

Adoption extent of organic vegetable farming in Bogra district, Bangladesh

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Abstract:

Adoption of organic vegetable farming can play a significant role in sustainable agricultural development through refraining indiscriminate use of agrochemicals which has been proven as the significant cause of environmental pollution. In this line, the main purpose of the study was to determine the adoption extent of organic vegetable farming by the farmers of Bogra district and to explore the factors that influence farmers' adoption of organic farming. The study was conducted in some selected villages under Shahjanpur Upazila (sub-district) of Bogra district. Data were collected by using an interview schedule from randomly selected 102 farmers during whole February, 2017. Multiple regression analysis was done to explore the significant factors and their contribution in adopting organic vegetable cultivation. The survey revealed that highest proportion of the farmers (79.40%) had low to medium adoption of organic farming while the rest had high adoption. Among the selected factors, extension media contact, training exposure, attitude towards organic farming and profitability had a significant contribution to the adoption of organic vegetable farming. The findings of the study indicated that the adoption level of organic vegetable farming has yet not to be satisfactory. Some initiatives like to increase farmers contact with media, arrange more training program, ensure the proper price of organic vegetable and improve transportation should be taken in creating a favorable attitude of the farmers towards organic farming as well as the adoption of organic farming.

Key words: Adoption, Organic vegetable, Farming, Linear regression, Bangladesh

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1. INTRODUCTION

Agriculture is the single largest producing sector of Bangladesh economy since it comprises about 14.75 % of the country's GDP and employs around 47.8% of the total labor force (BBS, 2016). The performance of this sector has an overwhelming impact on major macroeconomic objectives like employment generation, poverty alleviation, human resources development and food security as well. As the population increases over time, it demands for a change about the cultivation systems of agriculture. The application of modern agricultural science and technology has contributed to increase productivity of agriculture in the last half-century. The successes of agriculture, however, have been accompanied by many ecological problems. Today, both rural and urban inhabitants feel threatened by dangers posed to the environment by modern practices such as the heavy use of agro-chemicals. Chemicals have created many problems such as topsoil depletion and degradation, reduced soil microbial activities, groundwater contamination etc. Besides, excessive use of agro-chemicals endangered human health hazard through pesticide residual effect, heavy metal contamination (Rossette, 2006; Haque, 2011).

Scientist is expressing great concern over the indiscriminate use of chemicals. Therefore, emphasis is now focused on the use of organic and other byproducts of agriculture and industries. Researchers have proved that the reduction or non-use of synthetic chemicals can reduce environmental hazards and possible adverse effects. In contrast, organic fertilizers could improve the physical, chemical and biological properties of soil, and its use is important in sustaining soil productivity in the long term premise (Conway et al., 1991; Sana, 2003).

Organic farming may be a good choice as cost-effective method that can trim down rural poverty and curb pollution (Hossain, 2013). It is also the need in the present day context of serious threat to our ecology and environment. The farming method is the best means to make sure air, water and soil unpolluted leaving the environment safe for the present and future generations. For a sound future, organic farming offers a dynamic interaction among soils, plants, humans, ecosystem and environment which ultimately protect natural and agricultural resource bases from further degradation and to ensure long term sustainability in agricultural system (IFOAM, 2008).

At present organic farming is expanding in our country specially in the vegetable production sector (Nazim, 2016). However, the extent of adoption of organic vegetable farming is rarely researched. Now the question came how far vegetable growers adopt organic vegetable farming. Extent of adoption of organic vegetable farming practices by the growers will determine the success and failure of organic vegetable farming projects and help to readdress the projects in future. Therefore, the researcher has become interested to undertake a research entitled adoption of organic vegetable farming by the farmers of Bogra district focusing following objectives.

- 1.1 To describe the selected characteristics of the farmers;
- 1.2 To determine and describe the extent of adoption of organic vegetable farming by the farmers and
- 1.3 To explore the contribution of the selected characteristics of the farmers to their adoption of organic vegetable farming

2. METHEDODOLOGY

2.1 Study location

The locale of the study was four villages namely brikushtia, khudrokushtia, kamar para and chupinagar villages of Shahjahanpur upazilla (sub-district) in Bogra district. The study area was purposively selected as a considerable number of farmers practice organic vegetable farming in these areas. Menonite Central Committee (MCC) is an NGO who is working here for last five years to popularize organic farming among vegetable growers.

2.2 Population and Sampling Design

The researchers with the assistance of neighborhood pioneers and concerned program officer of organic vegetable farming venture arranged a refreshed rundown of organic vegetable farmers of the selected four villages. An aggregate number of 315 organic vegetable farmers were recorded. As indicated by Yamane's (1967) formula, the sample size was resolved as 102. In computing sample size 8% accuracy level, 50 percent degree of variability and estimation of $Z= 1.96$ at 95% confidence level were looked over the accompanying equation:

$$n = \frac{z^2 P(1-P)N}{z^2 P(1-P) + N(e)^2}$$

Where;

n = Sample size

N = Population size

e = The level of precision

Z = The value of the standard normal variable at the chosen confidence level

P = The proportion or degree of variability

A reserve list of 10 organic vegetable farmers was also prepared. Farmers in the reserve list were used only when a respondent in the original list was not available. The distribution of the sample farmers and those in the reserved list from the villages is shown in Table 1.

Table 1. Distribution of the population, sample and number of trained farmers in the reserve list.

Name of the villages	Population	Sample	Reserve list
Kamarpara	98	32	3
Bri-Kushtia	87	28	3
Khudrokushtia	59	19	2
Chupinagar	71	23	2
Total	315	102	10

2.3 Selection and measurement of Variables

Considering individual, financial, social and mental components of the target group, time and assets accessibility to the researcher, checking on applicable writing and talking about with pertinent specialists, we selected 12 characteristics of the respondents as the independent variables. These are age, education, farm size, annual family income, time spent on vegetable farm, knowledge on organic vegetable farming, profit from vegetable cultivation, level of pest infestation, extension media contact, organizational participation, attitude towards organic vegetable farming and agriculture training exposure Adoption extent of organic vegetable farming by the farmers was the dependent variable in this study. It was measured by averaging hectares of land where organic vegetable farming is done by the farmers in last

three years. Suppose, a farmer cultivated 1 ha in 2014, 2 ha in 2015 and 3 ha in 2016 than his adoption score would be $\frac{1+2+3}{3} = 2$.

2.4 Collection, processing and analysis of data

In order to collect viable and authentic data from the respondents a structured interview schedule was outlined carefully keeping the objectives of the study in mind. Simple, easy and direct questions and different scales were used to obtain information from the respondents. Both open and closed form questions were included in the interview schedule. The schedule was checked by the Supervisory Committee. We collected data using pre-tested interview schedule and on the basis of pre-test experiences necessary corrections, additions, modifications and alternations were made before finalizing the interview schedule for final data collection. The data collection period was from 01 to 28 February, 2017.

The collected raw data were analyzed thoroughly to detect errors and exclusions. Qualitative data were converted into quantitative data by means of suitable scoring whenever necessary. For this the collected data were given numerical coded values. The obtained data were then compiled on a master sheet and then tabulated and analyzed with keeping the objectives of the study in mind. The analysis of data was performed using statistical treatment with SPSS (Statistical Package for Social Sciences) computer program, version 21. Statistical measures such as number, range, mean, standard deviation and percentage were used in describing the variables whenever applicable. In order to explore the contribution of the concerned variables, multiple regression analysis was used.

3. RESULTS AND DISCUSSION

3.1 Selected Characteristics of the Organic Vegetable Farmers (OVF)

The characteristics of the organic vegetable farmers were selected to find out their contribution on their adoption extent of organic vegetable farming. The salient features of the respondents with their thirteen selected characteristics have been presented in Table 2.

Table 2. Salient features of the selected characteristics of organic vegetable farmers

Categories	Measuring unit	Possible Range	Observed Range	Mean	S.D
Age	Year	-	18-67	46.29	10.80
Level of education	Schooling years	-	0.5-16	4.42	4.26
Farm size	Hectare	-	0.11-1.75	0.40	0.30
Annual income	Thousand Taka	-	105-410	181.24	68.14
Time spend in OVF	Hours/week	-	13-29	18.63	4.30
Knowledge on OVF	Score	0-30	20-30	25.47	2.64
Profit from vegetable farming	Thousand Taka	-	11-118	53.02	23.82
Pest infestation level	Score	8-40	21-31	25.21	2.24
Extension media contact	Score	0-40	20-28	22.81	2.38
Organizational participation	Score	0-12	1-7	2.32	1.31
Agricultural training	No of days	-	0-12	3.96	3.95
Attitude towards OVF	Score	10-50	24-45	31.83	4.54

Tripp and Woolley (1989) reported that one individual character which pertaining to individual personal make up and play key role in individual adoption behavior is age. The lowest and highest age of the respondents was 18 and 67 years respectively with an average of 46. The mean value indicates majority of the farmers had primary level of education. Educated farmers are more innovative and analytical for adopting sustainable technologies. Farm size of the growers varied from 0.11 to 1.75 hectares with an average of 0.41 hectares. Though the average farm size was small in the study area but it was more than two and half times higher than that of national average (0.15 ha) of Bangladesh (BBS, 2016). In case of annual income, the average was 181.24 thousand BDT which is equivalent to 2263 \$. For vegetable farming activities they spent about 19 hours per week. Though there was a high level of pest infestation but the farmers gained profit from vegetable production. The pest infestation and profit both is high in vegetable production which is common and strange scenario in Bangladesh. Farmers' knowledge and attitude towards OVF was better compare to their training opportunities and organizational participation. The farmers were also contacted with various media to get help about their organic farming activities (Table 2).

3.2 Adoption Extent of Organic Vegetable Farming by the Farmers

Adoption extent of organic vegetable farming by the farmers was the dependent variable of the study. Based on the adoption score of organic vegetable farming, the farmers were classified into three categories which are shown in Table 3.

Table 3. Distribution of the respondents according to their adoption of OVF

Categories	Respondents		Mean	Standard deviation
	Number	Percent		
Low adoption (<Mean – 0.5 SD, i.e. <0.025)	26	25.50	0.04	0.03
Medium adoption (Mean ± 0.5 SD i.e. 0.025 to 0.055)	54	52.90		
High adoption (>Mean + 0.5SD, i.e. >0.055)	22	21.60		
Total	102	100.00		

Findings shown in Table 3 reveal that the highest proportion (52.90%) of the respondents had medium adoption of organic vegetable farming, while 25.50 percent had low adoption and the rest 21.60 percent had high adoption of organic vegetable farming. Table 3 also reveals that almost three fourth (78.40%) of the farmers had low to medium adoption of organic vegetable farming. This could be due to the fact that most of the organic vegetable farmers were middle to old in aged, had low education which created low attitude towards adoption of organic vegetable farming.

3.3 Contribution of the Selected Characteristics of the Farmers to their Adoption of Organic Vegetable Farming (OVF)

In order to identify significant factors influencing adoption extent of organic vegetable farming practices, multiple regression analysis was used which is shown in the Table 4.

Table 4. Multiple regression coefficients of contributing variables related to adoption extent of organic vegetable farming

Factors	Standardized Coefficients	Significance	R ²	Adjusted R ²	F	p
Age	-.031	.740	0.535	0.467	7.796	0.003** *
Level of education	-.066	.510				
Annual income	.122	.170				
Farm size	-.114	.221				
Time spent in OVF	.008	.931				
Knowledge in OVF	-.059	.518				
Profit from vegetable farming	.252	.012*				
Level of pest infestation	-.050	.559				
Organizational participation	-.015	.875				
Extension media contact	.297	.001**				
Agricultural training exposure	.281	.002**				
Attitude towards OVF	.272	.001**				

*Significant at p<0.05 and **significant at p<0.01

The data in Table 4 indicates there is a significant contribution of some selected characteristics such as extension media contact, attitude towards organic farming, agricultural training exposure and profit from vegetable farming in adopting organic vegetable farming at 5% and 1% level of significance respectively. The R² value (0.535) illustrate that 54 percent variation of the respondents' adoption of organic vegetable farming can be attributed to extension contact, attitude, training and profit making. The F value shows that the model is significant (p<0.003) at 1.0 % level of significance (Table 4).

However, each predictor may explain some of the variance in respondent's adoption extent of organic farming simply by chance. The adjusted R² value penalizes the addition of extraneous predictors in the model, but values of adjusted R² (0.467) still show that variances in respondents adoption extent of organic vegetable farming can be attributed to the predictor variables rather than by chance, and the both are suitable models (Table 4). In summary, the models suggest that the respective authority should consider the respondent's extension media contact, attitude towards organic vegetable farming, agricultural training exposure and

profit from vegetable farming in order to increase the adoption area of organic vegetable cultivation.

From analysis, it was showed that extension media contact of the vegetable farmers had the highest positive contribution (0.297) to their adoption of organic vegetable farming. This implies that with the increase of extension media contact of the vegetable farmers their adoption of organic farming will be increased. The finding is similar with the study of Kabir and Rainis (2015). Extension media contact plays an important role in adoption of organic vegetable farming. Continuous contact with different extension media help farmers to become aware about organic vegetable farming, learn about organic vegetable farming technologies, understand advantages of organic vegetable farming which increase the adoption extent of organic vegetable farming.

Agricultural training exposure among the vegetable farmers was another important contributor to farmers' adoption of organic vegetable farming. The positive coefficient between these two variables indicates higher the training facilities higher the adoption of organic vegetable cultivation. Training helps the farmers to acquire deep knowledge and improve skills about the respected aspects. Trained farmers can cope and handle smoothly the adverse situation in their cultivation. The finding is similar with the result of Kabir and Rainis (2015) who stated that training facilities increases the adoption of integrated pest management (IPM) by the farmers.

The farmers were also influenced by their attitude towards organic vegetable farming. This implies that with the increase of positive attitude towards organic vegetable farming by the vegetable farmers it would be increased their adoption extent of organic vegetable farming. From descriptive statistics, it was found that 82.40 percent vegetable farmers belong to positive attitude towards organic vegetable farming. Thus, positive attitude towards organic vegetable farming plays an important role in adoption extent of organic vegetable farming.

Profitability is a key factor for not only the adoption extent of organic vegetable farming but also other agricultural production. Profit is the key to any investment endeavor. Renewals of investment largely depend on the extent to which someone gets profit. Therefore, profit from vegetable farming influence on the adoption extent of organic farming. Farmers get higher price from organic vegetable than non organic. Besides, as the farmers did not spend money for purchasing chemical pesticide so they get profit from their vegetable cultivation. This is because pesticide cost is the most important item of cost for the vegetable farmers. However,

the inputs that are needed to cultivate organic vegetable should be more available to increase more profit as well as the area under organic vegetable farming.

4. CONCLUSIONS AND RECOMMENDATIONS

The findings revealed that majority of the farmers had low to medium adoption of organic vegetable farming in the study areas. It also revealed that average adoption of organic vegetable farming was very low as compared to average areas used for non organic vegetable farming. This fact leads to the conclusion that overall adoption of organic vegetable farming by the farmer was not satisfactory. There is huge scope for increasing the adoption extent of organic vegetable farming by the vegetable farmers. Extension media contact had highest contribution to the adoption extent of organic vegetable farming. Therefore, department of agricultural extension ((DAE) and other private organization should take steps to increase extension media contact which will increase the adoption extent of organic vegetable farming. Training was another dimension where the respective organization should be given more emphasis. To increase organic vegetable production only few NGOs are working. The level of government organization engagement is negligible. They should come forward to increase area under organic vegetable cultivation through providing training, showing success stories, result discussions, method demonstrations etc. for forming more positive attitude towards organic farming.

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