

## Original Research Article

### FARMERS' KNOWLEDGE, ATTITUDE AND PRACTICE (KAP) REGARDING NITROGEN FORTIFIED ORGANIC MANURE IN CROP PRODUCTION

#### ABSTRACT

The study was carried out mainly to evaluate the attitude of farmers regarding nitrogen fortified organic manure. Data were collected from purposively selected 120 farmers from Kharnia union, Atalia union, Maguraghona union of Dumuria upazila under Khulna district of Bangladesh through personal interview using an interview schedule during January to February, 2019. There were eleven personal socioeconomic characteristics of farmers selected for the study which were age, educational qualification, family size, farming experience, organic farming experience, annual income, farm size, organizational participation, agricultural training, cosmopolitanism, extension contact regarding nitrogen fortified organic manure. Most of the respondents (85.8%) had medium attitude and highest respondents (65%) had high knowledge, while majority of the respondents (65.8%) conducted their practice regarding nitrogen fortified organic manure. Among the selected characteristics of farmers, annual income showed negative significant relationship with attitude while farm size, agricultural training showed positive significant relationship; and family size showed negative significant relationship with knowledge of farmers regarding nitrogen fortified organic manure. Cosmopolitanism and extension contact showed positive significant relationship with practice; while agricultural training showed negative significant relationship with problem of farmers regarding nitrogen fortified organic manure.

*Key words: Knowledge, attitude, practice, N fortified organic manure.*

#### 1. INTRODUCTION

Agriculture sector plays an important role in overall economic development of the Bangladesh. According to national accounts statistics (2018) of BBS, The agriculture sector contributes about 13.75% of the total GDP. It includes three subsectors namely (i) Crops and horticulture (ii) Animal farming and (iii) Forest and related services. The overall growth rate of the broad agriculture sector for FY 2017-18 is provisionally estimated at 3.06% in real terms over FY 2016-17.

But the agriculture of the country is facing lots of challenges due to the soil issues because excessive use of chemical fertilizer. Soils are losing its health its health to support the crops and plants to grow. For this reason using nitrogen fortified organic manure is very essential to keep the soil productive and fertile for the crops and plants. To meet the existing food

Comment [AAZ1]: Reference?

Comment [AAZ2]: Is it your own opinion ?

Comment [AAZ3]: Where did you find it?  
Reference ?

demand of the population and to maintain sustainable agriculture, using nitrogen fortified organic manure is one of the possible way.

In spite of greater potentially of production, the farmers of Bangladesh are not free from problems in agricultural farming. They face several problems in production and marketing. Most of the farmers sometimes fail to overcome their problems. The problem is mainly due to the excessive use of urea and other fertilizers etc. Considering these points in view the study was taken.

In order to proper direction to the research the following specific objectives were formulated:

- i. To explore the status of manure production by the farmers.
- ii. To determine the attitude of the farmers in producing N fortified manure.
- iii. To measure the relationship between PSC (personal socioeconomic characteristics) and attitude.

## 2. METHODOLOGY

The study was conducted in three unions (Kharnia, Atalia, Maguraghona) of Dumuria Upazila in Khulna District of Bangladesh. Khulna is the third largest metropolitan and second port city in Bangladesh, which is located at the southwestern region of the country. Dumuria Upazila under Khulna District possesses 454.23 sq. km of area, bounded by the latitude from 22°39' to 22°56' north latitudes and in between 89°15' to 89°32' east longitudes. The primary data were collected through the use of interview schedule. In total 120 (one hundred twenty) farmers were selected for interview. Cluster sampling was used for sampling from the population. Sampling plan for the study is given in Table1.

**Table1. Sampling plan for the study**

Upazila	Union	Block	No. of selected farmers
Dumuria	Kharnia	Kharnia	51
		Bamundiya	
		Tepna	
	Atalia	Atalia	52
		Chuknagar	
		Boratia	
Maguraghona	Maguraghona	17	
	Batagram		
	Kansonpur		
Total			120

In this study selected 11 personal, economic and social characteristics of the farmers were considered as independent variables such as age of the farmers, family size, educational qualification, farming experience, organic farming experience, annual income, farm size, organizational participation, agricultural training, cosmopolitanism, extension contact. Knowledge, attitude, practice and problems of the farmers regarding nitrogen fortified organic manure were consider as dependable variable.

The researcher converted all qualitative data to quantitative form by means of applying some appropriate scoring technique. A coding plan was developed and code numbers were given to the each category of measurements. For determining the extent of attitude of farmers are

**Comment [AAZ4]:** How does it possible? Can Nitrogen fortified organic manure ensure food demand and sustainable agriculture?

**Comment [AAZ5]:** What is the research gap? What is justification of this study?

**Comment [AAZ6]:** ?

**Comment [AAZ7]:** The sample size is not large enough to represent the true population.

**Comment [AAZ8]:** Why did you select these variables? Do you have any rationality?

**Comment [AAZ9]:** ?

categorized into three groups as low attitude (up to 46), medium attitude (47-73) and high attitude (above 73). A rating scale was used to determine the extent of attitude where 'highly agree', 'agree', 'undecided', 'disagree' and 'highly disagree' were assigned for 5, 4, 3, 2 and 1 scores respectively.

To compare the level of practice in 20 issues attitude score (AS) and attitude index (AI) for 20 issues were calculated by using the following formula:

$$AS = (N_1 \times 1) + (N_2 \times 2) + (N_3 \times 3) + (N_4 \times 4) + (N_5 \times 5)$$

Where,

AS = Attitude Score

$N_1$  = No. of respondents who highly disagreed

$N_2$  = No. of respondents who disagreed

$N_3$  = No. of respondents who undecided

$N_4$  = No. of respondents who agreed

$N_5$  = No. of respondents who highly agreed

$$\text{Attitudescore} = \frac{\text{Observedscore}}{\text{Possiblescore}} \times 100$$

The researcher collected data through face to face interview during the free time of the respondents. Statistical treatments such as range, means, standard deviation, maximum, minimum, rank order etc. were used to interpret data. Correlation(s) test was used to ascertain the relationships between the concerned independent variables and the dependent variable and simple linear regression was done to determine the effect of the selected five independent variables on participation. Statistical Package for Social Science (SPSS) version 20.0 was used for data analysis.

**Comment [AAZ10]:** Why did you do this? Try to relate it with some other literature.

### 3. RESULTS AND DISCUSSION

#### 3.1 Selected characteristics of the farmers

Data represented that middle aged farmers (60.0%) were highly involved in farming followed by young aged (20.0%) and old aged farmers (20.0%). This study revealed that middle aged people are highly involved in nitrogen fortified organic farming. Rana *et al.*, (2017) found that highest portion of respondents (46%) is middle aged. Major proportion (55.0%) of respondents had secondary level of education while 24.2% farmers had primary level of education, 11.7% of respondent had higher secondary level of education, 5.7% famers were illiterate, 1.8% farmers could sign only and both 0.8% farmers had BSc and MSc degree. The higher percentage of higher secondary level of respondents came to farming operation because these types of farmers might have knowledge and they cannot find jobs easily. Rana *et al.*, (2017) found that highest portion of respondents (40%) had secondary level of education. Maximum numbers of families in selected areas were medium in size (56.7%) followed by small size (21.7%) and large size family (21.7%). Rana *et al.*, (2017) found that highest portion of respondents (50.8%) had medium size family. Majority of respondents (72.5%) had high farming experience, fewer portions of farmers (22.5%) had medium farming experience and a few farmers (5.0%) had low farming experience. Majority of the respondents (70.0%) had higher experience where small portion of respondents (23.3%) had medium experience and only few respondents (6.7%) possessed higher experience about organic farming (Table2).

**Comment [AAZ11]:** Where is the result? Is it statistically proved that middle aged people are highly involved in nitrogen fortified organic farming?

**Comment [AAZ12]:** It doesn't bear any sense?

**Comment [AAZ13]:** Did you find that? Where is the result?

**Comment [AAZ14]:** What does it mean? Try to relate .

Majority of the respondents family member had lower annual income (55.8%) followed by medium annual income (35.8%) and high annual income (8.3%). More than half (54.2%) of the respondents had small farm size and only a few portion of respondents (2.5%) had large farm size. However, medium portion (38.3%)of the respondents had medium farm size and very few (5.0%) of the respondents had marginal farm size and only no respondents were land less farmers. Nearly all the respondents (91.7%) had low participation in organization,small portion of respondents (6.7%) respondents had medium participation and very few respondents (0.8%) had high participation in organization. Highest proportion of the respondents (90.8%) had no training and small portion (6.7%) of the respondents had received low training and only a few portion(2.7%) of respondents had high number of training.Farouque *et al.*, (2018) found that highest portion of respondents (85.0%) had no training.Majority (60.8%) of the farmers had lowcosmopolitanism compared to less farmers(38.3%) and a few(0.8%) having medium and highcosmopolitanism respectively. Majority of the farmers (68.3%) had low extension contact and 31.7% had medium extension contact where there were no farmers who possessed higher extension contact (Table.2).Farouque *et al.*, (2018) found that highest portion of respondents (40%) had low access to extension services.

**Comment [AAZ15]:** Not majority of the respondent. It is 55.8%.

**Comment [AAZ16]:** You should make it clear. Define organization type.

**Comment [AAZ17]:** What is the base of high, medium and low?

**Comment [AAZ18]:** How does it possible? All 70%, 50%, 60% are major?

Majority (65%)of the farmers had high knowledge on organic farm activities compared to less portion of farmers (35%) having medium knowledge on nitrogen fortified organic manure respectively. Nearly most of the farmers (85.8%) had medium attitude towards nitrogen fortified organic manure whereas small portion of farmers (14.1%) had high attitudetowards nitrogen fortified organic manure.Hasan *et al.*, (2015) found highest portion of respondents (76.9%) had favorable attitude. Majority of respondents (65.8%) had medium practice, where small portion of respondents(36%) had high practice and a small portion (4.2%) of the farmers still had low practice in using nitrogen fortified organic manure.Farouque *et al.*, (2018) and highest portion of respondents (73.2%) had low practice.Majority of farmers (65.0%) faced medium problem while using nitrogen fortified organic manure compared to 22.5% farmers faced higher problem and only 12.5% had low problem (Table2).

**Comment [AAZ19]:** ?

**Table2. Distribution of farmers according to their selected characteristics (N= 120)**

Parameter	Categories	Score	Respondents (N=120)		Mean	SD	Min.	Max.
			Number	Percentage				
Age (Years)	Young	≤35	24	20.0	43.18	10.63	22	85
	Middle	36-55	72	60.0				
	Old	>55	24	20.0				
Education (Schooling years)	Illiterate	0	7	5.7	7.54	3.36	00	20
	Sign	.50	2	1.8				
	Primary	1-5	29	24.2				
	Secondary	6-10	66	55.0				
	HSC	11-12	14	11.7				
	BSc	13-16	1	0.8				
MSc	>16	1	0.8					
Family size (No. of members)	Small	≤4	26	21.7	5.78	1.83	2	10
	Medium	5-7	68	56.7				
	Large	>7	26	21.7				

<b>Farming experience (Years)</b>	Low	≤10	06	05.0				
	Medium	10-20	27	22.5				
	High	>20	87	72.5	28.80	10.42	1	50
<b>Organic farming experience (Years)</b>	Low	≤10	08	06.7				
	Medium	10-20	28	23.3	28.50	10.92	1	50
	High	>20	84	70.0				

**Comment [AAZ20]:** Which type organic manure they use mostly? Author did not mention it anywhere of this manuscript.

Parameter	Categories	Score	Respondents (N=120)		Mean	SD	Min.	Max.
			Number	Percentage				
<b>Annual income (BTD)</b>	Low	≤120000	67	55.8				
	Medium	120001-180000	43	35.8	151966.67	14714.73	500	120000
	High	>180000	10	8.3				
<b>Farm size (ha)</b>	Landless	<0.02	0	0.0				
	Marginal	0.02-0.20	6	5.0				
	Small	0.21-1.0	65	54.2	1.05	0.91	0.04	6.15
	Medium	1.01-3.0	46	38.3				
	Large	>3	3	2.5				
<b>Organizational Participation (Score)</b>	Low	≤6	110	91.7				
	Medium	7-12	8	6.7	4.30	1.59	1	11
	High	>12	1	0.8				
<b>Agricultural training (No. of training)</b>	No	0	109	90.8				
	Low	≤3	08	6.7	0.85	1.29	0	6
	Medium	4-5	00	0.0				
	High	>5	03	2.7				
<b>Cosmopolitanism (Score)</b>	Low	≤8	73	60.8				
	Medium	9-16	46	38.3	8.01	2.58	3	16
	High	>16	01	0.8				
<b>Extension contact (Score)</b>	Low	≤11	82	68.3				
	Medium	12-22	38	31.7	10.87	2.77	6	19
	High	>22	00	0				
<b>Knowledge (Score)</b>	Low	<7	00	00				
	Medium	8-15	42	35	16.31	1.90	13	20
	High	>15	78	65				
<b>Attitude (Score)</b>	Low	≤46	0	0				
	Medium	47-73	103	85.8	67.07	5.58	54	86
	High	>73	17	14.1				
<b>Practice (Score)</b>	Low	≤10	5	4.2				
	Medium	11-20	79	65.8	17.98	4.01	3	26
	High	>20	36	30				

<b>Problem (Score)</b>	Low	≤10	15	12.5				
	Medium	11-20	78	65.0	17.03	4.65	4	25
	High	>20	27	22.5				

\*SD- Standard deviation, Min. - Minimum, Max. - Maximum Source: Field survey, 2019

### 3.2 Extent of attitude of farmers in selected 2-aspects along with 20-issues of farmers towards nitrogen fortified organic manure

Attitude of respondents was measured by using five rating scale against which some positive and negative statement was given. To measure the attitude of farmers the activities were arranged in twenty issues where attitude Index (AI) was calculated (Table 3).

Usually farmers use nitrogen fertilizers in their fields. But they have awareness about the advantages of using nitrogen fortified organic manure. So their attitude is increasing day by day about nitrogen fortified organic manure. Hasan *et al.*, (2015) also found somewhat similar types of attitude. They found that highest portion of respondents (76.9%) had favorable attitude.

Respondents were obtained highest score by answering that nitrogen fortified organic manure is good. Because most farmers know that nitrogen fortified organic manure is good for supplement of all nutrients. Weed problem is serious ranked as last. It proved that farmers know that by using nitrogen fortified organic manure, weed problem is most devastating problems in this regards.

**Table3. Relative position (Rank order) of the selected 2-aspects along with 20- issues of farmers in case of attitude towards nitrogen fortified organic manure based on attitude score (AS) and attitude participation index (AI) (N=120)**

**Comment [AAZ21]:** Author should discuss this table more clearly.

Positive Statements	Degree of agreement					AS	AI	Rank (20 issues)
	Highly agree (5)	Agree (4)	Undecided (3)	Disagree (2)	Highly Disagree (1)			
i. N fortified organic manure is good	60×(5)	54×(4)	4×(3)	2×(2)	0×(1)	532	88.67	1 <sup>st</sup>
ii. Soil health is maintained	62×(5)	48×(4)	8×(3)	2×(2)	0×(1)	530	88.33	2 <sup>nd</sup>
iii. It's renewable and biodegradable	21×(5)	79×(4)	18×(3)	2×(2)	0×(1)	479	79.83	5 <sup>th</sup> =
iv. It's ecofriendly	18×(5)	72×(4)	22×(3)	4×(2)	4×(1)	456	76	7 <sup>th</sup> =
v. Helps in soil aeration	26×(5)	74×(4)	20×(3)	0×(2)	0×(1)	486	81	4 <sup>th</sup> =
vi. Great source of income	22×(5)	84×(4)	14×(3)	0×(2)	0×(1)	488	81.33	3 <sup>rd</sup>

vii. It is a time demanding technology	36×(5)	54×(4)	30×(3)	0×(2)	0×(1)	486	81	4 <sup>th</sup> =
viii. Soil holds its moisture properly	19×(5)	67×(4)	30×(3)	4×(2)	0×(1)	461	76.83	6 <sup>th</sup>
ix. It reduces N leaching loss in soil	25×(5)	55×(4)	32×(3)	7×(2)	1×(1)	456	76	7 <sup>th</sup> =
x. Application is easy	48×(5)	41×(4)	19×(3)	6×(2)	6×(1)	479	79.83	5 <sup>th</sup> =
$\bar{X}$ of A	Rank-1					485.3		

Negative Statements	Degree of agreement					AS	AI	Rank
	Highly agree (1)	Agree (2)	Undecided (3)	Disagree (4)	Highly Disagree (5)			
i. An extra hazardous to prepare	14×(1)	23×(2)	38×(3)	41×(4)	4×(5)	358	59.67	9 <sup>th</sup>
ii. Slowly release nutrients than fertilizer	3×(1)	39×(2)	26×(3)	46×(4)	6×(5)	373	62.17	8 <sup>th</sup>
iii. Application management is still difficult	6×(1)	44×(2)	30×(3)	30×(4)	10×(5)	354	59	11 <sup>th</sup> =
iv. Give less yield compared to inorganic fertilizer	4×(1)	40×(2)	34×(3)	42×(4)	0×(5)	354	59	11 <sup>th</sup> =
v. Hard to maintain proper yield quantity	10×(1)	44×(2)	28×(3)	29×(4)	9×(5)	343	57.16	12 <sup>th</sup>
vi. Marketing facilities for organic product is not so better	15×(1)	31×(2)	42×(3)	27×(4)	5×(5)	336	56	14 <sup>th</sup>
vii. Using of large amount of N fortified organic manure is problematic	5×(1)	55×(2)	29×(3)	20×(4)	11×(5)	337	56.16	13 <sup>th</sup>
viii. High	2×(1)	54×(2)	35×(3)	26×(4)	3×(5)	334	55.67	15 <sup>th</sup>

knowledge is needed to produce N fortified organic manure									
ix. Weed problem is serious	36x(1)	30x(2)	24x(3)	26x(4)	4x(5)	292	48.67	16 <sup>th</sup>	
x. GO' and NGO's support is less	20x(1)	25x(2)	27x(3)	34x(4)	14x(5)	357	59.5	10 <sup>th</sup>	
$\bar{X}$ of B	Rank-2					343.8			

### 3.3. Relationship between the selected characteristics of the farmers and their knowledge, attitude, practice and problem

This section deals with the relationship between eleven selected characteristics of the farmers and their knowledge, attitude, practice and problem on nitrogen fortified organic manure. To explore the relationships between the selected characteristics of the farmers and their knowledge, attitude, practice and problem on nitrogen fortified organic manure Spearman's rank order co-efficient of correlation ( $\rho$ ) was used in case of ordinal data and Pearson's product moment correlation co-efficient ( $r$ ) was used for ratio or interval data.

Annual income had negative and significant effect on attitude of farmers. This might be due to rich people do not want to go only agriculture sector. Those rich people sometimes unnoticed the harmful effect of excess nitrogen fertilizers used. Family size had negative and significant effect on knowledge of farmers. It might be caused due to unwillingness of the family members to the available agricultural information source. Whereas, farm size had positive and significant effect on knowledge of farmers. Agriculture training had positive and significant effect on knowledge of farmers. It indicates that when farmers take more training, his knowledge will increase. Cosmopolitanism and extension contact had positive and significant effect on practice of farmers. Agriculture training had negative and significant effect on problem of farmers. So it indicates that if agricultural training can be given properly to farmers then automatically decrease the problems of farmers because usually their possible solution is given in agricultural training.

**Comment [AAZ22]:** Why did you use this two technique? Does your data follow the assumptions of these tests? If yes then mention it.

**Table.4. Computed correlation coefficient between the selected characteristics of the farmers and their focus variables**

	Independent Variables	Dependent Variables				Correlation type
		Knowledge	Attitude	Practice	Problem	
i.	Age	0.087	0.018	-0.073	-0.146	r
ii.	Education	0.084	0.021	0.070	0.005	r
iii.	Family Size	-0.205*	-0.057	0.024	0.052	r
iv.	Farming experience	-0.003	-0.067	-0.038	-0.004	r
v.	Organic farming experience	-0.008	-0.079	-0.016	0.024	r
vi.	Annual income	0.145	-0.181*	0.152	0.053	r



<b>vii.</b>	<b>Farm size</b>	0.226*	-0.084	0.036	0.045	r
<b>viii.</b>	<b>Organization participation</b>	0.021	-0.107	0.020	0.091	$\rho$
<b>ix.</b>	<b>Agricultural training</b>	0.304**	0.149	-0.24	-0.383**	r
<b>x.</b>	<b>Cosmopolitanism</b>	0.046	0.051	0.224*	-0.113	$\rho$
<b>xi.</b>	<b>Extension contact</b>	0.063	-0.008	0.206*	-0.031	$\rho$

\*\* Correlation is significant at the 0.01 level (2-tailed), \* Correlation is significant at the 0.05 level (2-tailed), r = Pearson's product moment correlation co-efficient,  $\rho$  = Spearman's rank order co-efficient of correlation.

UNDER PEER REVIEW

#### 4. CONCLUSION

Based on the results and its logical interpretation it can be concluded that most of the respondents (85.8%) had medium attitude and highest respondents (65%) had high knowledge respectively while majority of the respondents (65.8%) conducted medium practice regarding nitrogen fortified organic manure. Although farmers usually use nitrogen fertilizer but they have favorable attitude regarding nitrogen fortified organic manure. So the results revealed that the knowledge, attitude and practice regarding nitrogen fortified organic manure are increasing day by day.

**Comment [AAZ23]:** You did not show any comparison with previous data. So, how could you conclude it?

#### REFERENCES

1. BBS. Bangladesh Bureau of Statistics. 2018. Statistical Division, Ministry of Planning, People's Republic of Bangladesh, Dhaka, Bangladesh.
2. Devi Dr. K. R. Sakthi. 2017. A study on attitude of farmers towards organic farming. *International Journal of Current Research and Modern Education*, 2(1): 159-162.
3. Farouque M. G, Sarker M.A. 2018. Farmers' knowledge and practice of organic vegetables cultivation: A field level study of two villages from Bangladesh. *Journal of Agricultural extension and rural development*, 10(5): 99-107.
4. Hasan SS, Turin M.Z, Sultana S. 2015. Bangladeshi extension workers attitude towards sustainable agriculture. *Academia Journal of Agricultural Research*, 3(11): 312-320.
5. Mondal S, Haitook T, Simaraks S, 2014. Farmers' knowledge, attitude and practice toward organic vegetables cultivation in northeast Thailand. *Kasetsart Journal of Social Science*, 35(1): 158 – 166.
6. Nandi R, Bokelmann W, Nithya V. G, Dias G. 2015. Smallholder organic farmer's attitudes, objectives and barriers towards production of organic fruits and vegetables in India: A multivariate analysis. *Emirates Journal of Food and Agriculture*, 27(5): 396-406.
7. National accounts statistics, 2018. Bangladesh Bureau of Statistics, Statistics and Informatics Division Ministry of Planning. Ministry of Planning, People's Republic of Bangladesh, Dhaka, Bangladesh.
8. Rana S, Hasan M. H, Alam M. S, Islam M. S. 2017. Farmer attitude towards organic vegetable cultivation in Rangunia Upazila, Chittagong, Bangladesh. *Journal of Bioscience and Agriculture Research*, 14(01): 1151-1156.