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ATTITUDE OF THE SMALLHOLDER FARMERS OF DINAJPUR DISTRICT TOWARDS MODERN MAIZE PRODUCTION

MA Islam*, MA Rahman and S Deb

Department of Agricultural Extension Education, Sylhet Agricultural University, Sylhet, Bangladesh

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Abstract

The main objective of the study was to determine the attitude of the smallholder farmers towards modern maize production and to explore the relationships between the selected characteristics of the maize growers and the attitude. The study was conducted in three villages under Goaldihi union of Khansama upazila of Dinajpur district. Data were collected from 50 maize growers randomly selected as sample from a population of 93 growers of three selected villages by using a pretested well-structured interview schedule from 1 October to 30 November, 2018. Attitude was measured through 30 items constructed on cognitive, affective, conative and evaluative psychology of growers towards the modern maize production. Results revealed that majority (70%) of the growers had moderately favorable attitude towards modern maize production followed by 16% less favorable and only 14% had highly favorable attitude. The results also revealed that attitude of smallholders was mainly influenced by their cognition (AI=38.0 scores), conation (AI=35.75 scores), evaluation (AI=24.21 scores) and affection (AI=13.16 scores) to modern maize production. Precisely, high profit, facilitated family nutrition, source of livestock feed and rich source of fuel straw for family consumption had substantial influence on such attitude. The result of Pearson's product moment correlation co-efficient 'r' showed significant positive association between the education, annual income, profit gained, cosmopoliteness, use of communication media and the attitude of smallholder farmers towards modern maize production cognitive.

Keywords: Attitude, Modern maize production, Small holder farmer

Introduction

Bangladesh is first and foremost an agricultural based country restrained by crop production and has been reputed for growing large variety of tropical crops particularly rice, wheat, maize, jute, pulses, oilseeds, sugarcane etc. where maize is one of the utmost indispensable cereal crop and it is one of the foremost crop in the world. In terms of area and production, it ranked third major cereal crop after rice and wheat in Bangladesh (BBS, 2012). Amongst the developing countries maize rank first in Latin America and Africa but third after rice and wheat in Asia (Dowswell *et al*., 1996). As the demand for maize crop has been shifting increasingly in the world, particularly in the developing countries, its requirement also increased from 282 million tons in 1995 to 504 million tons in 2020 (Pingali and Pandey, 2000). Maize was grown in Bangladesh, on approximately 0.36 M ha in 2012–2013, largely through the replacement of pulses, oilseeds and wheat (FAOSTAT, 2015). The area under maize cultivation is increasing steadily due to ready market, remunerative price, low cost of production and overall higher-profitability compared to that of rice and wheat. In order to face frequent food shortage, malnutrition and to save the heavy drainage of foreign currency required for importing of food grains, it is essential to increase agricultural production where maize can play an important role in the agrarian economy of Bangladesh. High profitability of maize cultivation continued to incentivize the farmers to produce more maize. Production of maize rose significantly, registering a 23.7 per cent growth (BBS, 2017). Maize can be cultivated in three cropping seasons: Rabi (Nov-Feb), Kharif-1 (March-June), and Kharif-2 (July-Oct). Production of maize by small holder farmer may vary on the attitude level (low, medium, high) of the farmers and DAE, some NGOs and international organization like CIMMYT, FAO etc. have taken strong interest to build positive attitude because of its extensive use in poultry, fish, textile, industries and as fuel etc. Since smallholder farmers are the inevitable drivers of Bangladesh agriculture and constitute large share of the farming community about20 million people having farm size ranging from 5 decimals to 250 decimals. Their actual attitude towards maize production matters to understand necessary steps need for boosting production of this crop.

***Corresponding author: MA Islam,** Department of Agricultural Extension Education, Sylhet Agricultural University, Sylhet-3100, Bangladesh. Email: maislam.aext@sau.ac.bd*

Materials and Methods

The study was conducted in three villages namely Bara Fatehpur, Batupara and Chandgara of Goaldihi union of Khansama upazila under Dinajpur district. A total of 93 small holder maize farmers (farm size up to 1.0 ha) of the selected villages constitute the population from which 50 were taken as sample for the study following simple random sampling method. By using a pretested well -structured interview schedule data were collected from the sample farmers during the period from 1 October to 30 November, 2018.

Attitude was measured through 30 statements constructed on cognitive, affective, conative and evaluative thinking about modern maize production of the farmers. There were 16 were positive and 14 negative. Scoring for each positive statement was done on the basis of response of the respondent by assigning +2, +1, 0, -1, and -2 to the five alternative responses as "strongly agree", "agree", "undecided", "disagree", and "strongly disagree", fashion ('Attitude Scales - Rating Scales to measure data', n.d.). Reverse score was assigned for a negative statement. However, attitude towards modern maize cultivation of a farmer was obtained by summing up his/her scores for all the thirty statements in the interview schedule. Attitude score, thus obtained for a respondent could range from -60 to 60. Attitude Index (AI) was calculated for each item by adding all responses for a particular item of the 50 respondents. Rank order for each of the 30 items was made based on AI scores of the items.

Results & Discussion

Attitude refers to one's favorable and unfavorable feelings, beliefs and actions towards a concept. The mean scores of attitude of the respondents was 40.99 and standard deviation of 5.46. Table 1 shows that more than two thirds (70%) of the respondents had a medium favorable attitude followed by 16% had low favorable attitude and only 14% had highly favorable attitude towards modern maize production. A favorable attitude may help to make the practice of maize long lasting.

Table 1. Distribution of the respondents on the basis of their attitude towards modern maize cultivation.

Attitude level	Respondents		Mean	Standard deviation	Range
	Number	Percent			
Low favorable attitude (Up to 36)	16	16	40.99	5.46	-48 to 58
Medium favorable attitude (36.01 to 46)	70	70			
Highly favorable attitude (>46)	14	14			
Total	50	100			

Following modern method in maize cultivation farmers can harvest not only higher yield but also higher profit than traditional method. But any deviation in applying inputs or performing intercultural operations may result in poor yield of the crop is the vital risk of modern cultivation. Islam (2017) in this regard reported that older farmers are more resistant in adopting a new technology. As attitude is the precursor of adoption of any practice, method, and technology; favorable attitude towards modern method of maize production indicates that they have tendency to adopt modern maize production method. However, Table 2 shows that out of four components for attitudinal development of the respondents towards modern method of maize production, cognitive component had the highest average value (38.0, average scores of six items included under this component) followed by conative (35.75), evaluative (24.21) and affective components (13.16). This apparently significant stance towards modern maize production method might have been attributed by two reasonable issues-one is urge to fulfill family nutrition, and another is getting high amount of straw from maize plants. It is mentionable that maize straw is used as fuel for cooking in the rural areas.
However, among 30 statements arranged under four components of attitude (Table 2), the top five statement were related to (i) profitability (item-17), (ii) family consumption and nutrition (item-15), (iii) inputs for household cattle rearing (item-6), (iv) laborer requirement (item-28), and (v) use of byproducts (item-13).

Table 2. Rank order of the statements constructed on cognitive, affective, conative and evaluative psychology towards different aspects of modern maize production

Statements		AI	Rank order
Cognitive	+1. It is possible to integrate maize with other crops.	27	19
	-2. Modern maize production is very much sensitive to irrigation.	33	16
	+3. More tillage of maize field can reduce the infestation of disease and insect attacks.	37	13
	+4. Increase of maize production depends on facility to marketing the product.	28	18
	-5. Practice of a recommended prescription for modern maize production is very complex.	47	8
	+6. Maize production enhances smooth supply of cattle feed.	56	3
	Average	**38.0**	
Affective	7. I believe practice of modern maize cultivation is only be possible for educated farmers.	38	25
	-8. I believe, only the rich can afford such huge investment for modern maize production.	-18	24
	-9. I believe that if neighboring farmers do not come forward to adopt modern maize production method, I will not continue maize farming.	-16	15
	-10. I feel scared about modern maize due to absence of ready market.	45	10
	-11. I believe that traditional maize variety is much tasty than high yielding modern variety.	-12	7
	+12. I believe that all the required intercultural operations for modern maize production can easily be done by the local people.	42	12
	Average	**13.16**	
Conative	+13. I prefer maize production as it gives high amount of fuel straw.	52	5
	-14. I avoid modern maize production because necessary inputs are not available locally.	8	27
	+15. Farmers adopt modern maize production for fulfilling family nutrition.	57	2
	-16. I avoid integrated farming of maize with other crop.	26	20
	Average	**35.75**	
Evaluative	+17. Modern maize production is highly profitable.	58	1
	+18. Farmers can get more production through cultivating modern maize.	46	9
	+20. Production of maize can be possible in fallow land.	36	14
	-21. Cost of production in modern maize cultivation is relatively high.	20	22
	-22. There is no difference between traditional variety and high yielding variety of maize in gaining profit.	-30	17
	-23. Maize takes more time to harvest than other crop.	50	6
	-24. More production cost and time needed for better tillage operation.	19	23
	+25.Organic fertilizer can increase the production of maize.	23	21
	-26. Soil fertility decreases by modern maize production.	15	26
	+27. Seeds of modern variety can be stored as long time as the traditional variety.	19	23
	+28. More care is not necessary for modern maize production.	53	4
	+29. Storability of modern maize seed is so high.	43	11
	+30. Modern maize production is environment friendly.	15	26
	+30. Less chemical insecticide is required for maize production	-30	17
	Average	**24.21**	

Source: Author's estimation based *on field survey, 2018*

Attitude of the farmers towards modern maize production

Modern maize production includes the use of high yielding/hybrid variety, application of recommended dose of different inputs like chemical fertilizers, chemicals for insect pest control and timely conduction of intercultural operations.

Profile of the small holder farmers

There are many interrelated and constituent attributes that characterize an individual and form an integral part on the development of one's behavior and personality. It was, therefore assumed that attitude towards modern maize cultivation will be influenced by their various characteristics (age, education, family size, annual income, area under maize cultivation, potential area under maize cultivation, cost of production, profit gained, organizational participation, cosmopoliteness, innovativeness, knowledge, use of communication media and constraints faced by the farmers).

Data contained in Table 3 revealed that majority (66%) of the respondents were middle aged (29 to 52 years), with the average of 47.65 years and standard deviation of 10.84. As young and middle aged farmers are more enthusiastic to adopt new technology, medium favorable attitude of 70% respondents towards modern maize cultivation can be explained by the profit gained from modern maize production, mitigating family nutrition need through increased production, facilitated livestock rearing by using maize plants as fodder, less labor requirement and dried straw, byproduct of maize can be used as fuel.

In contrast, though education develops mental and psychological ability of a person to understand, decide, and also develops positive attitude of a farmer towards modern maize production, most of the farmers (46%) of the study area had only primary education. The data indicate that average family size (5.84) of the farmers were higher than the national average of 4.44 (BBS, 2013). Data revealed that majority of the farmers (70%) had medium income and only 17% had higher annual income in this study area where most of them (82%) hold medium area under maize production while 14% of them had large potential area for maize production.

On the other hand, the majority (81%) of the respondents had medium cost of production, and 82% had termed their profit as medium (Table 3). So, more profit can be gained by taking more area under production of maize. In the study area, 45% of the respondents had no participation to the organization in contrast, 55% had medium to least organizational participation. An overwhelming majority (87%) of the respondents had medium to high cosmopoliteness that helps to improve outlooks of the farmers for which they started to consider modern method of maize production as good despite higher production cost. It is evident from Table 3, that the highest proportion (71%) of the maize farmers had medium innovativeness as they (82%) had medium to high level of knowledge on modern method of maize production, and 88 % had low to medium use of communication media. Regarding problems in practicing modern maize production, 50% had moderately severe problems, 36% severe to highly severe problems. Billah (2013) also found in his study that, the highest portion of the respondents had faced medium constraints in adopting their farming practices.

Table 3. Socio-economic characteristics of the farmers

Attributes	Categories	Percent	Mean	Standard Deviation
Age	Young (up to 28 years)	13	47.65	10.84
	Middle-aged (29 to 52 years)	66		
	Old aged (> 52 years)	21		
Education level	No education (0 score)	21	8.83	4.74
	Primary (1-5 score)	46		
	Secondary (6-10 score)	23		
	Above secondary (above 10)	10		
Family size	Small family (up to 5)	23	5.84	1.81
	Medium family (6-8)	64		
	Large family (above 8)	13		
Annual family income (0.000 TK)	Small (Tk. 104-669 thousand)	13	716.81	337.78
	Medium (Tk. 670-1234 thousand)	70		
	High(> Tk. 1234 thousand)	17		
Area under maize cultivation	Small area (up to1.07 ha)	82	0.75	0.66
	Medium area(1.08-2.05 ha)	12		
	Large area(>2.05 ha)	06		
Potential area of maize cultivation	Small area (0.30-2.22 ha)	85	1.41	1.14
	Medium area (2.23-4.14)	12		
	Large area (above 4.14)	06		
Cost of production	Low cost (up to Tk. 86.0 thousand)	11	85.5	7.61
	Medium cost (Tk. 87-92 thousand)	81		
	High cost (above Tk. 92 thousand)	8		
Profit	Low profitable (up to Tk. 81 thousand)	8	74.6	14.1
	Medium profitable (Tk. 82-114 thousand)	82		
	High profitable (above Tk. 14 thousand)	10		
Organizational participation	No participation (0 score)	45	0.89	0.95
	Least participation (1 score)	34		
	Low participation (2 score)	15		
	Medium participation (3 score)	6		
Cosmopoliteness	Low Cosmo-politeness (up to 10 scores)	13	19.54	4.12
	Medium Cosmo-politeness (11 –20 scores)	67		
	High Cosmo-politeness (above 20 scores)	20		
Innovativeness	Low innovativeness (up to 21 scores)	18	25.19	3.85
	Medium innovativeness (22 – 27 scores)	71		
	High innovativeness (above 27 scores)	11		
Knowledge on maize cultivation	Low (up to 26 scores)	18	29.71	3.10
	Medium (27-31 scores)	60		
	High (above 31 scores)	22		
Use of communication media	Low (up to 25 scores)	21	26.14	8.14
	Medium (26-38 scores)	67		
	High (above 38 scores)	12		
Problems faced by the farmer in practicing modern maize production	Not severe (up to 15 scores)	14	22.67	5.71
	Moderately severe (16-22 scores)	50		
	Severe (23-30 scores)	19		
	Highly severe (above 31)	17		

Correlation between the selected characteristics of the respondents with their attitude towards modern maize cultivation

Each of the characteristic of the farmers constituted the independent variables while their attitude towards modern maize cultivation was the dependent variable of this study. Pearson's Correlation Co-efficient 'r' was used to test the null hypothesis concerning the relationship between any two variables. Results contained in Table 4 indicated that respondents' age, family size, area under maize cultivation, potential area of maize, cost of production, organizational participation, innovativeness and knowledge of the farmers had no significant relationship with their attitude. Similar findings were revealed by Nurzaman (2000) and Habib (2000) in their respective study.
Education of the farmers had positive significant relationship with their attitude. Similar findings were reported by Chowdhury (2003), Shehrawat (2002), Khan (2002), Kumari (1988), Sulakshana (1988) and Kashem (1987) in their respective studies. Most of the farmers (84%) had primary to secondary level education. Based on the findings, it can be concluded that any attempt to raise education of the farmers would be helpful for developing favorable attitude towards modern maize cultivation.

Attitude of the respondents also varied significantly with the variation of their annual income. This means high income enhances the capabilities to purchase the required inputs, hire laborers, and to meet up other expenses for production of modern maize variety. Results also revealed that profit gained through practicing modern production method significantly associated with the attitude.
Cosmopoliteness and attitude of maize farmers had positive significant relationship. That means higher the cosmopoliteness higher the favorable attitude towards modern maize cultivation. The use of communication media and the maize farmers' attitude was found positive significantly correlated. So, it can be concluded that increased use of media by the maize growers can turn their attitude favorable to modern maize cultivation.

Table 4. Correlation co-efficient between the selected characteristics of the respondents and their attitude towards modern maize cultivation.

Characteristics of the farmers	Correlation of co-efficient (r) value with attitude	Tabulated value significant at 0.05 level	0.01 level	Remarks
1. Age	.192			Not significant
2. Education	.392**			Positively significant at 0.01 level
3. Family size	.072			Not significant
4. Annual income	.269*	0.256	0.365	Positively significant at 0.05 level
5. Area under maize cultivation	.059			Not significant
6. Potential area of maize	.107			Not significant
7. Profit gained	.288*			Positively significant at 0.05 level
8. Cost of production	.002			Not significant
9. Organizational participation	.007			Not significant
10. Cosmopoliteness	.378**			Positively significant at 0.01 level
11. Innovativeness	.095			Not significant
12. Knowledge on maize cultivation	.029			Not significant
13. Use of communication media	.276*			Positively significant at 0.05 level

* Significant at P< 0.05 (tabulated r = 0.196)
** Significant at P <0.01 (tabulated r = 0.256)

Conclusion

Attitude as a precursor to adopt modern method of maize production is influenced by some socio-psychological-economic characteristics of the maize growers like education, annual income, profit gained, cosmopoliteness and use of communication media. But there are hardly any scope to make change in the above mentioned characteristics of the small holders except intensifying existing use of communication media. Feelings of the growers developed through uncertainty to market the produces need to address properly by extending processing and procuring centers. Farmers' views to traditional maize production need to be changed through proper extension activities. As the modern maize production is evaluated as profitable and less labor requiring, it is expected that the area under this crop will be increased if the extension services work effectively. Their stance to modern maize production might be triggered by the urge of mitigate family nutrition and livestock feed through enhanced production.

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