

**ADOPTION OF ORGANIC VEGETABLE FARMING BY THE FARMERS
OF BOGRA DISTRICT**

MASUD PARVEZ



**DEPARTMENT OF AGRICULTURAL EXTENSION AND INFORMATION SYSTEM
SHER-E-BANGLA AGRICULTURAL UNIVERSITY
DHAKA-1207**

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**ADOPTION OF ORGANIC VEGETABLE FARMING BY THE FARMERS
OF BOGRA DISTRICT**

BY

MASUD PARVEZ

Reg. No. 10-03799

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APPROVED BY

Kh. Zulfikar Hossain

Assistant Professor & Supervisor
Dept. of Agricultural Extension and
Information System
Sher-e-Bangla Agricultural University
Dhaka

Dr. Muhammad Humayun Kabir

Associate Professor & Co-supervisor
Dept. of Agricultural Extension and
Information System
Sher-e-Bangla Agricultural University
Dhaka

Md. Mahbubul Alam, Ph.D.

Chairman
Examination Committee
Dept. of Agricultural Extension and Information System
Sher-e-Bangla Agricultural University



**DEPARTMENT OF AGRICULTURAL
EXTENSION AND INFORMATION SYSTEM**
Sher-e-Bangla Agricultural University
Sher-e-Bangla Nagar, Dhaka-1207

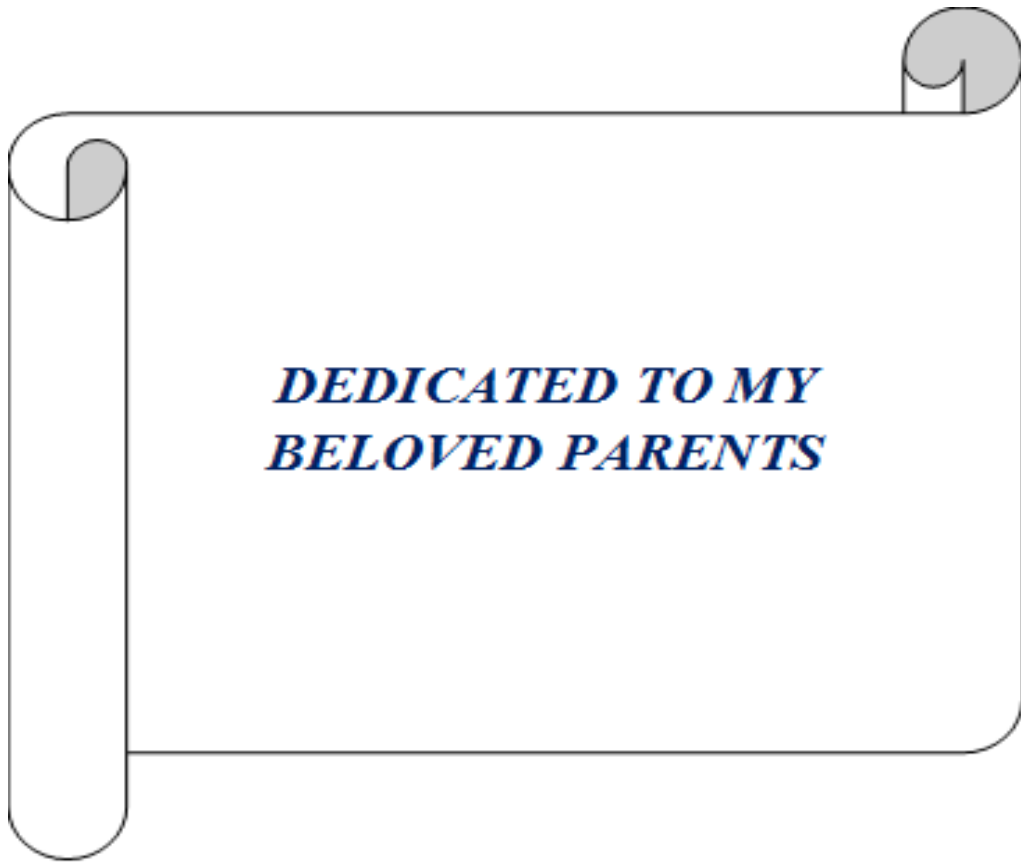
CERTIFICATE

This is to certify that the thesis entitled “ADOPTION OF ORGANIC VEGETABLE FARMING BY THE FARMERS OF BOGRA DISTRICT” submitted to the Faculty of Agriculture, Sher-e-Bangla Agricultural University, Dhaka-1207, in partial fulfillment of the requirements for the degree of Master of Science in Agricultural Extension And Information System, embodies the result of a piece of bonfire research work carried out by MASUD PARVEZ, Registration No. 10-03799 under my supervision and guidance. No part of the thesis has been submitted for any other degree or diploma.

I further certify that any help or source of information, received during the course of this investigation has been duly acknowledged.

Dated:
Place: Dhaka, Bangladesh

Kh. Zulfikar Hossain
Assistant Professor & Supervisor
Dept. of Agricultural Extension and Information System
Sher-e-Bangla Agricultural University
Dhaka



***DEDICATED TO MY
BELOVED PARENTS***

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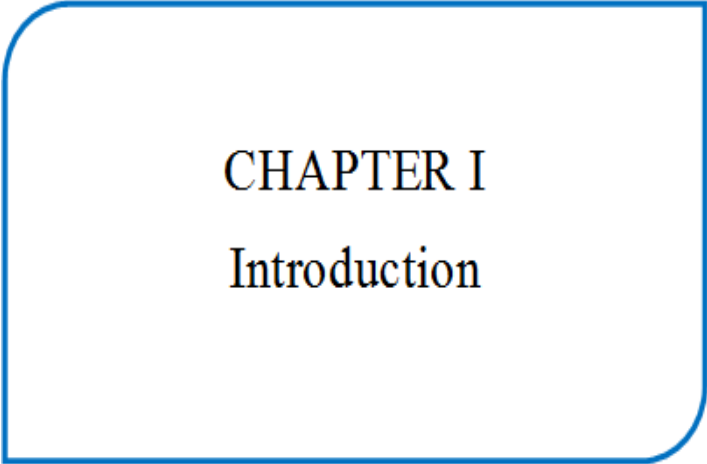
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LIST OF ABBREVIATIONS AND ACRONYMS

Abbreviation	ACRONYM
SAU	Sher-e-Bangla Agricultural University
DAE	Department of Agricultural Extension
etc.	Etcetera
e.g.	Example
ha	Hectare
Tk.	Taka
i.e.	That is
Km	Kilometer
viz.	Namely
NGO	Non-Government Organization
%	Percent
MCC	Melonitte Central Committee
BARI	Bangladesh Agriculture Research Institute
FAO	Food and Agricultural Organization
AFO	Assistant Field Officer
GUP	Gram Unnayan Prokolpo

ABSTRACT

Adoption of organic farming can play significant role to sustainable agricultural development through refraining indiscriminate use of agrochemical, which has been proven as significant causes of environmental pollution. However, factors affecting adoption of organic vegetable farming are not well focused. The main purpose of this study was to determine the adoption extent of organic vegetable farming by the farmers and to explore the contribution of the selected thirteen characteristics of the farmers to their adoption of organic vegetable farming. The study was conducted in four villages of Chupinagar union under Shahjahanpur upazila of Bogra district. Data were collected by using an interview schedule from the randomly selected 102 respondents during 2 February to 20 February, 2017. Multiple Regression method was computed to explore the contribution of the selected characteristics of the farmers upon their adoption of organic vegetable farming. The findings revealed that the highest proportion (79.40%) of the respondents had low to medium adoption of organic farming, while only 21.60 percent of the respondents had high adoption of organic vegetable farming. Among thirteen selected characteristics, extension media contact, agricultural training exposure, attitude towards organic vegetable farming and profit from vegetable farming had significant positive contribution to the adoption of organic vegetable farming. On the other hand, age, education, farm size, annual family income, knowledge on organic vegetable farming, time spent on vegetable farm, level of pest infestation, organizational participation, problem faced in adoption extent of organic vegetable farming had no significant contribution to the adoption of organic vegetable farming. The findings of the study indicated that adoption of organic vegetable farming has yet not to be satisfactory. To increase adoption of organic vegetable farming by the farmer's dissemination information regarding organic vegetable farming, arrange more training, improve marketing channel, ensure proper price, improve transportation, reduce input cost etc. will be helpful in creating favorable attitude towards organic farming as well as adoption of organic farming.



CHAPTER I
Introduction

CHAPTER I

INTRODUCTION

1.1 General Background

Bangladesh has an agrarian economy. Agriculture is the single largest producing sector of the 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 agricultural practices such as the heavy use of chemicals. Chemicals has 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. Groundwater contamination of agro-chemicals has been linked to gastric cancer, goiter, birth malformations, hypertension, testicular cancer and stomach cancer (Rossette, 2006; Haque, 2011). Excessive air and water-borne nitrogen from fertilizers may cause respiratory ailments, cardiac disease, and several cancers potentially affect the dynamics of several vector-borne diseases, including West Nile virus, malaria and cholera.

Scientist are 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 to synthetic fertilizers, 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. Reflecting on excessive, unscientific and imbalance use of inputs, agricultural scientists, environmentalists and policy makers are now advocating the introduction of low input

sustainable agriculture, ecological farming, organic agriculture and integrated intensive farming system.

Organic farming may be a good choice as cost-effective method that can trim down rural poverty and curb pollution (Hossain, 2001). 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.

“Organic farming is a holistic production management system which promotes and enhances agro-ecosystem health, including biodiversity, biological cycles, and soil biological activity. It emphasizes the use of management practices in preference to the use of off-farm inputs, taking into account that regional conditions require locally adapted systems. This is accomplished by using, where possible, agronomic, biological, and mechanical methods, as opposed to using synthetic materials, to fulfil any specific function within the system.” (FAO, 2009). Bangladesh agricultural research institute first initiated organic farming in Bangladesh through AFACI project. Some Non-government organization namely, Hunger Free World, MCC, Action in Development, FIVDB, ALRD, CARTITAS, Action Aid, UBINIG, Community Development Association (CDA), BARCIK, Concern International, B-Safe, Fukuoka Foundation, VOCTA etc. are promoting organic farming through training, demonstrations and awareness building. 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 developed a felt need to conduct this sort of research. Viewing and analyzing the aforesaid conditions the researcher has become interested to undertake a research entitled “adoption of organic vegetable farming by the farmers of Bogra district”

1.2 Statement of the Problem

Agriculture and environment are reliant on each other. At present, it has been set up that agriculture is a noteworthy polluter of on a nearby, territorial and worldwide premise (Conway et al., 1991). In addition to beneficial effects the modern agricultural practices have tremendous influence on environmental pollution and Bangladesh is not exception to this (Sana, 2003). Now a day's farmers are indiscriminately using agro-chemical in vegetable production which posing harmful health hazards as well as environmental pollution. To address these issues, adoption of organic vegetable farming can be a good alternative for eco-friendly way of producing vegetable. To sustain agricultural productivity as well as to conserve the environment, organic farming may be viable alternative approach.

Bangladesh agriculture research institute initiated organic farming in Bangladesh and introduced Farmers Field School (FFS) and organic farming club for training of the farmers. Several NGOs were also given training on organic farming for vegetable cultivation. Most of the projects worked on organic vegetable farming were extension-led projects. Organic farming not only improves the environmental condition but also improves the socio-economic condition of the farmers. Organic farming is a profitable agribusiness. Now a day's farmers are showing interest in organic farming. Organic farmers can make more money than their inorganic counterparts, even with their lower yields, because consumers are willing to pay more for organic foods. A large number of undesirable costs of modern agriculture can be minimized by avoiding use of chemical fertilizers, pesticides, anti-biotic etc. However, lack of good quality seed, lack of financial support, low knowledge on organic farming, lack of proper marketing channel and transportation facilities are seemed to be the key challenges to vegetable farmers for adopting organic farming. But very few studies were found related to socio economic factors which could play an important role for adoption of organic vegetable farming. From that above point of view, the researcher attempted the present study to seek answer to the following research questions:

1. What is the extent of adoption of organic vegetable farming by the farmers?
2. What are the characteristics of the farmers who practice organic farming?

3. What are the contribution of the selected characteristics of the farmers to their extent of adoption of organic vegetable farming?

1.3 Objectives of the Study

In order to find proper direction of the present study, following specific objectives were formulated:

1. To determine and describe the extent of adoption of organic vegetable farming by the farmers
2. To determine and describe the following selected characteristics of the farmers, such as
 - a) Age
 - b) Level of education
 - c) Annual family income
 - d) Farm size
 - e) Time spent in vegetable farming
 - f) Knowledge in organic vegetable farming
 - g) Profit from vegetable cultivation
 - h) Level of Pest infestation
 - i) Organizational participation
 - j) Extension media contact
 - k) Agricultural training exposure
 - l) Attitude towards organic vegetable farming, and
 - m) Problems faced by the farmers in organic vegetable cultivation; and
3. To explore the contribution of the selected characteristics of the farmers to their adoption of organic vegetable farming

1.4 Justification of the Study

Farmers are now heavily dependent on input oriented agriculture. Many researchers also recommended that organic agriculture is effective in poorer countries and it can give socio-

economic and ecologically sustainable development. It can overcome the harmful impacts of the green revolution (IFOAM, 2008).

As organic farming is recognized as sustainable farming method, this can perhaps give the best answer to provide sustainability in production. Farmers of Bangladesh are conscious about environment but they are illiterate, resource poor and highly dependent on purchased inputs. Farmers of Bangladesh have lack of knowledge on organic farming practices. By the support of Bangladesh government, different government organizations like DAE, BARI etc. and non-government organizations like BRAC, CARE, Hunger Free World, MCC were given different training on organic farming practices like pheromone trap, extract of botanical product, light trap, bagging of fruits, field sanitation, crop rotation, vermicomposting, Trico composting, yellow trap etc. in vegetable cultivation. Farmers Field School, Organic Farming Club etc. are working to disseminate organic farming related information among the farmers. Therefore, findings of this study will be helpful for the extension workers and policy makers to arrange programmes for dissemination of organic vegetable farming. The findings of the study will also manifest the extent of adoption of organic vegetable farming by the farmers and will be able to give a hypothetical thought all over the nation. It is expected that this study will inspire other researchers to conduct same sorts of research in other parts of the country. Considering the importance, the researcher has decided to undertake the study entitled “adoption of organic vegetable farming by the farmers of Bogra district”.

1.5 Assumptions of the Study

An assumption is the supposition that an apparent fact or principle is true in the light of the available evidence (Goode and Hutt, 1952). The researcher had the following assumptions in mind while undertaking this study:

- a) The respondents included in the sample were competent to fulfill the query of the researcher.
- b) Data which was provided by the respondents were authentic.
- c) views and opinions provided by the respondents included in the sample were representatives of the views and opinions of the whole population of the study area.

- d) The socio-economic conditions of the farmers were more or less same.
- e) The nature of problems gave a representative feature in the context of the other rural areas of Bangladesh
- f) The findings of the study were hoped to be convenient for planning and execution of various extension programs and the process of conveying agricultural technologies.

1.6 Limitation of the Study

The present study was conducted with a view to determine the adoption extent of organic farming by the farmers. In order to exploiting the research in an effective way some limitations must need to be imposed. Considering the time, money, labor and other necessary resources available to the researcher, the following limitations have been observed throughout the study:

- a) The study was restricted to four villages namely kamarpara, Bri-kushtia, Khudro kushtia and chupinagar of chupinagar union under Shahjahanpur upazila of Bogra district
- b) There were many farmers in the study area, but only the farmers who were involved in organic vegetable farming was considered for this study.
- c) There were many ways to determine adoption of organic vegetable farming by the farmers. But it was calculated on the basis of their average land under organic vegetable cultivation for three years.
- d) For some cases, the researcher confrontation unexpected interference from the over interested side talkers while collecting data from the target respondents. However, the researcher tried to overcome the problems as far possible with sufficient tact and skill.
- e) The researcher relied on the data furnished by the farmers from their memory during interview.
- f) The researcher had to depend on the data furnished by the respondents during their interview with him.

1.7 Definition of Terms

A number of key terms have been used throughout the study are defined below to avoid uncertainty and misapprehension.

Age

Age of a respondent was defined as the period of time in actual years from his birth to the time of interviewing.

Level of education

Empirically it was defined to the development of desirable changes in knowledge, skill and attitudes in an individual through reading, writing, working, observation and other selected activities. It was measured based on classes passed from a formal educational institution by the farmers.

Farm size

Farm size referred to the cultivated area either owned by the farmer or obtained from other on barga system, the area being estimated in terms of full benefit and half benefit to the farmer respectively. The self-cultivated owned land and cultivated area taken as lease or mortgage from others was recognized as full benefit.

Time spent in vegetable farming

Time spent on vegetable farm alluded to the total sum of time a farmer spends in his farm in a typical day.

Knowledge in organic vegetable farming

Knowledge referred to a theoretical or practical understanding of a subject. In this study knowledge on organic farming referred to extent of basic knowledge of the farmers in different aspects of organic farming

Profit from vegetable farming

It implied the measure of benefit ones get from vegetable farming.

Level of pest infestation

Level of pest infestation implied the state of the farm in the wake of being attacked by the pest.

Agricultural training exposure

It referred to the total number of days that a respondent had exposure training from DAE, NGOs or other organizations under different training program.

Extension media contact

This term referred to an individual's access to or contact with the different extension media.

Organizational participation

Organizational participation of a respondent refers to his/her taking part in various social organizations as various membership.

Attitude towards Organic farming

Attitude is permanent feeling, thoughts and predisposition people have about certain aspects of their environment (Hawkins, Dunn and Cary, 1982). The attitude towards organic farming means farmers believes, feelings and actions toward various aspects of organic farming practices.

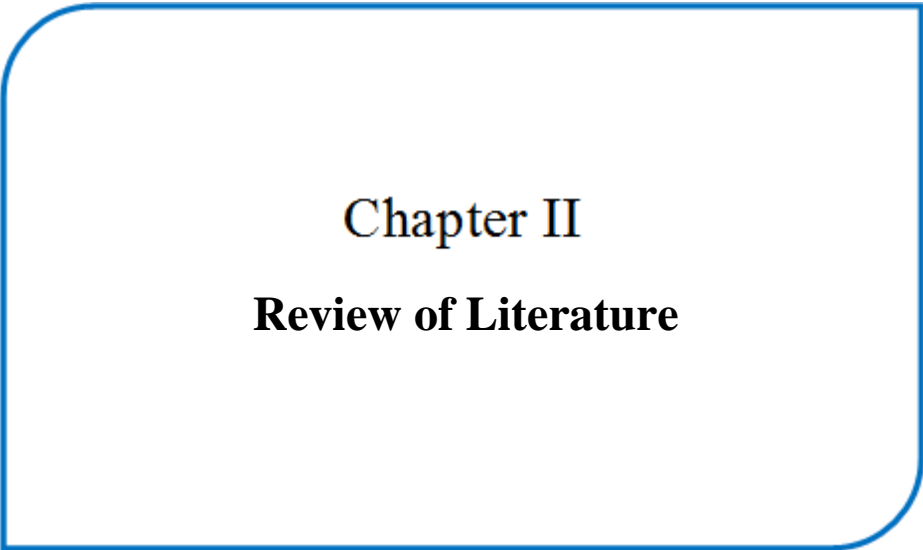
Adoption

According to Rogers (1995) "Adoption is a decision to make full use of an innovation as the best source of action available". Ray (1991) said "when an individual takes up a new idea as the best course of action and practices at the phenomenon is known as adoption". However, adoption of production technologies refers to one's use of different practices of production technologies and the decision to continue their use in future. It is an individual decision-making process.

Organic vegetable farming

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. So organic vegetable farming can be defined as a holistic production

management system which promotes and enhances agro-ecosystem health, including biodiversity, biological cycles, and soil biological activity. It emphasizes the use of management practices in preference to the use of off-farm inputs. (FAO, 2009).



Chapter II
Review of Literature

CHAPTER II

REVIEW OF LITERATURE

The purpose of this Chapter is to review of literature having insights to the present study. The present study was mainly concentrated with the adoption of organic vegetable farming by the vegetable growing respondents. Considerable works have done in the field of adoption of improved vegetable cultivation practices, in many countries including Bangladesh but very few studies relating to adoption of organic vegetable farming have been conducted in our country.

It is always beneficial for research to consult available literature to access the stock of knowledge and receive future guidelines for conducting further research in the particular area. This chapter comprises of four sections. The first section reviewed the literature of findings researches on adoption. Second section dealt with relationship on contribution of the selected characteristics of the farmers with their adoption of organic vegetable farming. Third section dealt with the research gap of the study and the final section dealt with the conceptual framework of the study.

2.1 Review of Literature Relating to Adoption of Organic Farming

Arif (2015) conducted a study on factors affecting the adoption of organic farming in Peshawar-Pakistan found that age, education, low input cost, productivity and profitability had significant relationship with their adoption of organic farming.

A study conducted by Thapa (2012) mentioned motivation by NGOs and GOs, motivation by fellow farmers, women's role in organic vegetable farming, training on organic vegetable farming, and satisfaction with the price of organic vegetables, had positive influence on the adoption of organic vegetable farming.

Vishal and Patil (2016), studied the adoption of organic farming in shindkheda tehsil and found that age, knowledge, financial support, extension agent's role and environmental awareness had significant positive relationship with the adoption of organic farming.

Ragasa (2012) in a review of technology adoption in agriculture concluded from 35 case studies that, women have much slower rates of adoption than men. This was attributed to differentiated access to complementary inputs and services. Specifically, for organic technology,

Tovignan and Nuppenau (2004) showed that households with large family sizes were more amenable to consumers' perceptions, attitudes and willingness to pay towards chemical free vegetable in North Sumatera

Burton et al. (2013) and showed that, the positive coefficient of household size did not impact on the adoption of organic technology significantly.

Zakowska-Biemans (1998) found that the farmers' concern about food quality and their desire to live in harmony with the environment had influence on the adoption of organic farming.

Prasant, P. (2015) found that training, financial support, marketing facilities had significant impact on adoption of organic farming by the farmers of Karimnagar district of Andhra Pradesh.

Chomba, G.N. (2004) found in his study that financial support, marketing facilities and environmental consciousness had significant impact on adoption of organic farming in Zambia.

2.2 Review of Literature Concerning Relationship on Contribution of the Selected Characteristics of the Farmers to their Adoption of Organic Farming

2.2.1 Age and the adoption of organic farming

Sarker (2010) found that the age of the respondents had no significant relationship with their adoption of organic vegetable farming.

Hossain (2011) conducted a study to determine the relationship of farmers' characteristics with their adoption behavior of improved farm practices in Sadar upazila of Jamalpur district. He reported that age of the wheat farmers significantly influenced the adoption of improved farm practices.

2.2.2 Level of education and the adoption of organic farming

Sarkar (2010) in his study found that education had significant and positive relationship with the adoption of organic vegetable farming.

Rahman (2006) found that the education of the farmers had significant positive relationship with their adoption of organic vegetable farming.

Sardar (2002) found that the education of the farmers had significant positive relationship with their adoption of IPM practices.

2.2.3 Annual family income and the adoption of organic farming

Sarkar (2010) found that the annual family income of the farmers had no significant relationship with their adoption of organic vegetable farming.

Rahman (2006) found that the annual income of the farmers had no significant correlation with their adoption of organic vegetable cultivation technologies.

Singh (2011) in a study found that income of the farmers was significantly associated with the level of adoption of organic vegetable farming.

Ahmed (2006) found that the annual family income of the farmers had no significant positive relationship with their adoption of selected wheat varieties.

2.2.4 Firm size and the adoption of organic farming

Sarkar (2010) found that the farm size of the farmers had no significant relationship with their adoption of organic vegetable farming.

Rahman (2006) found that the farm size of the farmers had no significant correlation with their adoption of organic vegetable cultivation technologies.

2.2.5 Time spent in vegetable farming and the adoption of organic farming

Uttam (2015) studied that the time spent in vegetable farming had no significant relationship with their adoption of IPM practices in vegetable production.

2.2.6 Knowledge in organic vegetable farming and the adoption of organic farming

Sarkar (2010) found that the knowledge on organic farming of the farmers had significant positive relationship with their adoption of organic vegetable farming.

Sadder (2012) in his study revealed that agricultural knowledge of the farmers had positively significant with their adoption of IPM practices.

Koch (2005) conducted a study in the north-west organic free, state South Africa concerning perception of agriculture innovativeness, aspiration, knowledge and innovation adoption. He observed that there was a strong positive relationship between perception, knowledge and practice adoption.

Reddy et al. (2007) found significant association between knowledge and use of organic farming practices in paddy production by participant and non-participant farmers.

2.2.7 Level of pest infestation and the adoption of organic farming

The researcher could not find any relevant literature to this relationship.

2.2.8 Profit from organic vegetable farming and the adoption of organic farming

Sarkar (2010) stated that profit from organic vegetable farming had significant positive impact on adoption of organic vegetable farming.

Rahman (2012) conducted a research and find that profit is the major reasons of adopting organic vegetable farming in Bangladesh.

2.2.9 Organizational participation and the adoption of organic farming

Kher (2012) carried out a research study on the adoption of improved wheat cultivation practices by the farmers of selected village of Rajouri block, India. He observed that there was no significant relationship between the farmers' social participation and their adoption of improved wheat cultivation practices.

Rahman (2015) in his study found that organizational participation of potato farmers had no relationship with their knowledge regarding improved practices of potato cultivation.

Mahasin (2006) in his trial found that the organizational participation had no significant relationship with their adoption of IIYV winter vegetables.

Hussein (2001) in a study on the farmers' knowledge and adoption of modern sugarcane cultivation practices observe that organizational participation of the growers had significant positive relationship with their adoption of modern sugarcane cultivation practices.

Rahman (2005) observed that the organizational participation of the farmers had no significant relationship with their adoption of modern rice varieties.

2.2.10 Extension media contact and the adoption of organic farming

Rahman (2001) found that the extension media contact of the farmers had significant positive correlation with their adoption of organic vegetable farming.

Sardar (2012) concluded that the extension contact had positively significant, relationship with their adoption of IPM practices.

2.2.11 Agricultural training exposure and the adoption of organic farming

Hossain (2011) in his study observed that proper training raises the knowledge and skill level of participants significantly.

Verma et al. (2009) in his study showed there was significant change in attitude of rural women from before training to after training in improved home making tasks. They said that due to gain in knowledge the attitude became more favorable.

Islam (2002) in a study on farmers' knowledge and adoption of ecological agricultural practices under the supervision of Proshika observed that agricultural training exposure of the farmers had no significant relationship with their adoption of ecological agricultural practices.

Haque (2003) in his study found that training received of the respondent had positive significant relationship with their practices in farmers' adoption of 31 modern maize cultivation technologies.

2.2.12 Attitude towards organic vegetable farming and the adoption of organic farming

Sarker (2010) found that the attitude toward organic vegetable cultivation of the farmers had significant positive relationship with their adoption of organic vegetable farming.

Islam (2002) revealed that the attitude towards technology of the farmers had a significant positive relationship with their adoption of modern agricultural technologies.

Hasan (2006) led a review on adoption of some chosen agricultural advances among the farmers as saw by the cutting edge GO and NGO laborers. He found that there was significant positive connection between state of mind towards improvement and saw adoption of chosen innovations.

2.2.13 Problems faced by the farmers in organic vegetable farming and the adoption of organic farming

Sarker (2010) found that the problems faced by the farmers in organic vegetable farming had negative relationship with their adoption of organic vegetable farming.

Hossain (2013) carried out a research on adoption of HYV rice by the rice farmers in Bhabakhali union under Mymensingh district. The findings indicated no relationship between community problem awareness and adoption of HYV rice.

Kashem and Hossain (2012) in his study observed adoption behavior of sugarcane farmers. The study revealed a positive relationship between community problem awareness and adoption of sugarcane farmers.

Rahman (2005) in his study identified problems faced by farmers' in cotton cultivation. Non-availability of quality seed in time, unfavorable and high cost of fertilizer and insecticides, lack of operating capital, not getting fair weight and reasonable price according to grade, effects of cattle in cotton field, lack of technical knowledge, lack of storage facility, stealing from field at maturity stage, and late buying of raw cotton by Cotton Development Board were identified as major problems of cotton farmers in Mymensingh district.

2.3 Research Gap of the Study

Many studies related to organic vegetable farming have been conducted in different countries of the world. Some of those focused on farmers' attitude towards organic vegetable farming and adoption of organic farming. For example, study conducted by Thapa (2010) on adoption and extent of organic vegetable farming in Mahasarakham province, Thailand found that motivation by NGOs and GOs, motivation by fellow farmers,

women's role in organic vegetable farming, training on organic vegetable farming, and satisfaction with the price of organic vegetables, had positive influence on the adoption of organic vegetable farming. Another study conducted by Zakowska-Biemans (1998) found that the farmers' concern about food quality and their desire to live in harmony with the environment have influence on the adoption of organic farming. Arif (2015) conducted a study on factors affecting the adoption of organic farming in Peshawar-Pakistan found that age, education, low input cost, productivity and profitability had significant relationship with their adoption of organic farming. These studies were conducted in other countries than Bangladesh. In Bangladesh, very few studies had been done on organic vegetable farming. Sarker (2010) conducted a study on determinants of adoption decisions: the case of organic farming in Bangladesh in Tangail revealed that age, educational level, contact with NGOs, knowledge, Environmental awareness had significant positive relationship with their adoption decisions of organic farming. Moreover, these studies conducted in other area than Bogra. Bogra ranked first in vegetable production (BBS, 2016). Because of location and socio-cultural differences, a factor which is suitable for a locality at one time might be found inappropriate in another locality at the same or different time. Therefore, an area specific study is always required.

2.4 A Conceptual Framework of the Study

In scientific research, selection and measurement of variables constitute an important task. Properly constructed hypothesis of any research contains at least two variables namely, "dependent variable" and "independent variable". Selection and measurement of those variables is an important task. A dependent variable is that which appears, disappears or varies as the researcher introduces, remove or varies the independent variables (Townsend, 1953). This study concerned with dependent variable, adoption extent of organic vegetable cultivation and the selected characteristics as independent variables, i.e. age, education, annual income, farm size, time spend in farm, knowledge on organic farming, Level of pest infestation, profit from vegetable cultivation, organizational participation, extension contact, agricultural training exposure, attitude towards. Organic vegetable farming and problems faced by the farmers in organic vegetable cultivation. Based on these above discussions and the review of literature, the conceptual framework of this study has been formulated and shown in figure 2.1

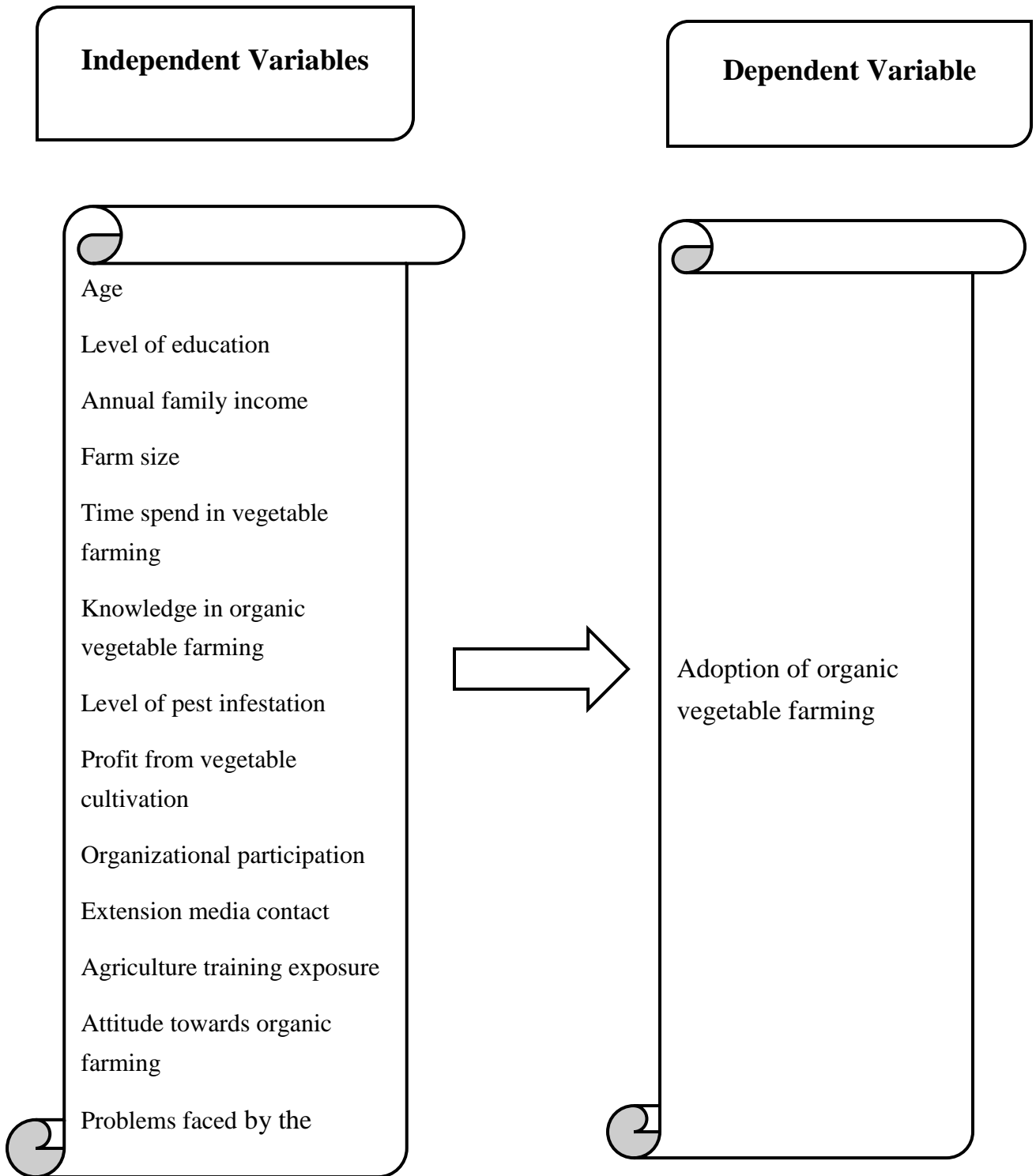
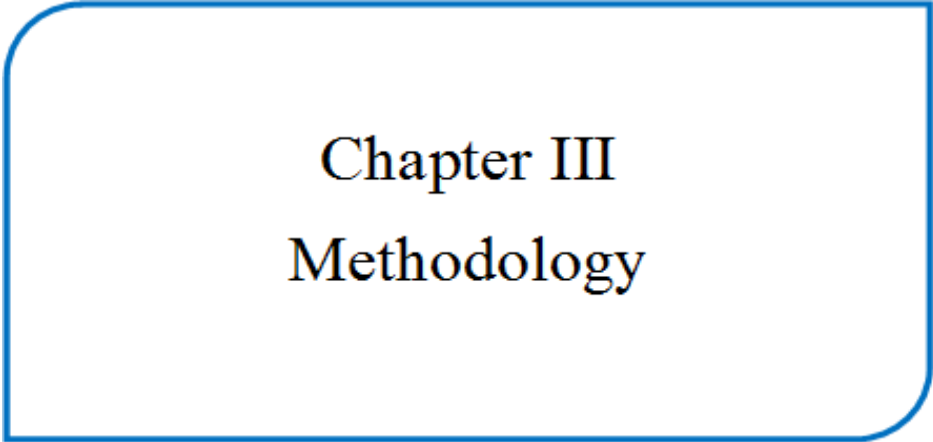


Figure 2.1 Conceptual framework of the study



Chapter III
Methodology

CHAPTER III METHEDODOLOGY

Methodology is an important and integral part of research which regulates whether a scientific research will be prolific or not. It requires a very careful consideration to organize methodology to make the study systematic. A proper methodology helps researcher collecting valid and authentic data for arriving at prolific decisions. The methods and procedures followed in conducting this study has been described in this Chapter and are presented below in the following sections and sub-sections.

3.1 Locale of the Study

The locale of the study was four villages namely bri kushtia, khudro kushtia, kamar para and chupinagar villages of Chupinagar union of Shahjahanpur upazilla in Bogra district. The study area was about 20 K.M. far from Bogra and well communicated. The site was purposively selected as locale of the study due to familiarity with the researcher as well as a considerable number of farmers practice organic vegetable farming in these areas. Melonnite central committee is being working here for last five years to popularize organic farming among vegetable growers. A map of Bogra district showing Shahjahanpur upazilla and another map showing study are in Shahjahanpur upazilla are presented in figure 3.1 and 3.2 respectively.



Figure 3.1 Map of Bogra District showing [■] the study area- Shajahanpur Upazila

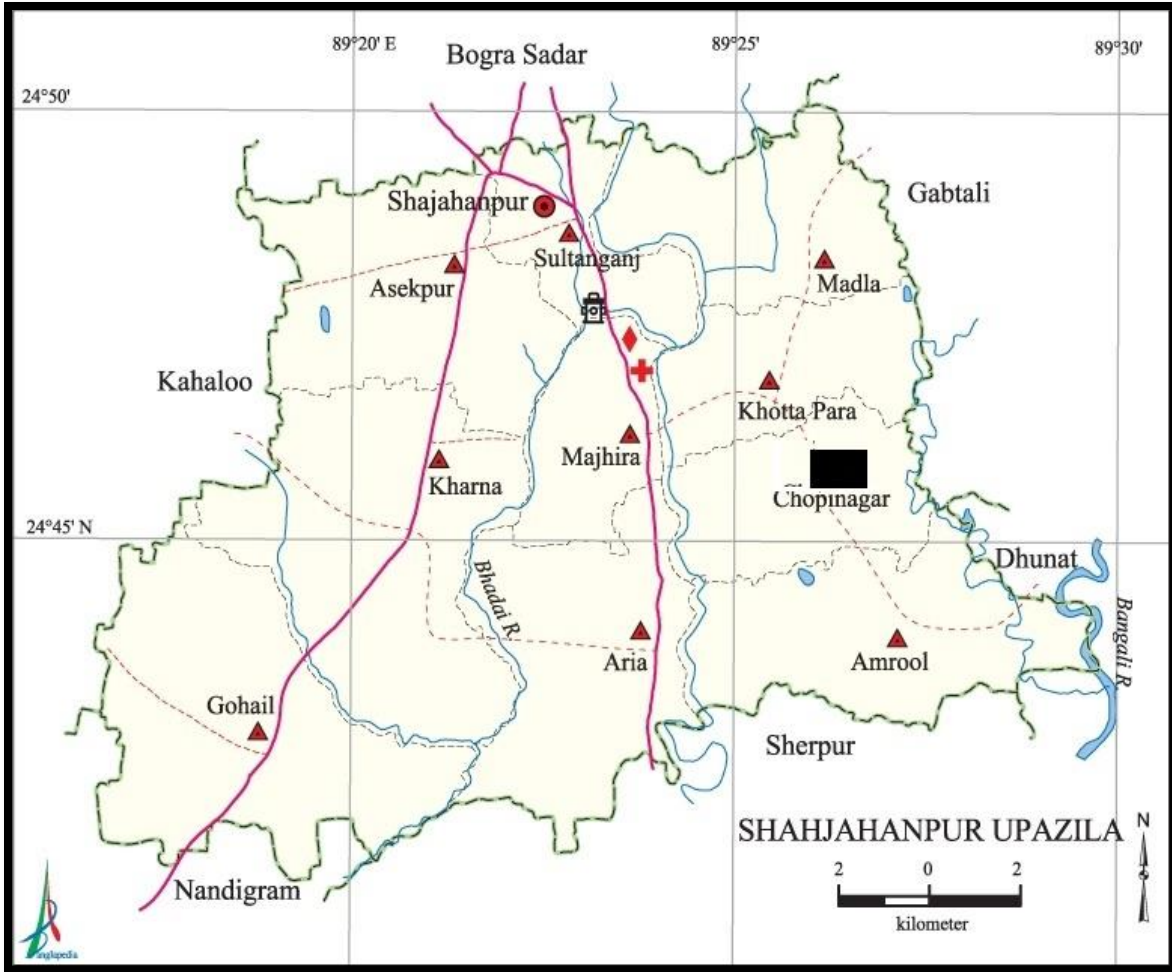


Figure 3.2 Map of Shahjahanpur Upazila showing the study area [■]

3.2 Population and Sampling Design

The researcher himself with the assistance of neighborhood farmers and concerned program officer of organic vegetable farming project 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

Then 102 organic vegetable farmers were selected from the population following proportionate random sampling technique. A reserve list of 10 organic vegetable farmers was also formulated. 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 3.1.

Table 3.1 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
Khudro kushtia	59	19	2
Chupinagar	71	23	2
Total	315	102	10

3.3 Selection of Variables

The researcher drew in better than average care in choosing the variables of the study. 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, the researcher chose the variables for the study entitled adoption of organic vegetable farming by the farmers of Bogra district was the dependent variable of this study. The researcher selected 13 characteristics of the respondents as the independent variables. These were: age, level of education, farm size, annual family income, time spent in vegetable farming, knowledge in organic vegetable farming, profit from vegetable cultivation, level of pest infestation, extension media contact, organizational participation, attitude towards organic vegetable farming, agriculture training exposure and problems faced by the farmers in organic vegetable cultivation.

3.4 Research Instruments

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. An English version of the interview schedule has been enclosed in the Appendix A.

3.5 Measurement of Variables

3.5.1 Measurement of independent variables

The independent variables of the study were 13 selected characteristics of the organic vegetable farmers. The measurement procedure of which is discussed in subsequent sections.

3.5.1.1 Age

Age of a farmer referred to the period of time from his/her birth to the time of interview. It was measured in terms of genuine years on the basis of his/her statement. One score was assigned for each year of his/her age.

3.5.1.2 Level of education

Education was measured by the year of schooling. Educational level of the respondent farmers was measured on the basis of completed years of schooling in an academic institute. If a respondent did not attain formal education, his score was assigned as zero (0). A score of 0.5 was assigned to a respondent who only could sign his/her name. A score of one (1) was assigned for each year of schooling, i.e. 10 for S.S.C, 12 for H.S.C., and so on.

3.5.1.3 Annual family income

This specified to the last year aggregate income in taka of all relatives of a respondent from farming (crops, animals and fisheries), business, work and different sources. A score of one (1) was assigned for each thousand taka.

3.5.1.4 Farm size

Farm size of the respondent was measured as the size of his farm (including vegetable and other crops) on which he continued his/her farm practices during the period of study. Each respondent was asked to mention the homestead area, the area of land under his/her own cultivation, own land given to others on barga system, land taken from others on barga system, and land taken from others on lease system. The area was estimated in terms of full benefit to the farmers or his family.

The following formula was used in measuring the farm size:

$$\text{Farm size} = A_1 + A_2 + \frac{1}{2}(A_3 + A_4) + A_5$$

Where, A_1 = Homestead area, A_2 =Own land under own cultivation, A_3 = Own land given to others on borga, A_4 = Land taken from others on borga, A_5 = Land taken from others on lease. The unit of measurement was hectares.

The data was first recorded in terms of local measurement unit i.e. ekor or shotok and then converted into hectare. The total area, thus, obtained is considered as his farm size score (assigning a score of one for each hectare of land).

3.5.1.5 Time spent in vegetable farming

How much time a respondent spent in vegetable field was measured in hours/day considering average time spent per day.

3.5.1.6 Knowledge in organic vegetable farming

To quantify the organic vegetable cultivation information of a respondent a 15-items questions was set up in the questionnaire plan. Each question was apportioned 2 points. Reasonable score was given for all intents and purposes adjust reply. So right answer of 15 questions expected to acquire 30 points. Wrong answer was allotted zero. So, a respondent could get zero on the off chance that he/she answer wrong all the 15 addresses. The conceivable knowledge score of organic vegetable farming run from 0-30

3.5.1.7 Level of pest infestation

Level of pest infestation means the condition of the farm after being invaded by the pest. The scale used for computing the level of pest infestation score was presented below:

Level of pest infestation	Assigned score
Very high	5
High	4
Medium	3
Low	2
Very low	1

Level of pest infestation score of a respondent was determined by adding together the scores obtained from each of the eight (8) types of pests. The level of pest infestation score of the respondents could range from 8 to 40, where, 8 indicating low pest infestation and 40 indicating very high pest infestation.

3.5.1.8 Profit from vegetable farming

It was measured by calculating profit from vegetable farming.

3.5.1.9 Organizational participation

The organizational participation score was evaluated for each respondent based on his/her membership with four different types of organizations. The following scale was used for computing the organizational participation score.

Nature of participation	Score assigned
No participation	0
Participation as ordinary member	1
Participation as executive member	2
Participation as secretary/president	3

Organizational participation score of a respondent was determined by adding together the scores obtained from each of the four (4) types of participation. Organizational participation score of the respondents could range from 0 to 3, where, 0 indicating no participation and 3 indicating very high participation.

3.5.1.10 Extension Media Contact:

Extension media contact refers to one's exposure to the influence of extension program through different communication media and sources. The extension media contact of a respondent was measured by computing an extension contact score based on his/her extension contact with ten (10) selected extension media. Respondents mentioned the nature of his/her contact by putting a tick mark against any one of the four responses -not at all, rarely, occasionally, often and regularly. The score for each respondent was determined by adding his/her response to all the items based on his/her frequency of contact

with a score of 0, 1, 2, 3 and 4 respectively. The extension media contact score of the respondents could range from 0 to 40, where 0 indicating no extension media contact and 40 indicating very high extension media contact.

3.5.1.11 Agricultural training exposure

Agricultural training exposure was measured by the aggregate number of days of a respondent took part in diverse training programs from various organizations. A score of one (1) was assigned for each day of training attended.

3.5.1.12 Attitude towards organic vegetable cultivation

Ten relevant statements were carefully constructed to develop attitude scale. The Likert scale was used to serve the purpose. There were 5 positive and 5 negative statements in the scale. These statements were alternately arranged. A respondent was asked to indicate her/his degree of agreement about each of the statements along with a five-point scale as, strongly agree, agree, undecided, disagree and strongly disagree. Scores were assigned to these five alternate responses as 5, 4, 3, 2 and 1 respectively for each positive statement. In case of negative statement, the reverse scores were assigned. However, the score of a respondent was obtained by adding her/his scores for all the 10 statements. Thus, the attitude score of a respondent could range from 10 to 50, where, 10 indicates very low attitude towards organic vegetable cultivation and 50 indicates very high attitude towards organic vegetable cultivation.

3.5.1.13 Problem faced by the farmers in organic vegetable cultivation

The farmers were made a request to give their supposition on 6 chosen problematic issues, which were recognized amid pre-testing of the poll alongside their degree of problem faced in organic vegetable cultivation. A five-point scale was used for computing the problem score of a respondent. The weights were assigned 1 for 'very low' 2 for 'low' 3 for 'medium' and 4 for 'high' problem and 5 for "very high". The weights of responses of all the problems they faced were added together to obtain the problem faced score. Thus the problem confronted score of the respondents could range from 6 to 30 where 6 indicating very low problem and 30 indicating highest extent of problem faced in organic vegetable cultivation.

3.5.2 Measurement of dependent variable

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 cultivate 1 ha in 2014, 2 ha in 2015 and 3 ha in 2016 than his adoption score will be $\frac{1+2+3}{3} = 2$.

3.6 Validity of the Research Instruments and Ethical Considerations

3.6.1 Validity of the research instruments

The validity is how much a test measures what it is accepted to quantify. The validity of a test or other measuring instruments rely on upon the steadfastness with which it is measured whatever it indicates to gauge. The researcher experienced a few comparative research instruments judged from home and abroad, Besides, the examination instruments, particularly poll for the review were by the Supervisory Committee. By directing a seminar, the analyst changed and refined the substance and sizes of the examination instruments as indicated by the recommendations of the specialists of the Department of Agricultural Extension and Information System, Sher-e-Bangla agricultural university.

3.6.2 Ethical considerations

Some basic ethical principles were maintained throughout the study and pointed out below.

1. The researcher built up affinity with the respondents appropriately.
2. The researcher treated the respondents with incredible regard.
3. The reasons for the study were clarified before beginning meetings with the respondents.
4. Autonomy, protection and non-judgmental perspectives were considered significantly amid making interviews with the respondents.
5. Special care was taken to keep away from subjective judgments and misinterpretations amid accumulation and documentation of subjective information.

3.7 Data Collection

The researcher himself gathered information from the respondents with the assistance of interview schedule in face to face setting. The researcher collected data using pre-tested interview schedule and based on pre-test experiences necessary corrections, additions, modifications and alternations were made before finalizing the interview schedule for final data collection. Meeting with the respondents was made ahead of time with the assistance of AFO of Gram unnyan prokolpo. Researcher took all conceivable care to build up affinity with the respondents so they don't equivocate to reply to the inquiries and explanations. At whatever point any respondent confronted any trouble in seeing any question care was taken to portray the same unmistakably. The researcher was likewise cognizant about side talking amid information accumulation and attempted to stay away from that issue thoughtfully. Information accumulation occurred from 02 to 20 February 2017. Be that as it may, scientist didn't confront any genuine troubles amid information accumulation because the respondents and different villagers of the study area were particularly useful and agreeable.

3.8 Processing of Data

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.

A wide range of relevant theories and empirical researches were collected and reviewed. The researcher contacted different relevant sources such as books, journals, articles, theses, abstracts, and internet to set a concrete research plan and to outline the research background.

3.9 Hypothesis of the Study

According to Karlinger (1973), a hypothesis is a conjectural statement of the relation between two or more variables. Hypothesis are always in declarative sentence form and they are related, either generally or specifically from variables to variables. In broad sense

hypotheses are divided into two categories: (a) Research hypothesis and (b) Null hypothesis.

3.9.1 Research hypothesis

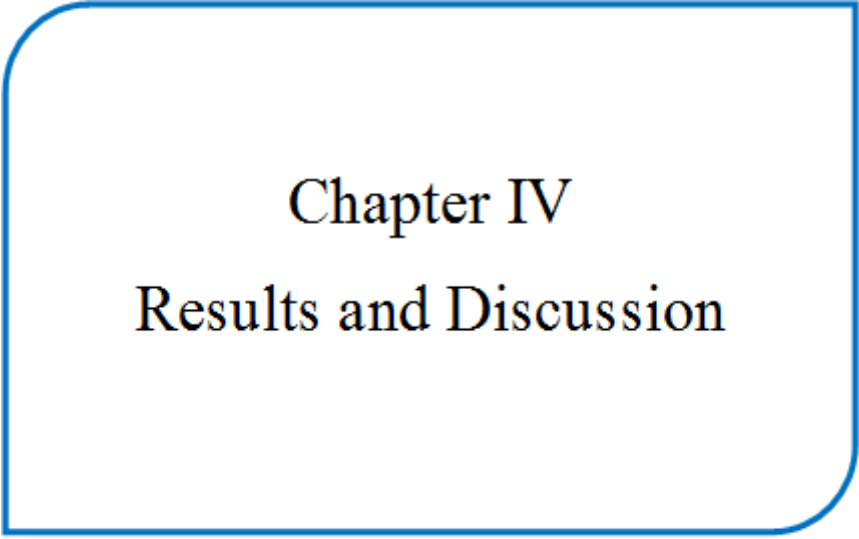
Based on review of literature and development of conceptual framework, the following research hypothesis was formulated: “Each of the thirteen (13) selected characteristics (age, level of education, annual income, farm size, time spend in vegetable farming, knowledge in organic vegetable farming, level of pest infestation, profit from vegetable cultivation, organizational participation, extension contact, agriculture training exposure, attitude towards organic farming and problems faced by the organic vegetable farmers has significant relationship to adoption extent of organic vegetable farming. However, when a researcher tries to perform statistical tests, then it becomes necessary to formulate null hypothesis.

3.9.2 Null hypothesis

A null hypothesis states that there is no contribution between the concerned variables. The following null hypothesis was formulated to explore the contribution of the selected characteristics of farmers on their adoption extent of organic vegetable farming. Hence, in order to conduct tests, the earlier research hypothesis was converted into null form as follows: “There is no contribution of the selected characteristics of the farmers to their adoption of organic vegetable farming.”

3.10 Data Analysis

Data collected from the respondents were analyzed and interpreted in accordance with the objectives of the study. 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. Throughout the study, five percent (0.05) and one percent (0.01) level of significance was used as the basis for rejecting any null hypothesis.



Chapter IV
Results and Discussion

CHAPTER IV

RESULTS AND DISCUSSION

A consecutive and itemized discussion on the findings of the study has been presented in this Chapter. The Chapter is partitioned into three segments. In the first segment, independent variables i.e. characteristics of the respondents have been discussed. The second segment dealt with dependent variable i.e., adoption of organic vegetable farming by the farmers and lastly, the contribution of the selected characteristics of farmers to their adoption of organic vegetable farming has been discussed in the third segment.

4.1 Selected Characteristics of the Organic Vegetable Farmers

Adoption of organic vegetable farming by the farmers are affected largely by different characteristics of an individual. The characteristics of the organic vegetable farmers were selected to find out their contribution on their adoption of organic vegetable farming. The salient features of the respondents with their thirteen selected characteristics have been presented in Table 4.1.

Table 4.1 Salient features of the selected characteristics of organic vegetable farmers

Categories	Measuring unit	Range		Mean	S.D.
		Possible	Observed		
Age	Year	-	18-67	46.29	10.80
Level of education	Years of schooling	-	0.5-16	4.42	4.26
Farm size	Hectare	-	0.11-1.75	0.40	0.30
Annual family income	Thousand Taka	-	105-410	181.24	68.14
Time spend in vegetable farming	Hours/day	-	7-12	8.63	1.30
Knowledge in organic vegetable farming	Score	0-30	20-30	25.47	2.64
Profit from vegetable farming	Thousand Taka	-	11-118	53.02	23.82
Level of pest infestation	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 exposure	No of days	-	0-12	3.96	3.95
Attitude towards organic vegetable farming	Score	10-50	24-45	31.83	4.54
Problems faced in the organic vegetable farming	Score	6-30	18-30	24.61	2.30

4.1.1 Age

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 age of the respondents ranged from 18 to 67 years with a mean of 46.29 and standard deviation of 10.80. Based on their age, the respondents were classified into three categories as shown in Table 4.2.

Table 4.2 Distribution of the respondents according to their age

Categories	Respondents		Mean	Standard Deviation
	Number	percent		
Young aged (up to 35 years)	16	15.7	46.29	10.80
Middle aged (36-50 years)	53	51.9		
Old aged (above 50 years)	31	32.4		
Total	102	100.0		

Data presented in Table 4.2 show that the majority (51.90%) of the organic vegetable farmers were middle aged category, compared to 32.40 percent of them being old aged and 15.70 percent of young aged. More than two third (67.60%) of the respondent belonged to young to middle aged categories. The young to middle aged group normally show more positive attitude towards trying new ideas. The extension providers can target those farmers in planning their extension activities.

4.1.2 Level of education

Level of education of a respondent was measured by the level of her/his formal education. Education scores of organic vegetable farmers ranged from 0.5 to 16, with an average of 4.42 and standard deviation of 4.26. Based on their education, the respondents were classified into four categories as shown in Table 4.3.

Table 4.3 Distribution of the respondents according to their level of education

Categories	Respondents		Mean	Standard deviation
	Number	Percent		
Can sign only (0.5)	45	44.10	4.42	4.26
Primary education (1-5)	26	25.50		
Secondary education (6-10)	20	19.60		
Above secondary education (above 10)	11	10.80		
Total	102	100.00		

Data exhibited in Table 4.3 demonstrate that highest proportion (44.10%) of the organic vegetable farmers had no education, where as 25.50 percent, 19.60 percent, and 10.80 percent of them had primary, secondary or above secondary level of education respectively. Majority (55.90%) of the farmers had primary to above secondary level of education. Educated farmers are relatively more creative than the uneducated farmers. Educated farmers are more innovative and analytical for adopting sustainable technologies.

4.1.3 Farm size

Farm size varied from 0.11 to 1.75 hectares with an average of 0.41 hectares and standard deviation of 0.30. The respondents were classified into three categories based on their farm size (Table 4.4).

Table 4.4 Distribution of the organic vegetable farmers according to their farm size

Categories (hectare)	Respondents number	Percent	Mean	Standard deviation
Marginal farm (0.02-<0.20)	25	24.50	0.41	0.30
Small farm (0.20-<1)	70	68.63		
Medium farm (1-3)	7	6.87		
Total	102	100		

Data in the Table 4.4 uncover that majority of the respondent (68.63 %) had small farm, while 24.50 percent had medium farm and 6.87 percent had large farm. The normal farm size of the farmers of the study area (0.40 ha) was more than two and half times higher than that of national average (0.15 ha) of Bangladesh (BBS, 2016). The farmer with small farm size has very little scope to experiment about new technologies as their earnings depend on agriculture. On the other hand, the farmer with large farm size can easily adopt new technologies in a part of their farm as experiment & they play the role of early adopters.

4.1.4 Annual family income

The annual family income of the organic vegetable farmers ranged from 105 to 410 thousand taka with an average of 181.24 and standard deviation of 68.14. Based on their annual family income the respondents were classified into three categories as shown in table 4.5

Table 4.5 Distribution of the respondents according to their annual family income

Categories	Respondents		Mean	Standard deviation
	Number	Percent		
Low income (<Mean-1sd, i.e.<113.10)	13	12.70	181.24	68.14
Medium income (Mean \pm 1sd, i.e.113.10-249.38)	73	71.60		
High income (>Mean +1sd, i.e.>249.38)	16	15.70		
Total	102	100		

Information exhibited in the Table 4.4 demonstrate that the most elevated extent of the organic vegetable farmers (71.60%) had medium income, while 15.70 percent and 12.70 percent of them were high and medium income classification, individually. The discoveries show that lion's share of the farmers (87.30%) had medium to high income. In this way, it was normal that the farmers of medium to high wage class would liable to take part in organic vegetable development to a more noteworthy degree to expand their income.

4.1.5 Time spent in vegetable farming

Time spent inn vegetable farming varied from 7 to 12 hours per day with an average of 8.63 hours per day and standard deviation of 1.30. Based on their time spend in vegetable farm, the farmers were classified into two categories as shown in Table 4.6.

Table 4.6 Distribution of the respondents according to their time spend in vegetable farming

Categories	Respondents		Mean	Standard deviation
	Number	Percent		
Long time spend (up to 8 hrs)	78	76.50	8.63	1.30
Very Long time spend (>8 hrs.)	24	23.50		
Total	102	100.0		

Data in Table 4.6 indicate that majority (76.50%) of the respondents spend long time in vegetable farm and near one fourth of the respondents (23.50%) spend very long time in vegetable farm. Vegetable farming is labor intensive; therefore, all of the farmers have to spend long to very long time in their vegetable field for ensuring proper management of the crops.

4.1.6 Knowledge in organic vegetable farming

The observed knowledge score of the organic vegetable farmers get from 20 to 30 against a possible range of 0-30, with an average of 25.47 and standard deviation of 2.64. Based on their knowledge scores, the respondents were ordered into two classifications as appeared in Table 4.7.

Table 4.7 Distribution of the respondents according to their knowledge in organic vegetable farming

Categories	Respondents		Mean	Standard deviation
	Number	Percent		
Medium knowledge (0-20)	15	14.7	25.47	2.64
High knowledge (21-30)	87	85.3		
Total	102	100.00		

The data in table 4.7 reveals that the highest extent (85.30%) of the farmers had high knowledge on organic vegetable cultivation while just 14.70 percent of them had medium knowledge. This finding prompted the conclude that dissemination of organic vegetable cultivation information among the farmers was successful which might affect in creating favorable attitude towards organic farming as well as adopting organic farming.

4.1.7 Profit from vegetable farming

The observed profit of the farmers from vegetable farming ranged from 11 to 118 thousand taka with an average of 53.02 and standard deviation of 23.82. Based on their profit from vegetable farming, the respondents were classified into three categories as shown in Table 4.8.

Table 4.8 Distribution of the respondents according to their profit from vegetable farming

Categories	Respondents		Mean	Standard deviation
	Number	Percent		
Low profit (upto 40)	39	38.24	53.02	23.82
Medium profit (41-80)	51	50.00		
High profit (>80)	12	11.76		
Total	102	100.0		

Data in Table 4.8 demonstrate that half (50%) of the organic vegetable farmers had medium profit, while 38.24 percent and 11.76 percent of them had low and high profit respectively. The findings also show that lion's share of the farmers (88.24%) had low to medium profit. Profit is the key to any investment endeavor. Renewals of investment largely depends on the extent to which someone gets profit. Therefore, profit might have influence on adoption of new practices.

4.1.8 Level of pest infestation

The observed level of pest infestation score ranged from 21 to 31 with an average of 25.21 and standard deviation of 2.24. Based on level of pest infestation, the respondents were classified into three categories as shown in Table 4.9.

Table 4.9 Distribution of the respondents according to their level of pest infestation

Categories	Respondents		Mean	Standard deviation
	Number	Percent		
Medium infestation (<29)	95	91.10	25.21	2.24
High infestation (>29)	7	6.90		
Total	102	100.0		

Data in Table 4.9 indicate that the majority (93.10%) of the organic vegetable farmers had medium pest infestation, while 6.90 percent of them had high pest infestation.

4.1.9 Organizational participation

Organizational participation of the farmers was determined based on their nature and duration of membership in different organizations. The maximum organizational participation score of the respondents was 7 and the minimum score was 1. However, the average was 2.32 and the standard deviation was 1.31. Based on their organizational participation scores, the respondents were classified into three categories as shown in Table 4.10.

Table 4.10 Distribution of the respondents according to their organizational participation

Categories	Respondents		Mean	Standard deviation
	Number	percent		
Low participation (Up to 4)	86	84.30	2.32	1.31
Medium participation (5-9)	16	15.7		
Total	102	100.00		

Data in Table 4.10 reveal that the highest extent (84.30%) of the organic vegetable farmers had low organizational participation while 15.70 percent had medium organizational participation. The findings also uncover that all the farmers had low to medium organizational participation in the study area. The extent of organizational participation in the study area was very poor. Probably, most of the respondents were involved only to their own occupation. That is why, their organizational participation scores were not satisfactory.

4.1.10 Extension media contact

Extension media contact scores of the organic farmers ranged from 20 to 28 against a possible range of 0 to 40, with an average of 22.81 and standard deviation of 2.38. Based on their extension media contact, the respondents were classified into three categories as shown in Table 4.11.

Table 4.11 Distribution of the respondents according to their extension media contact towards organic vegetable farming

Categories	Respondents		Mean	Standard deviation
	Number	Percent		
Medium contact (14-27)	96	94.10	22.81	2.38
High contact (above 27)	6	5.90		
Total	102	100.0		

Data in Table 4.11 uncover that the majority extents (94.10%) of the organic vegetable farmers had medium extension media contact, where as 5.90 percent had high extension media contact, respectively. The findings also indicate that all the organic farmers had medium to high extension media contact in the study area. The findings indicate that a great majority of the farmers under study had medium extension media contact. So, extension

workers should concentrate their works with farmers to increase their contact with extension media.

4.1.11 Agricultural training exposure

The agricultural training exposure score of the respondents ranged from 0 to 12 with a mean and standard deviation of 3.96 and of 3.95 respectively. Based on their length of training scores, the respondents were classified into three categories. The distribution of the respondents according to their training exposure has been presented in Table 4.12.

Table 4.12 Distribution of the respondents according to their agricultural training exposure towards organic vegetable farming

Categories	Respondents		Mean	Standard deviation
	Number	Percent		
Low (0-4)	59	57.80	3.96	3.95
Medium (5-8)	23	22.60		
High (9-12)	20	19.60		
Total	102	100.0		

Data in Table 4.12 show that majority (57.80%) of the respondents had low training, while 22.60 percent of them had medium training and just 19.60 percent of them had high training. The findings also reveal that more than three fourth (80.40%) of the respondents had low to medium training. Training helps the farmers to acquire deep knowledge and improve skills about the respected aspects. Trained farmers can cope with and handle smoothly the adverse situation in their cultivation. So, they show favorable attitude toward adoption of organic vegetable farming.

4.1.12 Attitude towards organic vegetable farming

The observed attitude scores of the respondents ranged from 24 to 45 against a possible range of 10 to 50, with a mean of 31.83 and standard deviation of 4.54. Based on attitude scores, the respondents were classified into three categories as shown in Table 4.13.

Table 4.13 Distribution of the respondents according to their attitude towards organic vegetable farming

Categories	Respondents		Mean	Standard deviation
	Number	Percent		
Slightly favorable attitude (<Mean - 1Sd, i.e. <27.29)	18	17.60	31.83	4.54
Medium favorable attitude (Mean \pm 1sd, i.e. 27.29-36.37)	71	69.7		
High favorable attitude (>Mean +1sd, i.e. >36.37)	13	12.7		
Total	102	100.00		

The findings reveal that highest proportion (69.70%) of the respondents had medium favorable attitude towards organic vegetable cultivation, while 17.60 percent of them had low favorable attitude and 12.70 percent of them had high favorable attitude. The formation of medium to high favorable attitude towards organic vegetable cultivation might be due to their knowledge on organic vegetable cultivation attained from different extension programmes, other reasons might be low investment in organic vegetable farming, quick return and high profit from organic vegetable.

4.1.13 Problems faced in organic vegetable farming

Problems faced scores of the organic vegetable farmers ranged from 18 to 30 against a possible range of 6 to 30, with an average of 24.61 and standard deviation of 3.95. Based on their problem faced, the respondents were classified into two categories as shown in Table 4.14.

Table 4.14 Distribution of the respondents according to their problem faced in organic vegetable farming

Categories	Respondents		Mean	Standard deviation
	Number	Percent		
Medium problem (11-20)	4	3.90	24.61	3.95
High problem (21-30)	98	96.10		
Total	102	100.0		

Data contained in Table 4.14 indicate that the highest proportion (96.10%) of the organic vegetable farmers had high problem while only 3.90 percent faced medium problem. The findings reveal all the farmers faced medium to high problems in in the study area. So steps should be taken to reduce the problems by taking necessary measures for supplying quality seeds in time, reducing seeds price and ensuring adequate supply, providing agricultural credit, facilities for land development etc.

4.2 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. The observed adoption scores of the respondents ranged from 0.01 to 0.13 ha. The average score was 0.04 with a standard deviation of 0.03. Based on the adoption score of organic vegetable farming, the organic vegetable farmers were classified into three categories as shown in Table 4.15.

Table 4.15 Distribution of the respondents according to their adoption of organic vegetable farming

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 4.15 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 4.15 also reveals that almost three fourth (78.40%) of the farmers had low to medium adoption of organic vegetable farming. This could be because 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.

4.3 The Contribution of the Selected Characteristics of Farmers to their Adoption of Organic Vegetable Farming

In order to estimate the adoption extent of organic vegetable farming practices, multiple regression analysis was used which is shown in the Table 4.16.

Table 4.16. Multiple regression coefficients of contributing variables related to adoption extent of organic vegetable farming

Model	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 family income	.122	.170				
Farm size	-.114	.221				
Time spend in vegetable farming	.008	.931				
Knowledge in organic vegetable farming	-.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 organic vegetable farming	.272	.001**				
Problems faced in organic vegetable farming	-.052	.519				

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

The data in Table 4.16 test the final null hypothesis: There is a significant contribution of the selected characteristics (extension media contact, attitude towards organic farming, agricultural training exposure and profit from vegetable farming) of farmers in adoption of organic vegetable farming at 5% level of significance. 53.50 percent ($R^2= 0.535$) variation of the respondents' adoption of organic vegetable farming can be attributed to extension contact, attitude, training and profit making this an excellent model (Table 4.16). The F value indicates that the model is significant ($p<0.003$).

However, each predictor may explain some of the variance in respondent's adoption extent of organic farming simply by chance. The adjusted R^2 value penalizes the addition of extraneous predictors in the model, but values of 0.467 still show that variance 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 4.14). 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 and in this connection some predictive importance has been discussed below:

4.3.1. Contribution of the extension media contact to their adoption of organic vegetable farming:

From multiple regression, it was concluded that extension media contact of the vegetable farmers had 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 will increase their adoption of organic farming.

Extension media contact plays an important role in adoption of organic vegetable farming. By continuous contact with different extension media people are concerned about organic vegetable farming, learn about its positive side, become trained, get benefitted and so on, which increase the adoption extent of organic vegetable farming by the farmers.

4.3.2. Contribution of the agricultural training exposure to their adoption of organic vegetable farming:

Multiple regression showed that agricultural training exposure among the vegetable farmers had second highest positive contribution 0.281 to their adoption of organic vegetable farming. This implies that with the increase of agricultural training exposure among vegetable farmer's will increase adoption of organic vegetable farming.

Training helps the farmers to acquire deep knowledge and improve skills about the respected aspects. Trained farmers can cope with and handle smoothly the adverse situation in their cultivation. So, they show favorable attitude toward adoption of organic vegetable farming.

4.3.3. Contribution of the attitude towards organic vegetable farming to their adoption of organic vegetable farming:

Multiple regression showed that attitude towards organic vegetable farming had significant positive contribution 0.272 to their adoption of organic vegetable farming. This implies that with the increase of positive attitude towards organic vegetable farming by the vegetable farmers will increase their adoption extent of organic vegetable farming. Findings show that 82.40 percent vegetable farmers positive attitude towards organic vegetable farming. Thus, positive attitude towards organic vegetable farming plays in important role in adoption extent of organic vegetable farming.

4.3.4. Contribution of the profit from vegetable farming to their adoption of organic vegetable farming:

Multiple regression showed that profit from vegetable farming had significant positive contribution 0.252 to vegetable farmer's adoption extent of organic vegetable farming. This implies that with the increase of profit from vegetable farming will also increase their adoption extent of organic vegetable farming.

Profit is the key to any investment endeavor. Renewals of investment largely depends on the extent to which someone gets profit. Therefore, profit from vegetable farming influence on adoption extent of organic farming.

Chapter V
Summary of Findings, Conclusions
and Recommendations

CHAPTER V

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

This Chapter summarizes the significant empirical results of the selected characteristics of the organic vegetable farmers, their adoption extent of organic vegetable farming and contribution of selected characteristics of the vegetable farmers to their adoption extent of organic vegetable farming. It also draws some conclusions and recommendations for policy actions as further steps in improving the existing extension methods of popularizing organic vegetable farming. This Chapter finally recommends probable research endeavors that can be carried out in future:

5.1 Summary of the Findings

Understanding of the outcomes and the findings of the study have been presented elaborately in Chapter 4. The findings of the study are briefly described below:

5.1.1 Selected characteristics of the farmers

Age: The highest proportion (51.90%) of the organic vegetable farmer was in middle aged category, compared to 32.40 percent and 15.70 percent of them being old and young aged category, respectively.

Level of education: The highest proportion of the organic vegetable farmers (44.10%) had no education while 25.50 percent, 19.60 percent and 10.80 percent of the organic vegetable farmers had primary, secondary and above secondary education respectively.

Annual family income: The highest proportion of the organic vegetable farmers (71.60%) had medium income, where as 15.70 percent and 12.70 percent of them had high and low income respectively.

Farm size: The highest proportion 91.20 percent of the respondents belonged to small farm size, compared to having 7.8 percent had medium and 1 percent having large farm size respectively.

Knowledge in organic vegetable farming: The highest proportion (85.30%) of the organic farmers had high knowledge on organic vegetable farming, while 14.70 percent of them had medium knowledge on organic vegetable farming.

Time spend in organic vegetable farming: The majority (76.50%) of the respondents spend long time in vegetable farm and near one third of the respondents 23.50 percent spend very long time in vegetable farm.

Profit from vegetable farming: the most elevated extent of the organic vegetable farmers (48%) had low profit, while 40.20 percent and 12.70 percent of them were medium and high profit classification.

Level of pest infestation: the most elevated extent of the organic vegetable farmers (93.10%) had medium pest infestation, 6.90 percent of them were high pest infestation classification.

Organizational participation: the most elevated extent (84.30%) of the organic vegetable farmers had low organizational participation while 14.7 percent had medium organizational participation and just 1 percent had high organizational participation.

Extension media contact: the most astounding extents (94.10%) of the organic vegetable farmers had medium extension contact, where as 5.90 percent had high extension contact

Agricultural training exposure: the most noteworthy extent (57.80%) of the respondents had low training, while 22.60 percent of them had medium training and just 19.60 percent had high training.

Attitude towards organic vegetable farming: The highest proportion (69.70%) of the respondents had medium favorable attitude towards organic vegetable cultivation, while 17.60 percent of them had low favorable attitude and 12.7 percent of them had high favorable attitude.

Problem faced in adoption extent of organic vegetable farming: the highest proportion (96.10%) of the organic vegetable farmers had high problem while 3.90 percent faced medium problem in adoption extent of organic vegetable farming.

5.1.2. Adoption extent of organic vegetable farming

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.

5.1.3. Contribution of the selected characteristics of the organic vegetable farmers to their adoption extent of organic vegetable farming

Extension media contact, Attitude towards organic vegetable farming, profit from vegetable farming and agricultural training exposure of the organic vegetable farmers had significant positive contribution to their adoption extent of organic vegetable farming.

Characteristics of the farmers like age, level of education, farm size, annual family income, time spend in vegetable farming, knowledge in organic vegetable farming, level of pest infestation, organizational participation and problems faced in organic vegetable farming had no contribution to their adoption extent of organic vegetable farming.

5.1.4 Conclusions

Conclusions drawn based on the findings of this study and their logical interpretation in the light of the other relevant factors were furnished below:

1. The findings revealed that majority (78.40%) of the farmers had low to medium adoption in the study areas. It also revealed that average adoption of organic vegetable farming was very low only (0.04 ha) compared to average areas used for vegetable farming (0.20 ha). This fact leads to the conclusion that overall adoption of organic vegetable farming by the vegetable farmer was not satisfactory. There is huge scope for increasing the adoption extent of organic vegetable farming by the vegetable farmers.
2. Extension media contact had highest contribution to the adoption extent of organic vegetable farming. It also showed that (93.10%) of the respondents had medium extension media contact. This result concludes that any arrangement made to increase extension media contact will increase the adoption extent of organic vegetable farming.
3. Agricultural training exposure had second highest contribution to the adoption extent of organic vegetable farming. Training helps the farmers to acquire deep knowledge and improve skills about the respected aspects. Trained farmers can cope with and handle smoothly the adverse situation in their cultivation. But most of the farmers had low to medium agricultural training exposure. So, it may be

concluded that increase in the agricultural training exposure will increase the adoption extent of organic vegetable farming.

4. Profit from vegetable farming had significant contribution to the adoption extent of organic vegetable farming. The findings show that lion's share of the farmers (88.20%) had low to medium profit. Therefore, it is concluded that the higher income would help the farmers to adopt organic vegetable farming.
5. Attitude towards organic vegetable farming had significant contribution to the adoption extent of organic vegetable farming. The findings reveal that highest proportion (87.30%) of the respondents had low to medium favorable attitude towards organic vegetable cultivation. In the light of above findings, it may be concluded that formation of high favorable attitude towards organic vegetable farming by the vegetable farmers increase their adoption of organic vegetable farming.

5.1.5 Recommendations

The proposals for the review were figured on the premise of the real discoveries and conclusions. Nonetheless, a portion of the vital activities were proposed in the accompanying:

5.1.5.1 Recommendations for policy implication

The following recommendations based on the findings and conclusions of the study were drawn.

1. The findings of the study indicated that adoption of organic vegetable farming was not satisfactory. To increase adoption of organic vegetable farming, dissemination of organic vegetable farming information among the farmers, improved marketing channel, proper price, easy transportation, low input cost etc. will be effective in creating favorable attitude towards organic farming as well as adopting organic farming.
2. Extension media contact had highest contribution to the adoption extent of organic vegetable farming. Therefore, it was recommended that steps should be taken by the different government and non-government organizations like DAE

- and others to maximize individual, group and mass contact methods like farm and home visit, results and method demonstrations and TV programs on organic vegetable farming so that adoption rate would increase more.
3. Agricultural training exposure had second highest contribution to the adoption extent of organic vegetable farmers. Therefore, it may be recommended that Different government and non-government organizations like DAE and others should conduct more training programs on organic vegetable farming that would make the farmers more skilled to increase their adoption extent of organic vegetable farming.
 4. Attitude towards organic vegetable farming had significant positive contribution to the adoption extent of organic vegetable farming. Therefore, farmers need more success story, case study, result discussion etc. to have more positive attitude towards organic farming. Different government and non-government organizations like DAE and others should come forward for providing prerequisite extension services to create positive attitude towards organic vegetable cultivation among the people.
 5. The profit from vegetable farming had significant positive contribution to their adoption of organic vegetable farming. The findings indicated that the higher profit would help the farmers to organic vegetable farming. Therefore, it may be recommended that extension service should provide adequate farm management advice, proper training on organic farming, method and result demonstration etc. to the farmers. It is a fact that if profit be increased, farmer's receptive capacity to adopt organic vegetable cultivation practices will be increased.

5.1.5.2 Recommendations for further study

he present study which mainly highlights some aspects of dimensions (adoption extent of organic vegetable farming by the farmers) for agricultural improvement. So, it is suggested that concerned agencies should undertake further studies to have a deeper insight into the various aspects of the adoption of technologies as well as agricultural development. The aspects for future study are presented below:

1. The present study was done in the four villages of Chupinagar union of Shajahanpur Upazila in Bogra District. It is suggested that similar study should be done in different parts of the nation.
2. The current study concentrated on the contribution of thirteen selected characteristics of the farmers with their adoption extent of organic vegetable farming. So, it is recommended that further study should be conducted with other variables for determining the adoption extent of organic vegetable farming.
3. It is difficult to determine the appropriate adoption extent of organic vegetable farming by the farmers. Determination of adoption extent of organic vegetable farming is not free from questions. More reliable measurement of the concerned variables is necessary for determining adoption extent of organic vegetable farming.
4. To determine the adoption extent of organic vegetable farming, the researcher developed a scale and the validity of the scale may be verified for further studies. This would help for improvement and generalization of the scale.
5. Research should also be undertaken to identify the factors causing hindrance towards adoption extent of organic vegetable farming.

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APPENDIX-A
English Version of the Interview Schedule
Department of Agricultural Extension and Information system
Sher-e-Bangla Agricultural University
Dhaka-1207



An Interview Schedule for the Study Entitled
“ADOPTION OF ORGANIC VEGETABLE FARMING BY THE FARMERS OF BOGRA DISTRICT”

Questionnaire No.: _____

Date of Interview: ___/___/___

Name of the respondent:

Village.....

Upazilla.....

Union.....

District.....

Contact Number:

(Please provide following information. Your information will be kept confidential and will be used for research purpose only)

1 Age: How old are you? _____years.

2. Education: Please mention your level of education.

a) I can't read and write

b) I can sign only

c) I have passed.....class.

3. Annual family income:

Mention your last year annual income from the following sources

Income sources		Income in '000' Tk.
A.	Agricultural sources	
	1) Crop	
	2) Livestock	

	3)	Poultry	
	4)	Fisheries	
B.	Non-Agricultural sources		
	i)	Business	
	ii)	Job	
	iii)	Laborer	
	iv)	Others	
Total Income:			

4. Farm size: What is your total farm size according to use?

Sl. No.	Use of land	Land possession	
		Local unit	Hectare
1	Homestead area (A 1)		
2	Own land under own cultivation (A2)		
3	Land taken from others as borga system(A3)		
4	Land given to others as borga system (A4)		
5	Land taken from others as lease (A5)		
Total			

Total farm size = $A_1 + A_2 + 1/2 (A_3 + A_4) + A_5$

5. Time spent in vegetable farming

How much time do you spent in your organic vegetable farm?.....hrs/day

6. Knowledge in organic vegetable farming

Please answer the following questions:

Sl. No.	Questions	Assigned score (2)	Obtained marks
1	How organic farming differ from conventional farming?		
2	Mention benefits of organic farming		
3	How do you prepare vermicomposting?		
4	What is beneficial insect? Mention three beneficial insects		
5	How do you attract beneficial insects in your field?		
6	What do you control soil born fungal infestation without using chemical fungicide?		
7	How do you control white fly and thrips infestation without using chemical pesticide?		
8	What is crop rotation?		

9	How do you prepare Trico compost?		
10	What type of insect can be controlled by bio pesticides?		
11	Mention formulation and doses of two bio pesticides		
12	What do you do in case of viral infection?		
13	What is pheromone trap? How it works?		
14	Mention doses of vermicomposting and Trico compost for vegetable cultivation		
15	How insect infestation can be minimized through hand cleaning?		
Total			

7. profit from vegetable farming: Please mention your last year income and profit from different vegetable farming

Sl. No.	Name of the vegetables	Production(Kg)	Income(Tk)	Cost of production(Tk)	Profit(Tk)
1.	Radish				
2.	Carrot				
3.	Tomato				
4.	Brinjal				
5.	Cauliflower				
6.	Cabbage				
7.	Bean				
8.	Broccoli				
9.	Okra				

10.	Gourd				
11.	Cucumber				
12.	Chili				
13.	Lettuce				

8. Level of pest infestation: Please mention different pests with its level of infestation

Sl. No	Name of the pest	Infestation level				
		Very high	High	Medium	Low	Very low
1.	Caterpillar					
2.	Fruit fly					
3.	Aphids					
4.	Beetles					
5.	White fly					
6.	Viral diseases					
7.	Bacterial diseases					
8.	Fungal diseases					

9. Organizational participation:

Please indicate the nature and length of your past and present participation in the following organization

Sl No.	Name of organization	Not involved (0)	Nature of involvement		
			As ordinary member (1)	As executive Member (2)	President/ Secretary (3)
1.	NGO organized co-operative				
2.	GO organized co-operative				
3.	Self-organized co-operative				
5.	School/ Mosque/ Madrasa / Bazar committee				

10. Extension media contact

Please indicate your extent of contact with the following agriculture or information media

SL. No.	Communication media	Extent of media contact				
		Regularly	Often	Occasionally	Rarely	Not at All
Personal media contact						
1.	Contact with SAAO	>3times/ month	3 times/ month	2 times/ month	1 time/ month	0
2.	Contact with AEO	>6 times/ year	5-6 times/ year	3-4 times/ year	1-2 time/ year	0
3.	Contact with UAO	>6 times/ year	5-6 times/ year	3-4 times/ year	1-2 time/ year	0
4.	Contact with model farmer	>3times/ month	3 times/ month	2 times/ month	1 time/ month	0

5.	Contact with neighbor	>3times/ week	3 times/ week	2 times/ week	1 time/ week	0
6.	Contact with NGO officer	>6 times/ year	5-6 times/ year	3-4 times/ year	1-2 time/ year	0
Mass media contact						
7.	Visit agricultural exhibition	>1 time/ year	1 time/ 2 years	1 time/ 3-4 year	1 time/ 5 years or more years	0
8.	Watching agricultural TV Programme	>6 times/ month	5-6 times/ month	3-4 times/ month	1-2 time/ month	0
9.	Listening krishi radio programme	>6 times/ month	5-6 times/ month	3-4 times/ month	1-2 time/ month	0
10.	Reading printed agricultural materials	>6 times/ season	5-6 times/ season	3-4 times/ season	1-2 time/ season	0
Total						

11. Agricultural training exposure

Did you participate in any agricultural training program?

Yes

No

If yes, then please give the following information

Sl. No.	Name of the training courses	Duration of training(days)
1.		
2.		
3.		
Total		

12. Attitude towards organic farming:

Please answer the following question about your attitude towards organic farming:

Sl No.	Items	Strongly agree	Agree	Undecided	Disagree	Strongly disagree
1.	Organic farming is profitable					

2.	Organic farming is complex					
3.	Organic farming is environment friendly					
4.	Organic farming is labor intensive					
5.	Organic farming conserves soil health					
6.	Yield is comparatively low in organic farming					
7.	Organic farming reduces cost of production					
8.	Pest management is difficult in organic farming					
9.	Organic farming reduces farmer's exposure to health hazards.					
10.	Consumers have little awareness towards organic products.					

13. Problems faced by the farmers in organic vegetable cultivation

SL NO	Problems	Level of problem				
		Very high	High	Medium	Low	Very low
1.	Lack of quality seeds and seedlings					
2.	Lack of credit					
3.	Pest infestation					
4.	Lack of proper marketing channels					
5.	Poor transportation system					
6.	Lack of consumer awareness towards organic product					

14. Adoption extent of organic vegetable cultivation

SL No	Year	Land under vegetable cultivation (ha)	Land under organic vegetable cultivation(ha)
1.	2014		
2.	2015		
3.	2016		

Thanks for your participation.

Dated.....

Signature of respondent