



Evaluation of knowledge, attitude and practice (KAP) of farmers regarding organic farming

Md Shijan Islam, Md Matiul Islam* 

Agrotechnology Discipline, Khulna University, Khulna 9208, Bangladesh

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Mohammed Nasir Uddin
nasiragext@bau.edu.bd

*Corresponding Author

Md Matiul Islam
matiul_rubel@yahoo.com



ABSTRACT

Organic agricultural products are gaining popularity among the consumers day by day. Farmers are also becoming interested in producing organic agricultural commodities. The production strategy of organic food commodities is environment friendly and of high economic potential. However, the knowledge, attitude and practice (KAP) of farmers regarding organic farming is merely assessed. The main purpose of the study was to evaluate the knowledge, attitude and practice of the farmers regarding organic farming. Data were collected from randomly selected 70 farmers from selected three villages named Ghola, Zoykhali and Shailmary of Jalma union of Batiaghata upazila under Khulna district of Bangladesh, through personal interview using an interview schedule. The eleven characteristics of the farmers which had been selected for the study were age, educational qualification, farming experience, organic farming experience, family size, farm size, monthly family income, organizational participation, cosmopolitanism, extension media contact and training on organic farming. The focus variables were the knowledge, attitude and practice of the farmers on organic farming. The respondents were asked to provide responses regarding the focus issues, and the given responses were recorded against the standard scale, and obtained scores were statistically analyzed for further interpretation. Majority (70%) of the respondents had medium knowledge, most (95.7%) of them had highly favorable attitude while their (51.4%) practice on organic farming was low. Among the ten practices, “application of cow dung in the field” was the highest practiced activity, while the least practiced activity was “regular soil test”. Among the selected eleven characteristics of the respondents, experience in organic farming ($R^2 = 0.145$) ($p < 0.05$), cosmopolitanism ($R^2 = 0.357$) ($p < 0.01$), extension media contact ($R^2 = 0.265$) ($p < 0.01$) and training on organic farming ($R^2 = 0.107$) ($p < 0.05$) showed significant positive relationship with knowledge; while experience in farming ($R^2 = 0.135$) ($p < 0.05$) and experience in organic farming ($R^2 = 0.059$) ($p < 0.01$) showed significant positive relationship with their attitude towards organic farming; and cosmopolitanism ($R^2 = 0.149$) showed significant ($p < 0.01$) positive relationship with practice of the farmers. By utilizing the highly favorable attitude of the farmers towards organic farming, the knowledge level of them could be increased through training and extension contact, and as a result the magnitude of practices could be increased in the long run. Necessary agricultural policy strategies should be formulated to enhance the organic farming activities by the farmers.

Keywords: Attitude, farmer, knowledge, practice, organic farming



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1 Introduction

Bangladesh is predominantly an agrarian country. Agricultural sector contributes 14.1% to the country's Gross Domestic Product (GDP) and employs around 41% of total labor force (BBS, 2018). Due to its very fertile land and favorable weather, varieties of crops are grown abundantly in this country. The agriculture of this country is facing lots of challenges due to the soil related issues because of excessive use of chemical fertilizers and other agrochemicals (Das et al., 2019). Soils are losing its health to support the crops and plants to grow. For this reason organic farming is very essential to keep the soil productive and fertile for the crops and plants. Organic farming is one in which environmental and social costs are considered along with productivity (Reganold and Wachter, 2016). Organic farming is still under the experimental stage but slowly gaining wide acceptance called sustainable agriculture, combining modern science with the indigenous knowledge of the people through organic agriculture and adopting an integrated farming system for pest control that is environmental friendly (Biswas and Islam, 2018). Organic farming is a method of crop and livestock production that involves much more than choosing not to use pesticides, fertilizers, genetically modified organisms, antibiotics and growth hormones (Martin, 2009). At present there are 25.35 million total (farm and non-farm) household and 14.9 million-farm household and there is enormous biodiversity of vegetables, fruits, tubers and livestock (BBS, 2017). In addition to this, Bangladesh posses 10% of hill area and these are organic by default too (Biswas and Islam, 2018).

The agricultural and rural sector in Bangladesh has particular importance for the sustained food and livelihood security of its large, dense and overgrowing population (BBS, 2018). The agricultural activities in the country are pursued intensively for the crop as well as allied sectors and in conditions of scarce natural resources. The performance of this sector has great impact on macroeconomic situation like employment generation, poverty alleviation, food security and nutritional attainment, etc (Bishwajit et al., 2014). Furthermore, there is a tremendous pressure on cultivable land because of increasing population, land fragmentation and economic hardship. There is little or no scope for bringing any new land under cultivation (The Daily Sun, 2019). To meet the existing food demand of the population, production per unit area must be increased. This is possible by many ways. One of it is organic farming. In spite of greater potentiality of production the farmers of Bangladesh are not free from problems in the field of cultivation. They usually face several problems in production and marketing (Bishwajit et al., 2014). Most of the farmers in Bangladesh fail to overcome their problems. It is

because of many factors on which soil related problems are most predominating factors. The problem is mainly due to the excessive use of chemical fertilizers, fungicides, acaricides, insecticides, growth hormones, etc. In the recent years, food quality and safety have been attaining a growing importance to consumers and recent food adulterations scandal also created ample scope to produce safe food (Biswas and Islam, 2018). Moreover, many of the farmers have rich traditional knowledge, which is incompliance, the organic principles. However, high cost of production, inputs and lack of subsidies for organic farming poses a great challenge to adopt organic farming (Barik, 2017).

The production strategy of organic food is environment friendly and of high economic potential. However, the knowledge, attitude and practice (KAP) of farmers regarding organic farming is merely assessed. Previously KAP survey was conducted by Das et al. (2019) regarding nitrogen fortified organic manure production and use for crop cultivation. Another KAP survey research was edited by Nair and Ravindran (2015) on the use of Chlorpyrifos and Paraquat and their impact on human health and the environment, i.e., inorganic practice of agriculture. KAP survey was also conducted on climate change (Severin and Small, 2016). Ntawuruhunga (2016) conducted a research on African farmers' KAP on indigenous vegetables production in Kenya. Literature (Launiala, 2009) says that the attractiveness of KAP surveys is attributable to characteristics such as an easy design, quantifiable data, ease of interpretation and concise presentation of results, generalizability of small sample results to a wider population, cross-cultural comparability, speed of implementation, and the ease with which one can train enumerators. However, considering the available scientific literature support, it is evident that no KAP survey research, an attractive research method, has been conducted on overall organic farming, particularly in the southwestern coastal areas of Bangladesh. In this connection, the following research questions were raised to have clear understanding about organic farming by evaluating the knowledge, attitude and practice of the farmers: (a) what is the level of knowledge of the farmers regarding organic farming? (b) what is the affective status (i.e., attitude) of the farmers towards organic farming? (c) to what extent the farmers practice organic farming? (d) what are the selected characteristics of the farmers performing organic farming? and, (e) what relationship exists between the knowledge, attitude and practice of organic farming and selected characteristics of the respondents? To have the answers of these research questions the following specific objectives of the study were formulated: (i) to measure the knowledge, attitude and practice status of the farmers regarding organic farming, (ii) to describe the selected personal characteristics of the farmers performing organic farming, (iii) to ascertain

the relationships between selected personal characteristics of the farmers and the knowledge, attitude and practice of organic farming, and (iv) to quantify the correlated factors' contribution through regression analysis those affecting KAP on organic farming.

2 Materials and Methods

2.1 Research design and data collection

The present study was based on KAP (knowledge, attitude and practice) survey methodology. A KAP survey is a representative study of a specific population to collect information on what is known, believed and done in relation to a particular topic. In most KAP surveys, data are collected orally by an interviewer using a structured and standardized schedule. The present study was designed to evaluate (through survey by using structured interview schedule) the knowledge, attitude and practice regarding organic farming of 70 farmers of Ghola, Zoykhali and Shailmary villages of Jalma union under Batiaghata upazila under Khulna district in Bangladesh. The farmers who were partially or completely involved in any of the organic farming activity or practice were considered as the population of the study. The population size was around 700 as per the oral information provided by the concerned Sub-Assistant Agriculture Officer (SAAO) of the locality. Among them, 10% (i.e., 70 samples) were randomly selected for the study for the convenience of data handling and management, and resource constraint. An interview schedule was prepared (items were included in the schedule by consulting with academicians, extension workers and farmers) as the research instrument in order to collect relevant information from the farmers. Both close and open types of simple and direct questions were included into the interview schedule. After preparing the interview schedule, it was pretested with seven farmers of the selected villages. The pretest results helped the researchers to examine the suitability of different statements related with organic farming. Based on the pretest experiences, necessary correction, addition, alteration and re-arrangement were made in the interview schedule before it was run for final data collection. Data were collected from 04 to 24 May, 2018 by the researcher himself.

2.2 Data processing and analysis

After completion of survey, all the interview schedules were compiled for data processing. The qualitative data were converted into quantitative form by means of suitable code and score whenever necessary. In several instances indices and scales were constructed through the simple accumulation of scores assigned to individual or pattern of attributes. Indices and scales were considered the efficient instrument

for data reduction and analysis. Following [Nishi et al. \(2019\)](#), eleven selected characteristics of the farmers were treated as independent variables for this study. The selected characteristics were age, educational qualification, farming experience, organic farming experience, family size, farm size, monthly family income, organizational participation, cosmopolitanism, extension media contact and training on organic farming. Knowledge, attitude and practice on organic farming were considered as focus concepts of the study.

2.3 Measurement of focus issues

2.3.1 Knowledge

To measure the knowledge of the farmers on agriculture, 10 questions were included in interview schedule. All the questions covered only the "cognitive domain (knowledge)" of the Bloom's taxonomy ([Bloom et al., 1956](#)). Irrespective of difficulty of answer of the question, a score of 2 was assigned against each of the questions (for complete correct answer against each question the respondent would score 2, for partial i.e., half correct answer 1, and for no or incorrect answer 0). Thus, the whole questions comprised of 20 marks. Based on accuracy of the answer, the farmers' were given marks. The total score of a farmer was determined by summing up of all the scores obtained by the farmer against the selected 10 questions. The possible score of knowledge of a farmer on organic farming could range from 0 to 20, where 0 indicates no knowledge and 20 indicates the highest knowledge. The farmers were categorized (based on three approximate equal divisions between the possible lowest and highest scores) on the basis of their knowledge score on agriculture into low knowledge (1-7), medium knowledge (8-14) and high knowledge (>14) ([Table 1](#)).

2.3.2 Attitude

To evaluate the attitude of the farmers regarding organic farming, 20 statements (10- positive and 10- negative) were included in the interview schedule. A five point Likert-type scale (highly agree, agree, undecided, disagree, highly disagree) were fit against each of the statements and a weight of 5, 4, 3, 2 and 1 were assigned, respectively. The negative statements were weighed reversely. The possible score of attitude of a farmer on organic farming could range from 20 to 100, where 20 indicates least favorable attitude and 100 indicates the highest favorable attitude. The attitude scores of a farmer were determined by summing up of all of the scores against the twenty statements. Based on attitude scores, the farmers were grouped into less favorable attitude (20-35), moderately favorable attitude (36-50) and highly favorable attitude (>50) ([Table 1](#)). The researchers by consulting with

expert extensionists, considered that the respondents who could score >50 out of 100 should be included in highly favorable attitude category (as the educational, income and few other social quality aspects of the respondents were very low). Besides, the other categories were given an equal interval of 15.

2.3.3 Practice

So many practices are prevailing in the field of agriculture as indicators of organic farming activity. However, to evaluate the practice on organic farming by the farmers only 10 practice statements (by consulting with academicians and field level extension agents) were included in the interview schedule. Each farmer was asked to indicate the extent of his/her practice against a four-point scale as regularly, sometimes, rarely and not at all on each statements and a weight of 3, 2, 1 and 0 was assigned to these rating scales respectively. The practice scores of a farmer were determined by summing up of all the scores obtained by him/her against the ten practices which s/he practiced. The practice score could range from 0-30 where 0 indicates no practice and 30 indicates the highest extent of practice. Based on practice scores, the farmers were grouped (based on three equal divisions between the possible lowest and highest scores) into low practice (1-10), Medium practice (11-20) and high practice (21-30) categories (Table 1). To compare among the individual statements related to practice on organic farming, a calculation was done by the following formula (modified from Hanif et al. (2020)):

$$TPS = (N1 \times 3) + (N2 \times 2) + (N3 \times 1) + 0 \quad (1)$$

where, TPS = Total Practice Score, $N1$ = No. of farmers practiced regularly, $N2$ = No. of farmers practiced sometimes, $N3$ = No. of farmers practiced rarely, and $N4$ = No. of farmers practiced not at all.

The individual practice score could be ranged from "0-210" ($0 \times 70 = 0$ to $3 \times 70 = 210$), where 0 mean no practice and 210 means the highest extent of practice. Extent of each individual practice (Practice Index) could be calculated by the following formula (Das et al., 2019):

$$PI = \frac{PS_O}{PS_H} \quad (2)$$

where, PI = Practice Index, PS_O = observed practice score, and PS_H = possible highest score.

Based on the Practice Index (PI), the 10-selected practices were ranked (Table 2). For calculation and measurement of the selected characteristics, viz. age, educational qualification, farming experience, organic farming experience, family size, farm size, monthly family income, organizational participation, cosmopolitanism, extension media contact and training on organic farming, the procedure given by Sheel et al. (2019) was followed (Table 3).

2.4 Statistical tools and techniques used

After collection, data were analyzed and tabulated for interpretation. Statistical treatments such as number, mean, standard deviation, range, maximum, minimum, rank order, etc. were used to interpret data. To explore relationship between any two variables, Spearman's Rank Order Correlation Coefficient (ρ) were employed (for ordinal type of data) (Table 4). Simple linear regression analysis was performed for exploring the contribution of the selected characteristics on the focus issues (Table 5). Significantly correlated every factor was individually computed for regression coefficient and regression equation. For analysis of data, Statistical Package for Social Sciences (SPSS) and MS-Excel were used.

3 Results and Discussion

3.1 Knowledge on organic farming

Majority (70%) of the farmers had medium knowledge with a mean (\bar{X}) score of 9.2 and standard deviation (σ) of 3.06 (possible range 0-20) (Table 1). Only very few (4.3%) respondents had high knowledge on organic farming. It indicates that the respondents had some knowledge about organic farming which they have acquired from their literacy competence (those who acquired education) or from the practical problems they faced in recent times in their agricultural field during agricultural operations. About one-fourth (25.7%) of the farmers had low level of knowledge on organic farming. This one-fourth part of the farmers should be provided with training on organic farming to increase their knowledge level. Patel (2005), Mamun (2002) and Farhad (2003) also found that majority 71%, 52.8% and 68% of their respondents respectively had medium knowledge on organic farming, which advocates the credibility of the present study findings. Jaganathan et al. (2016) carried out a study which showed that organic farmers had better knowledge than inorganic farmers with the mean score difference of 3.73. The respondent farmers possessed a good score of knowledge on organic farming, although we didn't assess the knowledge level of the farmers regarding inorganic farming for comparison with organic farming like Jaganathan et al. (2016).

3.2 Attitude on organic farming

Most (95.7%) of the farmers had highly favorable attitude followed by moderately favorable attitude (4.3%) and no farmers (0%) had less favorable attitude which indicates that most of the farmers kept positive attitude towards organic farming. The mean (\bar{X}) attitude score was 63 (possible range 20-100) with

Table 1. Distribution of the respondents according to their knowledge, attitude and practice of organic farming

Characteristics	Range	Categories & Scores	Respondents		Mean \pm SD
			Number	Percentage	
Knowledge	2-15	Low (1-7)	18	25.7	9.2 \pm 3.06
		Medium (8-14)	49	70	
		High (>14)	3	4.3	
Attitude	49-78	Less (20-35)	0	0	63 \pm 6.93
		Medium (36-50)	3	4.3	
		High (>50)	67	95.7	
Practice	1-20	Low (1-10)	36	51.4	10.17 \pm 3.21
		Medium (11-20)	34	48.6	
		High (21-30)	0	0	

Table 2. Extent of practice on organic farming with rank order

Sl.	Statements	Extent of practice				TPS	PI (%)	Rank
		Regularly (3)	Sometimes (2)	Rarely (1)	Not at all (0)			
1.	I apply cow dung in the field every season	55 \times 3	5 \times 2	10 \times 1	0 \times 0	185	88.09	1st
2.	Well tillage is done before manure application	41 \times 3	20 \times 2	4 \times 1	5 \times 0	167	79.52	3rd
3.	Soil is tested regularly	0 \times 3	0 \times 2	9 \times 1	61 \times 0	9	4.28	9th
4.	Organic pesticides are used along with manures	0 \times 3	16 \times 2	50 \times 1	4 \times 0	82	39.05	7th=
5.	Animals get treated for manure supplement	2 \times 3	62 \times 2	4 \times 1	2 \times 0	134	63.81	5th
6.	Pests or insects are also controlled by using new organic technological method	5 \times 3	5 \times 2	40 \times 1	20 \times 0	65	30.92	8th
7.	Cultivable field is kept fallow before further cultivation	10 \times 3	58 \times 2	1 \times 1	1 \times 0	147	70	4th
8.	I irrigate my field as much as need	45 \times 3	18 \times 2	7 \times 1	0 \times 0	178	84.76	2nd
9.	Cultivation schedule and crop rotation is maintained properly	10 \times 3	15 \times 2	38 \times 1	7 \times 0	98	46.67	6th
10.	I cultivate multiple crop at the same land easily	5 \times 3	20 \times 2	27 \times 1	18 \times 0	82	39.05	7th=

TPS = Total Practice Score, PI = Practice Index

Table 3. Distribution of the respondents according to their selected characteristics

Characteristics	Range	Categories & Scores	Respondents		Mean \pm SD
			Number	Percentage	
Age (yrs)	24-67	Young (≤ 35)	20	28.6	43.9 \pm 12.20
		Middle aged (36-50)	29	41.4	
		Old (>50)	21	30	
Educational Qualification (Schooling years)	0-12	Illiterate (0)	2	2.9	6.63 \pm 2.5
		Primary (1-5)	24	34.3	
		Secondary (6-10)	43	61.4	
		Higher secondary (11-12)	1	1.4	
Farming experience (yrs)	6-45	Low (≤ 10)	6	8.6	22.74 \pm 9.45
		Medium (11-20)	27	38.6	
		High (>20)	37	52.8	
Organic farming Experience (yrs)	0-11	Low (≤ 5)	69	98.6	1.01 \pm 1.80
		Medium (6-10)	0	0	
		High (>10)	1	1.4	
Family size (Member no.)	3-13	Small (≤ 4)	20	28.6	6.09 \pm 1.66
		Medium (5-7)	33	47.1	
		Large (>7)	17	24.3	
Farm size (ha)	0.03-1.49	Landless (<0.02)	6	8.6	0.56 \pm 0.36
		Marginal (0.02-0.2)	3	4.3	
		Small (0.21-0.99)	52	74.3	
		Medium (1-2.99)	9	12.9	
		Large (≥ 3)	0	0	
Monthly family income (BDT)	5,000-9,550	Low ($\leq 10,000$)	70	100	7,150.09 \pm 1,004.49
		Medium (10,001-15,000)	0	0	
		High ($>15,000$)	0	0	
Organizational participation (Score)	0-14	No (0)	46	65.7	0.81 \pm 1.24
		Low (1-7)	14	20	
		Medium (8-14)	10	14.3	
		High (15-21)	0	0	
Cosmopolitanism (Score)	1-10	No (0)			5.19 \pm 2.58
		Low (1-5)	41	58.6	
		Medium (6-10)	29	41.4	
		High (11-15)	0	0	
Extension media contact (Score)	1-23	No (0)			10.37 \pm 5.65
		Low (1-10)	38	54.3	
		Medium (11-20)	27	38.6	
		High (21-30)	5	7.1	
Organic cultivation training (Number)	0-1	No (0)	69	98.6	0.03 \pm 0.17
		Low (1-2)	1	1.4	
		Medium (3-4)	0	0	
		High (>5)	0	0	

Table 4. Computed Spearman's Rank Order Correlation Coefficient between the selected characteristics of the farmers and their knowledge, attitude and practice on organic farming

Selected characteristics	Spearman Rank Order Correlation coefficient (ρ)		
	Knowledge	Attitude	Practice
Age	0.064	0.122	0.125
Educational qualification	0.094	-0.057	-0.084
Experience in farming	0.02	0.247*	0.08
Experience in organic farming	0.278*	0.338**	0.042
Family size	0.09	0.044	0.163
Farm size	0.166	0.195	0.14
Annual family income	0.196	0.233	0.192
Organizational participation	0.146	0.195	-0.105
Cosmopolitanism	0.609**	-0.11	0.379**
Extension contact	0.544**	-0.11	0.127
Agricultural tanning	0.287*	0.089	-0.141

** Correlation is significant at the 0.01 level (2-tailed); *Correlation is significant at the 0.05 level (2-tailed)

standard deviation (σ) 6.93 (Table 1). The respondents are observing that the soils are depleting, soil microorganisms are drastically decreasing at their cultivable land, soil productivity is declining, tastes of the foods are deteriorating, and thus possessing the sentiment of positive and favorable attitude towards organic farming. Similar with our findings, Jaganathan (2004) found that majority of the respondents (64%) had a favorable attitude towards organic farming. Likely, Pieniak et al. (2010) found that the attitudes towards organic vegetables have a direct positive and relatively strong relationship with organic vegetables consumption. Chen (2009) showed that a healthy lifestyle should be advocated to render the consumer's attitude towards organic foods more positive, which is in favor of our present findings too.

3.3 Practices on organic farming

Majority (51.4%) of the farmers had low practice followed by medium (48.6%) practice, and none (0%) had high practice; with a mean (\bar{X}) practice score 10.17 and standard deviation (σ) 3.21 (possible range 0-30). The present findings could be supported by Jaganathan (2004) who found in his study that majority of the respondents (64%) belonged to medium level of adoption of organic farming practices. Findings of Sarker et al. (2009) also support our data who found in his study that among the respondent farmers, the majority (75%) were adopters of organic farming. The extent of practice in organic farming by the farmers on which the data were based and analyzed has been presented in Table 1. Among the ten selected practices (Table 2); application of cow dung in the field in every season was highly practiced (1st) followed by irrigating field (2nd), well tillage is done before manure application (3rd) and so on. The least (9th) practiced organic farming practice is regular soil test.

3.4 Selected characteristics of the farmers

The age of the farmers was markedly varied. The highest proportion (41.4%) of the respondent was middle (36-50 years) aged as compared to 28.6% and 30% were young and old respectively. It could be said that middle aged farmers had been more interested in organic farming. The young respondents were less interested in organic farming as they wanted to have more production return and more profit from per unit area of cultivated land. Based on educational qualification, majority (61.4%) of the farmers had secondary level of education followed by primary (34.3%), illiterate (2.9%) and higher secondary (1.4%) level of education. Farmers having bachelor degree were not found at the village. The farmers those who had secondary level of education were comparatively more interested to get involved in organic farming. This might happened due to the curriculum of secondary level of education which provides some knowledge of agriculture. They were more conscious about sustainable techniques related to agriculture and willing to solve obstacles of farming. Thus, the farmers with substantial education became more interested in practical sustainable agriculture.

Majority (52.8%) of the farmers were highly experienced (>20 years) in farming followed by medium experience (38.6%) and low experience (8.6%). As 71.4% of the respondent farmers were middle to old aged, they had very high experience in agricultural activities. In the perspective of organic farming experience, most (98.6%) of the farmers were low experienced (≤ 5 years) followed by very little high experience (only 1.4%) and there were no medium experienced farmers. Usually farmers want to achieve more profit from agricultural practices and for this reason they follow the commercial or semi-commercial methods of crop production utilizing huge amount of agro-

Table 5. Computed simple linear regression data (R-squared value and equation) for the characteristics of the farmers having significant correlation with their knowledge, attitude and practice on organic farming

Focus issues	Characteristics of the farmers	Regression value	Equation [†]
Knowledge	Experience in organic farming	$R^2 = 0.145$	$y = 0.649x + 8.541$
	Cosmopolitanism	$R^2 = 0.357$	$y = 0.709x + 5.520$
	Extension contact	$R^2 = 0.265$	$y = 0.278x + 6.307$
	Agricultural tanning	$R^2 = 0.107$	$y = 5.970x + 9.029$
Attitude	Experience in farming	$R^2 = 0.135$	$y = 0.270x + 56.85$
	Experience in organic farming	$R^2 = 0.059$	$y = 0.941x + 62.04$
Practice	Cosmopolitanism	$R^2 = 0.149$	$y = 0.481x + 7.674$

[†] Regression equations could provide a basis for quantifying the necessary amount of changes needed in correlated independent factors to increase the knowledge, attitude and practice on organic farming

chemicals. Thus, their agricultural experiences was high, however, organic agricultural experiences was low. According to their family size, about half (47.1 %) of the farmers belonged to the medium sized family while 28.6% and 24.3% of the farmers belonged to small sized and large sized family respectively. The average family size of the study area was 6.09 which indicates that the respondents were not aware of population growth as the average family size of the study area is more than that of national average 4.4 (BBS, 2011).

The observed farm size scores of the farmers varied from 0.03 ha to 1.49 ha. Majority (74.3%) of the farmers possessed small farms compared to 12.9% and 4.3% of them had medium and marginal farms respectively. None of the farmers belong to large farm size category. Only a few (8.6%) of the farmers were landless. The average farm size (0.56 ha) of the farmers of the study area were less than that of national average (0.60 ha) of Bangladesh (BBS, 2014). Because of this, it's very risky for the farmers to adopt experiments and practical implementation of any techniques related to organic farming. The per capita income in Bangladesh at the end of the fiscal year 2018-2019 was 1,909 USD (\approx 1,62,216.78 BDT) i.e., the monthly per capita income was 13,517.565 BDT. Monthly family income of the farmers ranged from 5,000 to 9,550 BDT with an average of 7,150.09 BDT which is 6,367.475 BDT lower than the national average; and all of the farmers had very low income which forced them to earn more by obtaining more production per unit time and area that hinders the practices of organic farming. The reason behind it were that most (87.2%) of the respondents were small to landless farm holding category as well as almost all of the respondents were dependent on agriculture. Das et al. (2019) also found that 55.8% of their respondents had low annual family income. Because of low income, the farmers emphasized on inorganic practices of farming which brought them more yield and

profit compared with organic farming. It is easy to understand that, input and capital intensive modern inorganic agriculture is capable of producing higher quantity of yields from same piece of land than organic agriculture.

Majority (65.7%) of the farmers had no organizational participation. On the other hand, one-fifths (20%) of the farmers had low organizational participation and only a few (14.3%) farmers had medium organizational participation, and no farmers had high organizational participation. Nishi et al. (2019) found that 57.9% of their respondents had low organizational participation. The finding indicates that farmers felt less interest in organizational participation. As they were not highly educated with low economic solvency, thereby their involvement in organizations had not been satisfactory. According to the distribution of the respondents regarding their cosmopolitanism, majority (58.6%) of the farmers had low cosmopolitanism and 41.4% had medium cosmopolitanism. Nishi et al. (2019) and Das et al. (2019) found that 55% and 60.8% of their respondents had low cosmopolitanism respectively. None of farmers belonged to high cosmopolitanism category. Increasing cosmopolitanism may help to change the respondents' attitudes towards organic farming. Majority (54.3%) of the farmers had low scale extension media contact followed by medium scale extension media contact (38.6%) and high scale extension media contact (7.1%). It might be due to their lower level of education as well as the marketing policies of the inorganic fertilizer, pesticide, insecticide etc. producing companies, that hinders them to create or keep government extension media contact. Inadequate extension service might be another reason behind this. Most (98.6%) of the farmers had received no training on organic cultivation. However, very few (1.4%) of the farmers had received low training on organic cultivation. None of the farmers had medium and high training experience on organic cultivation. Very little training con-

duction by the Government Organizations (GOs) and Non-Government Organizations (NGOs) related to organic cultivation might be the reason of scanty training experience by the respondents. As most (98.6%) of the farmers had no training on organic cultivation, they had very little enthusiasm to conduct it by experimentally or commercially.

3.5 Relationship between farmers' characteristics and KAP

To explore the relationships between the selected characteristics of the farmers and their knowledge, attitude and practice on organic farming, Spearman's Product Moment Coefficient of Correlation (ρ) was used. The relationship of the selected characteristics of the farmers with their knowledge, attitude and practice on organic farming appears in Table 4. Among the selected eleven characteristics of the farmers; experience in organic farming ($p < 0.05$), cosmopolitanism ($p < 0.01$), extension media contact ($p < 0.01$) and agricultural training ($p < 0.05$) showed significant positive relationship with knowledge; while experience in farming ($p < 0.05$) and experience in organic farming ($p < 0.01$) showed significant positive relationship with their attitude toward organic farming; and cosmopolitanism ($p < 0.01$) showed significant positive relationship with the practice in organic farming by the farmers. Thus it might be said that the higher the experience in farming, experience in organic farming, cosmopolitanism and extension media contact, the higher the knowledge, the positive the attitude and the more the organic farming practices. Das et al. (2019) found that 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 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. Biswas and Islam (2018) found that, only educational qualification and extension media exposure of the respondents showed a negative and significant relationship and the computed " ρ " value were -0.238 ($p < 0.05$) and -0.271 ($p < 0.05$) respectively. Based on the findings, they concluded that educational qualification of the farmers had significant contribution in the problem encountering in organic farming. It means that the higher is educational qualification the higher is the

ability of the respondents to mitigate the problems in organic farming. Besides, it might also be concluded that the farmers having higher extension contact were likely to have lower level of problem to encounter in organic farming.

The selected characteristics of the farmers which showed significant relationship with the focus issues were further analyzed for simple linear regression coefficients for exploring the specific contribution of the personal characteristics to the focus issues (Table 5). Significantly correlated every factor was individually computed for regression coefficient and regression equation which was supported by the method followed by Nishi et al. (2019). Increase in knowledge on organic farming could be contributed 14.5% by organic farming experience, 35.7% by cosmopolitanism, 26.5% by extension media contact and 10.7% by agricultural training (organic cultivation). Similarly, favorable attitudes could be increased 13.5% by experience in farming and 5.9% by experience in organic farming. 14.9% practice could be increased by cosmopolitanism (Table 5). Nishi et al. (2019) computed coefficient of simple linear regression to predict the contribution effect of agricultural training, knowledge, attitude, and practice on the participation (could be said as performance) of rural women in organic farming practices. They showed that, in case of simple linear regression the performance of women improved with the increase of agricultural training, knowledge, attitude, and practice where 7%, 14.44%, 18.85% and 18.96% of the participation can be explained by the above variables respectively. In Table 5, the regression equations are also mentioned. The purpose of mentioning the equations that, the researchers could find out and quantify the changes in knowledge with experience in organic farming, cosmopolitanism, extension contact and agricultural training; quantify the changes in attitude with experience in farming and experience in organic farming; and quantify the changes in practice with cosmopolitanism.

4 Conclusions

Majority of the respondents in our study had medium knowledge on organic farming. Favorable attitude is another essential factor which makes any person enthusiastic about performing a task like organic farming. We found in our research that most of the respondents had highly favorable attitude towards organic farming. Based on the knowledge and favorable attitude a farmer would be enthusiastically capable to practice organic farming. However, we found that organic farming practice by the respondents was low. Organic farming needs attention to be increased in practice magnitude. We also found that the practice was highest in case of application of cow dung in the

field while it was least in case of regular soil test. The ascertained relationship and simple linear regression analysis showed that higher experience in farming has positive relationship with knowledge in organic farming, likely experience in organic farming, cosmopolitanism and extension media contact also have positive relationship with the knowledge in organic farming. Besides, the favorable attitudes and organic farming practices were also positively correlated with those factors. The regression equations could provide a basis for quantifying the necessary amount of changes needed in correlated independent factors to increase the knowledge, attitude and practice on organic farming. Thus, it could be concluded from the above findings that, by utilizing the highly favorable attitude towards organic farming, the knowledge level of the farmers should be increased through training, and as a result the magnitude of the organic farming practices could be increased.

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Conflict of Interest

The authors declare that there is no conflict of interests regarding the publication of this paper.

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