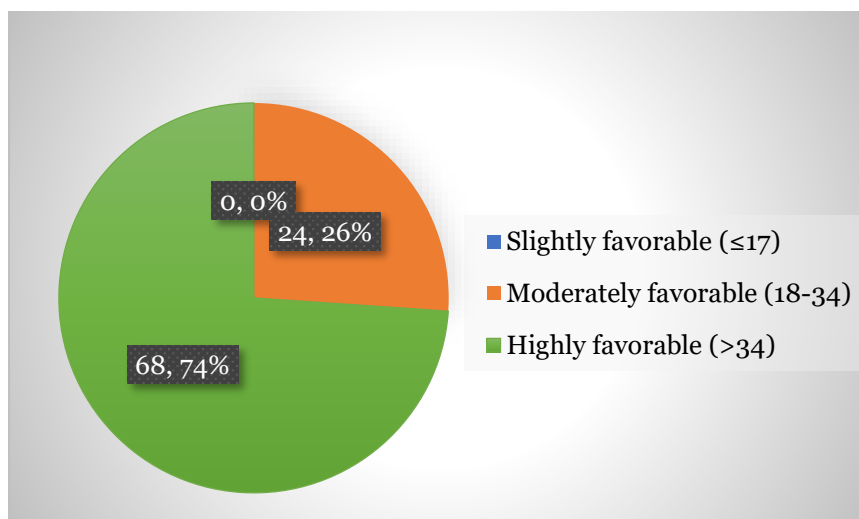
Fig. 1. Overall distribution of the farmers according to their attitude towards maize production.

Results existing in Figure 1 indicate that about three-fourths (73.9%) of the farmers had highly favorable attitude towards modern maize production while 26.1 percent moderately favorable attitude and there are no farmers under slightly favorable attitude towards modern maize production. It is found that whole (100.0%) of the farmers showed moderately favorable to highly favorable attitudes towards modern maize production. In Bangladesh, maize is becoming a more common field crop as output rises. However, farmers lack some technological expertise in maize production. The market price for maize is adequate for the farmers, and the yield is high. Farmers are, therefore, more interested in growing maize.

Rank order and attitude indices of the attitude of farmers towards modern maize production shown in Table 3. The weights allotted for the responses were the same for all the statements. The score ranged from 460 to 92 for positive responses and for negative responses vice-versa.

Table 2. Rank order of attitude indices towards maize production.

Sl. No.	Statements	Frequency of the Respondents					AI	RO
		SA	A	U	D	SD		
1. (+)	Production and price of maize is high, so the production of maize is profitable rather than other crops production.	56	33	0	1	2	416	1th
2. (-)	At present inputs for maize are high in cost, so modern maize production is not profitable.	22	22	6	35	7	259	4th
3. (+)	As yield of maize is high and food security is a crucial issue, therefore, modern maize production can play a very important role in present day for food security.	27	48	5	10	2	364	3rd
4. (-)	So far, I know maize is C_4 plant that is why they uptake more nutrients, so high input is required for maize production.	7	29	9	36	11	291	9th
5. (+)	As maize is cultivated like other field crops, so it has no adverse effect on the environment.	19	45	9	14	5	335	8th
6. (-)	The nutrient uptake rate of maize from soil is high therefore, if proper organic matter is not provided then soil quality is adversely affected.	4	15	7	40	26	345	6th
7. (+)	Unemployment problems can be solved in the local community through maize production.	36	35	9	10	2	369	2nd
8. (-)	More intercultural operation is required for modern maize production so it is more laborious than other crop production.	2	22	5	33	30	343	7th
9. (+)	As modern maize production increases the income of the farmers per unit of land, so it helps to improve the economic status of the farmers	61	24	3	2	2	416	1th
10. (-)	Transpiration rate in maize plant is very high, therefore it requires more irrigation. Fulfillment of high irrigation demand discourages farmers from cultivating maize.	4	13	11	34	30	349	5th

SA=Strongly Agree; A= Agree; U= Undecided; D= Disagree and SD= Strongly Disagree; AI= Attitude Index and RO= Rank Order

Findings contained in Table 2 reveal that the statements "Production and price of maize is high so, production of maize is profitable rather than other crops production" and "As modern maize production increase the income of the farmers from per unit of land, so it helps to improve the economic status of the farmers" are the jointly first ranked statements in the attitude index table having AI value of 416. This is because the maize yield is high and profit is high. Therefore, ultimately improves their socio-economic status. "Unemployment problems can be solved in the local community through maize production" had AI value of 369 and ranked 2. Data also revealed that the statement "So far I know maize is C_4 plant that is why they uptake more nutrients, so, high input is required for maize production", "As maize is cultivated like other field crops, so it has no adverse effect on the environment", and "More intercultural operation is required for modern maize production so it's laborious than other crop production" are the last three ranked statement in the attitude index table having AI value of 291 (9th), 335 (8th) and 343 (8th), respectively.

Selected characteristics of the farmers

Less than half (40.2 percent) of the farmers were middle aged. Slightly less than three-fourths (70.6%) of the farmers were young to middle aged. Young people are commonly attentive to new thoughts and belongings. They have a promising attitude towards annoying innovative ideas or technologies. The highest proportion (29.3%) of the farmers are secondary level. The overwhelming majority (56.5%) of the farmers had an education ranging from can sign only to secondary level. Education helps individuals become rational, conscious and get useful information to resolve their day-to-day working difficulties through different sources of information. It might help to progress their knowledge of maize production. Slightly above three-fifths of the farmers, 65.2% had medium sized families. The national average family size in Bangladesh is 4.3 (BBS, 2017), which was near the

mean value of the present study (5.15). It is quite logical that the prevalence of the joint family system in the study area might have also contributed to the large family size. Slightly above three-fifths (62.0%) of the respondents were small farm sized. Farm size of the people is lowering every day because of land fragmentation thru era to era. In order to have an inexpensive widespread of living, those farmers ought to have excessive crop yields per hectare and increase their production intensity. Data showed that more than half (55.4%) of the farmers were under marginal group. The overwhelming majority (90.2%) of the farmers had marginal to small maize cultivating areas. The majority (78.3%) of the farmers had medium income. Slightly above three-fifths (63.0%) of the farmers had no training received. It additionally proved that there might be constantly a dating among training received and alternate in mindset in the direction of modem technologies. The training develops the farmer's knowledge, abilities, and attitudes in an advantageous manner. The findings advise that training experience is probably the most vital aspect for the respondents to alternate their mindset in the direction of modern maize production. Near about half, a proportion (48.9%) of the farmers had medium cosmopoliteness. People range of their visiting behavior. Despite the innate traits of visiting behavior, maximum of the humans nowadays, inside the rural community, are very alarmed about their basic needs and that they considerably go to different locations on occasion due to the fact in maximum instances there is right communication network. The communication system, in maximum instances in Bangladesh, is growing day through day. Therefore, the farmers of the country have a possibility to go to space-to-space. Majority (65.2%) of the farmers had low extension media contact. This can be because of the motive that the respondents do now no longer touch extra strongly with specific extension media.

Table 3. Main features and categorization of the farmers (n=92).

Characteristics	Scoring method	Range		Categories	Respondents		Mean	SD
		Possible	Observed		No.	Percent		
Age	No. of year	Unknown	19-68	Young (≤35)	28	30.4	43.77	13.14
				Middle aged (36-50)	37	40.2		
				Old (≥51)	27	29.4		
Education	Year of schooling	Unknown	0-16	Illiterate (0)	17	18.5	6.43	5.52
				Can sign only (0.5)	17	18.5		
				Primary (1-5)	8	8.7		
				Secondary (6-10)	27	29.3		
				Higher secondary (11-12)	11	12.0		
				Above higher secondary (≥13)	12	13.0		
Family size	No. of Members	Unknown	3-9	Small (1-4)	28	30.4	5.15	1.37
				Medium (5-7)	60	65.2		
				Large (>7)	4	4.4		

Farm size	Hectare	Unknown	0.14-4.11	Marginal (<0.21)	3	3.3	1.08	0.84
				Small (0.21-1.0)	57	62.0		
				Medium (1.01-3.0)	27	29.3		
				Large (>3.0)	5	5.4		
Area under maize production	Hectare	Unknown	0.06-2.02	Marginal (0.06-0.33)	51	55.4	0.36	0.27
				Small (0.34-0.61)	32	34.8		
				Medium (>0.61)	9	9.8		
Annual income	('000' Tk.)	Unknown	67.10-1024.00	Low (≤99)	6	6.5	257.12	158.44
				Medium (99.01-415)	72	78.3		
				High (>415)	14	15.2		
Training received	Days	Unknown	0-180	No (0)	58	63.0	7.29	32.14
				Short (≤3)	20	21.7		
				Medium (4-7)	9	9.8		
				Long (>7)	5	5.5		
Cosmopoliteness	Score	0-18	3-16	Low (≤6)	43	46.7	6.73	2.58
				Medium (7-12)	45	48.9		
				High (>12)	4	4.4		
Extension media Contact	Score	0-30	2-24	Low (≤10)	60	65.2	9.86	5.21
				Medium (11-20)	26	28.3		
				High (≥21)	6	6.5		

Relationship between the selected characteristics of the farmers with their attitude towards modern maize production

The co-efficient of correlation was computed in order to explore the relationships between each of the selected characteristics of the farmers and their attitude towards modern maize cultivation. The relationships between each of the selected characteristics of the farmers and their attitude towards modern maize production are shown in Table 4.

Table 4. Correlation between focus issue and selected characteristics.

Focus Issue	Selected Characteristics	Correlation value of 'r' with 90df
Attitude of farmers towards maize production	Age	0.017
	Education	0.233[*]
	Family size	-0.067
	Farm size	0.206[*]
	Area under maize production	0.110
	Annual income	0.183
	Training received	0.107
	Cosmopoliteness	0.211[*]
	Extension media contact	0.214[*]

*** Correlation is significant at the 0.01 level and * Correlation is significant at the 0.05 level*

The relationship between education and attitude of farmers towards maize cultivation was statistically significant, with 90 degrees of freedom at 0.05 level of significance. Similar findings were also observed by Rahman (2015), Hossain (2015), Husna (2014) and Rashid (2014). Farm size of the farmers had a positive significant relationship with their attitude towards maize production. Similar findings were also observed by Hossain (2015), Rabby (2014) and Khan (2012). Cosmopoliteness had positive significant relationships with their attitude towards maize production. Similar findings were also observed by Chawdhury (2015) and Samad (2010). Extension media contact of the farmers had positive significant relationships with their attitude towards maize production. Similar findings were also observed by Rahman (2015), Chawdhury (2015), Rabby (2014) and Rashid (2014). Age, family size and area under maize production, annual income and training received had no significant relationships with their attitude towards maize production. In case of age similar findings were also observed by Ahmed (2013) and Khan (2012).

Problems and suggestions

Farmers may face numerous problems that hamper maize production. For easy thoughtful of the problems faced by the farmers and the suggestions to overawed the problems given are listed in this section, with their percent presented by the following figure.

Problems faced by the farmers in maize production

The researcher attempted to identify the various problems in modern maize production which are presented below (Fig. 2).
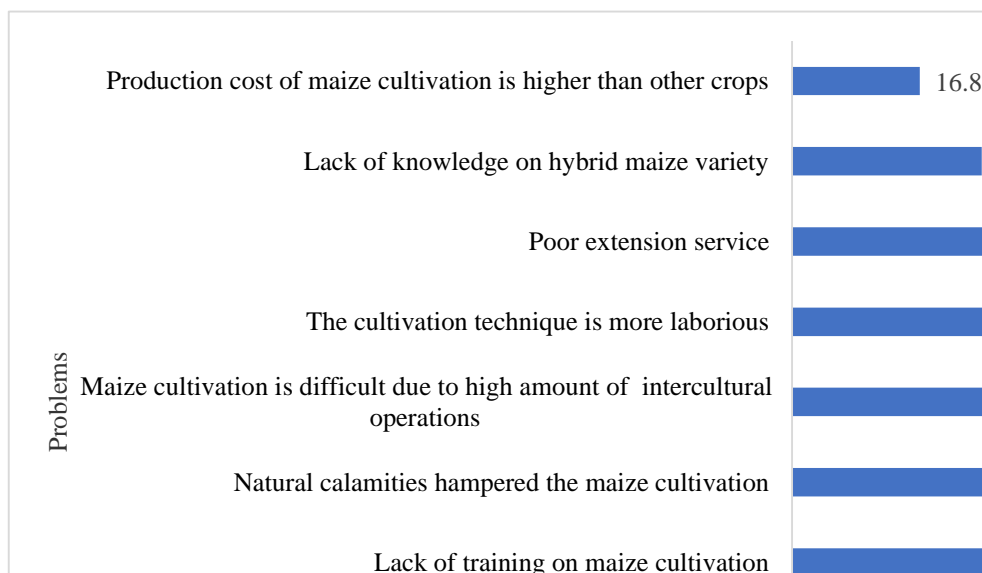
Int. J. Agril. Res. Innov. Tech. 14(1): 96-103, June 2024

101

Fig. 2. Problem faced by the farmers in maize modern production.

It is obvious from the data contained in figure 2 that 'Production cost of modern maize production is higher than other crops' (78.3%) emerged as the most important problem stated by the farmers. The result may be due to the modern maize production needs more input and intercultural operation. 'Maize is highly infested by insects and diseases' (63.0%) was the second most common problem perceived by the farmers. It is because they have low knowledge on preventive measures from these insects and diseases. The last two perceived problems mentioned by the farmer were 'Lack of knowledge on hybrid maize variety' (25.0%) and "Poor extension service" (30.4%). This might be due to that the extension service is very poor in the study area. They have fewer sources for the collection of information about maize production.

Suggestions offered by the farmers for overcoming the problems

Numerous suggestions were offered by the farmers to overcome the problems in modern maize production. These are given in Figure 3.
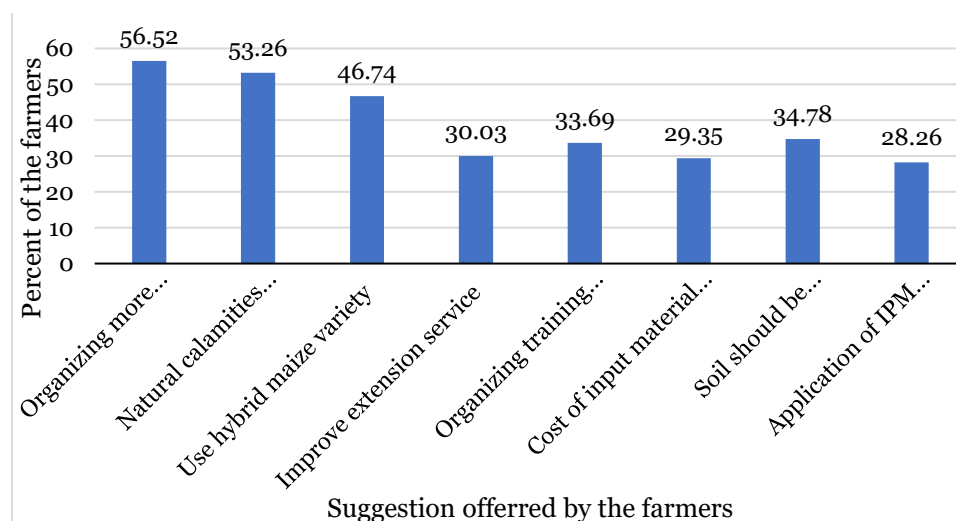

Fig. 3. Suggestions offered by the farmers to overcome the problems in modern maize production.

It is noted from the results shown in figure 3 that the foremost (56.5%) suggestion cited by the farmers was 'organizing more training program for the farmers. This implies that more will be the training more will be information collected by the farmers. Training programmes are more helpful in enhancing farm knowledge to them. 'Natural calamities tolerant variety production' was the second most important (53.3%) suggestion offered by the farmers. This is because more the farmers are affected by different Natural calamities such as drought, flood, and storm etc. 'Application of IPM technique' (28.3%) was suggested by the farmers as the last suggestion. The result might be due to that the IPM is environment friendly technique for pest and insects management. The 2nd last suggestion was "Cost of input material should be kept in a level of farmers purchasing" (29.4%). This is because most of the farmers are not economically solvent.

Int. J. Agril. Res. Innov. Tech. 14(1): 96-103, June 2024

102

Conclusion

Nearly three-fourths (73.9%) of the farmers had a very positive outlook on the cultivation of maize. It is feasible to conclude that unless the necessary authorities (GOs and NGOs) take appropriate action to change farmers' attitudes towards maize production, there will not be a major improvement in maize output. Most farmers (56.5%) had only completed high school or could hardly read and write. It may infer that educating the study region would help people have a good attitude towards new agricultural technology. It would also assist extension providers in showing, sharing, training, and inspiring farmers to use the right technologies. Among the nine selected characteristics, education, farm size, cosmopoliteness, and extension of media contact among the farmers had significant positive relationships with their attitude towards maize production. It may, therefore, be concluded that the above traits of the farmers considerably contribute to growth maize production. Age, family size and area under maize production, annual income and training received had no significant relationships with their attitude towards maize production. This indicates that attitude towards maize production, and above characteristics of the farmers is independent to each other. The maize farmers are facing different problems in cultivating maize. They also opined some suggestions to overcome them. Therefore, it can be concluded that important problems must be considered, and proper initiatives should be taken in this regard.

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