

FARMER'S KNOWLEDGE ON ECOLOGICAL AGRICULTURAL PRACTICES

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**FARMER'S KNOWLEDGE ON ECOLOGICAL
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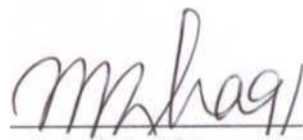
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**DEDICATED
TO
MY BELOVED PARENTS**

CERTIFICATE

This is to certify that the thesis entitled “**FARMER’S KNOWLEDGE ON ECOLOGICAL AGRICULTURAL PRACTICES**” submitted to the faculty of Agriculture, Sher-e-Bangla Agricultural University, Dhaka, in partial fulfillment of the requirements for the degree of **MASTERS OK SCIENCE IN AGRICULTURAL EXTENSION AND INFORMATION SYSTEM**, embodies the result of a piece of bona fide research work carried out by **MOHAMMAD AMINUL ISLAM**, Registration No. 02164 under my supervision and guidance. No part of the thesis has been submitted for any other degree or diploma.

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



Dated

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FARMER'S KNOWLEDGE ON ECOLOGICAL AGRICULTURAL PRACTICES

ABSTRACT

The main purpose of the study was to determine the extent of knowledge on ecological agriculture of the farmer as supervised by Proshika. Attempts were also made to describe some selected characteristics of Proshika farmers and their relationship with knowledge of ecological agricultural practices. The selected characteristics were: age, education, farm size, area under ecological farming, farming experience, experience in ecological farming, annual income, training exposure and extension contact. One hundred Proshika farmers were randomly selected from a total of 125 farmers in Dhamrai upazilla under Dhaka district. A pre-tested questionnaire was used for collecting data through face-to-face interview. The duration of the study was 30 days from 01 to 31 August, 2007. Pearson's Product Moment Correlation Coefficient (r) was used to determine the relationship of farmers' knowledge on ecological agricultural practices with their selected characteristics. T-test was used to determine the significance of the parameters.

The finding revealed that average age of the respondents was 39.34 years. In the case of educational level 61 percent was within primary level. Average farm size of the respondent was 0.76 ha and area under ecological agriculture in past and present year was same. Average farming experience of the respondent was 21.36 years. It was also found from the study that 84 percent of the respondents were in medium category in case of experience of ecological farming and they were involved 4.68 years in ecological farming. The average income of the respondents was Tk 74858.80. Majority (68 percent) of the farmers possessed medium knowledge compared to 23 percent had high knowledge and only 9 percent low knowledge on ecological agriculture.

Out of nine selected characteristics of the respondents, education, farm size, area under ecological agriculture, experience of ecological agriculture and annual income had positive significant relationship with their knowledge on ecological agriculture. Farmers' age, training exposure and extension contract was negatively correlated with their knowledge on ecological agriculture while farming experience did not have any significant relationship with knowledge.

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CHAPTER 1

INTRODUCTION

1.1 General Background

Agriculture has been the core of economic activities from the ancient time in this part of the subcontinent. It also plays a vital role in the political and cultural history of Bangladesh, where 80% of the population, accounting for 66% of the labour force, is directly or indirectly engaged in agriculture. Although the share of agriculture in Gross Domestic Production (GDP) has fallen from around 57% in the 1970s to 25% in recent years, it is still the largest economic sector (BBS, 2005).

Farming in Bangladesh was largely indigenous in nature until 1960s. Integral input- output relations existed between crop husbandries on the one hand and the livestock husbandry coupled with other forms of vegetation on the other. The essence of the farm practices was overwhelming dependence on natural or indigenously grown inputs. Mainly local varieties of crops were grown, restoration of the soil fertility was achieved through use of compost and Farm Yard Manure (FYM) and pests were controlled through indigenous devices based on local wisdom and experience.

Bangladesh became a perennially food-deficit country in the late 1950s. Threats of mass starvation have also been several times since then owing to droughts and severe floods. The grim food situation in the 1960s triggered a search for directly production oriented programs aimed at accelerating agricultural growth through expanding the coverage of irrigation, increasing the use of fertilizer and pesticides, and spreading High Yielding Varieties (HYV) of crops with the help of this HYV seed-water-fertilizer-pesticide technology, the so called "Green Revolution" was introduced in Bangladesh in the mid 1960s (Rahman, 2001).

The quantitative achievement of “Green Revolution” was soon visible. Although Bangladesh continues to be a net importer of food, importing on average 1.5 million tons of rice annually (Karim, 1997), it has achieved substantial gains in food grain production during the last two decades. Production nearly doubled from 11.08 million tons in 1970-71 to 20.23 million tons in 1997-98 recording growth rates of 2.64%. Production of the basic staple rice increased at 2.39% and wheat at, 10.13% annually over the mentioned period. At this time cropping intensity has increased from 143% to 177% (BBS, 2005).

Where food production has been improved through Green Revolution, all too often there have been adverse environmental and socio-economic impacts. Introduction of modern technologies in Bangladesh Agriculture has created tremendous pressure on land, soil and water resources. A number of undesirable costs of modern agriculture, in terms of loss of soil fertility, loss of biodiversity, health hazards, environmental pollution and other socio-economic problems have been identified and described by a number of researchers as compiled by Anonymous (1999), Rahman (2001) and Halim and Rahman (2002). All these studies revealed the social, cultural, economic and ecological crisis of serious magnitude. To check the colossal damages caused by the introduction of modern technologies, a new approach of farming is necessary which would ensure sustainability in production in one hand and also would be economically viable, environmentally and socially just on the other (Rahman, 2001).

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Ecological agriculture, also popularly known as organic farming, now-a-days has been emerged as a new approach to sustainable agriculture. Many authors consider it to be the farming system which best fulfills the requirements of sustainability (Lampkin, 1990; Gcnber and Hoffmann, 1998). This type of farming is steadily gaining popularity throughout the world and there are strong organic movements elsewhere in Europe and North America. Gradually, governments are recognizing that ecological agriculture could make a major positive contribution to the created by

modern conventional farming (McRobic, 1990).

Concept of ecological Agriculture:

The term “Ecological Agriculture” (or organic farming) can be defined negatively or positively.

When defined negatively, it is a farming system that does not allow certain ways of farming and certain substances; if defined positively, it is a farming system which can be achieved by following a set of knowledge and some certain rules (Hnang-Tzeng, 1996).

Ecological Agriculture is a multi layered, multi-structured, multi-functional and

intensively managed comprehensive agricultural production system that is established by deriving nourishment from past successes in various agricultural practices that the human society has experienced by following the principles of ecology and ecological economy and by applying modern scientific and technical approaches at a time when the modern convention agriculture is confronted with vital challenges.

Ecological Agriculture is just a comprehensive agricultural production system intensively engaged in accordance with the principles of ecology and ecological economy (Zhengfang, 1995)

According to Lumpkin (1994), the key characteristics of ecological farming include:

- Protecting the long-term fertility of soils by maintaining organic matter levels, fostering soil biological activity and careful mechanical intervention;
- Providing crop nutrients indirectly by using relatively insoluble nutrient sources which are made available to the plant by the action of soil microorganisms;
- Nitrogen self-sufficiency through the use of legumes and biological nitrogen fixation, as well as effective recycling of organic materials including crop residues and livestock wastes;
- weed, disease, pest control relying primarily on crop rotations, natural predators, diversity,

organic manuring, resistant varieties and limited (preferably minimal) thermal, biological and chemical intervention;

- the extensive management of livestock, paying full regard to their evolutionary adaptations, behavioural needs and animal welfare issues with respect to nutrition, housing, health, breeding and rearing.

The Ecological Agriculture Programme which devised by Proshika-MUK, a leading Non-Governmental Organization (NGO) in Bangladesh, is shown diagrammatically in Figure 1.1 (Proshika, 1991).

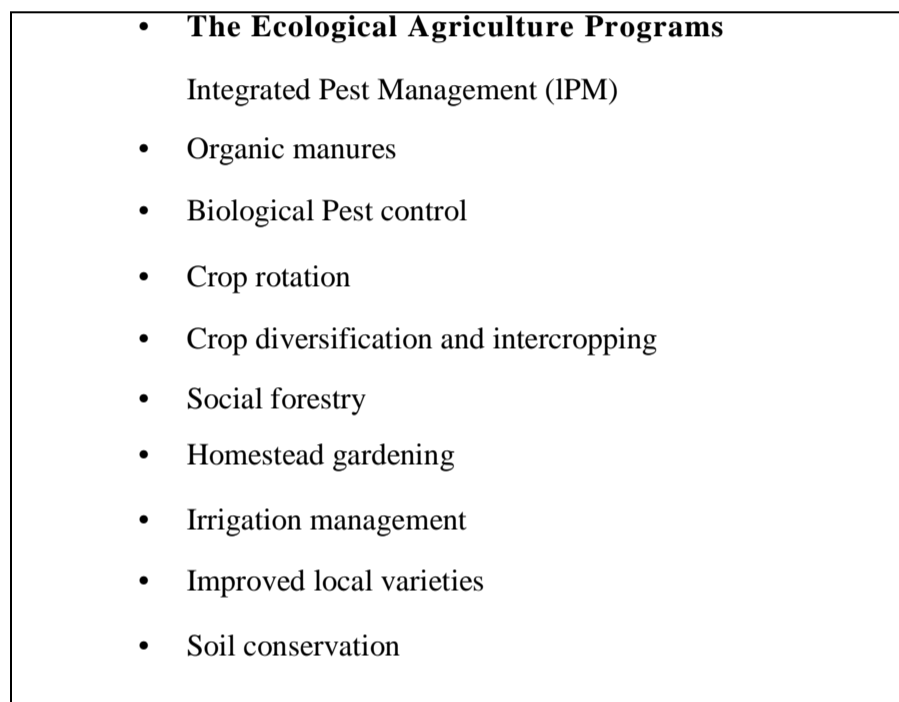


Figure 1.1 Components on Ecological Agriculture Programmes of Proshika **Ecological**

Agriculture in Bangladesh

In response to the changing circumstances of farming, a number of NGOs have been promoting the dissemination of ecological agriculture in Bangladesh since the mid 1980s. According to Bangladesh Rural Reconstruction Association (BARRA) Proshika Manobik Unnayan Kendra (Proshika-MUK, popularly known as Proshika) took a pioneer role in this aspect. Some of other important NGOs have been working in the ecological agricultural movement are CAD (Community Development

Association), Unnayan Bikolper Niti Nirdharani Gobeshona (UB1NIG) and Unnayan Dhara etc.

FORAM (Forum for Regenerating Agriculture

Movement), a coordinating body of the NGOs, has also been involved in networking and policy lobbying for the promotion of ecological agriculture.

During 1990-2001, the ecological agriculture programs devised by Proshika have been disseminated more or less regions all over Bangladesh. It is working in 121 Area Development Centres (ADCs) throughout Bangladesh. It is working with a view to providing ecological agricultural knowledge and skills to the landless, marginal and small farmers in their working areas. It provides training opportunities to their target farmers in various courses. Ecological agriculture is a reasonably good course out of them.

1.1 Statement of the Problem

In view of the need for having an understanding of the farmer's knowledge of ecological agricultural practices under the supervision of Proshika for planning and execution of agricultural development programmes, the researcher undertook this piece of research entitled "Proshika Farmers' Knowledge on Ecological Agricultural Practices". The purpose of the study was to determine -Proshika farmers' knowledge on ecological agricultural practices and others associated aspects. This study attempted to find out the answers of the following research question:

1. To what extent the Proshika farmers had knowledge about ecological agriculture?
2. What were the personal characteristics of the farmers, who were involved with Ecological Agriculture Programme of Proshika?
3. What relationships existed between the characteristics of the Proshika farmers and their knowledge on ecological agricultural practices?

1.2 Specific Objectives of the Study

In view of the problems stated above the following specific objectives were formulated for giving the proper direction to the study:

- (i) To determine Proshika farmers' knowledge on ecological agriculture.
- (ii) To determine selected characteristics of the ecological farmers working under supervision of Proshika. The characteristics were: age, education, farm size, area under ecological farming, farming experience, experience in ecological farming, annual income, training exposure, and extension contact.
- (iii) To determine the relationships between farmers' knowledge on ecological agriculture with their selected characteristics.

1.3 Justification of the Study

Whether ecological agriculture is the best alternative to the on-going modern farming technologies might be a point of long debate. There are both pro and contra arguments in this aspect. According to many scientists, like Sir Norman Borloug, though ecological agriculture has manifold advantages in comparison to conventional modern practices, it is particularly suitable for the rich industrialized countries. Some opponents even termed it against the process of scientific development (Pretty, 1994)). But there are also numerous arguments in favour of a widespread introduction of ecological agriculture. After a long period of discussion, Food and Agriculture Organization of the United Nations (FAO) started to recognize ecological agriculture as a suitable option for sustainable agriculture (IFOAM, 1996). Many authors raised strong arguments for introduction of ecological agriculture in the tropical and developing countries which was summarized by Pretty (1995) and Rahman (2001).

A widespread introduction of ecological farming in Bangladesh, according to Rahman (2001), can be justified through the following arguments:

- Ecological farming offers the possibility of long term sustainability;

- Ideological farming can offer yield benefit;
- Ecological farming is affordable for resource poor farmers;
- Problem of rural unemployment could be minimized through ecological farming; and
- Bangladesh has a long heritage of farming with traditional wisdom, which acts as bases for ecological knowledge.

Whatever is the result of the on-going debate on introduction of ecological agriculture in countries like Bangladesh, this approach of farming should have a chance to prove its feasibility.

Like many parts in the world, NGOs of Bangladesh look the initiative for

popularization of ecological agriculture among the farmers. Some of them, particularly Proshika, have been running the programme successfully and farmers in many areas of Bangladesh are reportedly welcoming this approach. As a new farming technology, not only in Bangladesh but throughout the world, it is necessary to examine its different aspects of dissemination such as adoption, constraints, farmers' attitude towards it, their knowledge and perception of ecological practices etc.

Considering the above facts the researcher became interested to carry out the present study on farmers' knowledge on ecological agricultural practices under the supervision of Proshika.

1.4 Assumptions of the Study

The study was undertaken with a view to have an understanding of the Proshika farmers' knowledge on ecological agricultural practices.

The researcher had the following assumptions in mind while undertaking this study:

- i) The farmers of Proshika in the study area were male.
- ii) **The respondents selected for this study were competent to furnish proper** responses to the queries included in the interview schedule.
- iii) Views and opinions furnished by the group members of Proshika in the sample were the representative views and opinions of all the farmers of Proshika of Dhamrai upazilla in Dhaka district.

In order to make the study manageable and meaningful from the point of view of research, it was necessary to impose some limitations as stated below:

- i) The study was confined with one NGO in a very limited area of the country.
- ii) Population for this study was kept confined mainly with the ecological farmers of the Dhamrai upazilla of Dhaka district, who were participating in Proshika Programmes.
- iii) The characteristics of the farmers of Proshika were many and varied. Relationships of knowledge of the farmers could be studied with various characteristics, but time, money and other resources did not permit the researcher to do so. Hence only nine characteristics of Proshika farmers were selected for investigation in this study.
- iv) For information about the study, the research dependent on data as given by the selected group members of Proshika during data collection.

1.7 Scope of the Study

A research gap is existed about the important aspect of ecological agriculture concerning in Bangladesh. The present NGO- lead ecological movement could not create opportunity for the vast minority of the farmers of the country to adopt ecological farming. Again no specific government strategy for its dissemination is visible so far. If ecological agriculture is to be popularized among the farmers of

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Bangladesh, research on its various aspects like farmers' knowledge must be undertaken. This study aimed at generating some specific findings which would be useful for ecological movement of Bangladesh. It is hoped that the findings of the study would be helpful for the policymakers and specialists of different government **and** development agencies in Bangladesh to strengthen their efforts for sustainable agricultural development in the country. <

1.8 Definition of Terms

Age: Age of a farmer was defined as the period of time in years from his birth to the time of interview.

Area under ecological farming: It referred to the area which a farmer cultivated ecologically during the season of collection of data.

Ecological agriculture: Ideological agriculture is just a comprehensive agricultural production system intensively managed in accordance with the principles of ecology and ecological economy (Zhengfang, 1995). In present study, it referred to the pattern of agricultural practices by way of maintaining environmental balance with the exclusion of use of any chemical fertilizer and pesticide.

Education: Academic qualification referred to the development of desirable change in knowledge, skills and attitude in an individual through reading, writing and other related activities. It was measured in terms of years of schooling completed by and individual at the time of interview.

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Experience of ecological farming: It referred to the total number of years that a respondent participated in ecological farming programme and practiced the ecological practices as calculated till the time of data collection.

Extension contact: These terms referred to an individual's access to or contact to the communication media and sources being used for dispersion of new technologies among Proshika farmers.

Family annual income: Family annual income was defined as the total earning of a respondent and members of his/her family both from agricultural and other sources (business, service etc.) during a year. It was expressed in taka.

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Farm size: Farm size referred to the area on which a farmer carried out his farming operation. The area was being estimated in terms to full benefit to the farmer's family.

Knowledge on ecological agriculture: It was the extent of basic understanding of the Proshika farmers in different aspects of ecological agricultural practices. It also included the basic understanding of the use of different ecological agriculture inputs and practices. It also included the basic understanding of the uses of different ecological agricultural inputs and practices.

Proshika: Proshika is one of the largest private voluntary development organization (NCiO) in Bangladesh. It started its activities in 1976.

Training Exposure: It referred to the total number of days that a respondent had received training in his/her entire life from Proshika or other organizations under different training programmes.

CHAPTER 2

REVIEW OF LITERATURE

The researcher made an intensive search for available literature on the present study. The review was conveniently presented on the major objectives of the study. This chapter is divided into two major sections. The first section deals with farmers' knowledge on agricultural technologies. The second section deals with the relationship between farmers' knowledge and their selected characteristics. It might be mentioned here that, despite frantic searches, no direct study could be identified on farmers' knowledge of ecological agricultural practices. Therefore, available literatures' on studied related to farmers' knowledge was only presented in this chapter.

2.1 Reviews on farmer's knowledge on agricultural technologies

Hussen (2001) conducted a study on farmers' knowledge of modern sugarcane cultivation practices. His study at Zill Bangla sugar Mill (ZDSM) area of Dcwangonj upazilla under Jamalpur district revealed that majority (84%) of the sugarcane growers had medium knowledge compared to 13% having high knowledge and only 3% having low knowledge on modern sugarcane cultivation practices.

Islam (1993) conducted a study knowledge and attitude of the Sub Assistant Agriculture Officer, on the selected modern agricultural technologies. His study at 7 Thanas of greater Rangpur district revealed that 52% of the Sub Assistant Agriculture Officer had high knowledge on modern agricultural technologies, while 48% had low knowledge.

Saha (2001) conducted a study on farmers' knowledge on improved practices on pineapple cultivation. His study at Ausnara union under Madhupur upazilla of Tangail district revealed that 62% of the farmers possessed good knowledge, 33% poor knowledge and only 5% possessed excellent knowledge on improved practices on pineapple cultivation.

Hossain's study (2000) on farmers' knowledge and perception of Binadhan-6. His study at 4 selected upazilaas of Sherpur distinct majority of the farmers (62%) had medium knowledge while, 21% had low knowledge and the rest 14% possessed high knowledge on Binadhan-6.

Nurzaman (2000) conducted a study on knowledge, attitude and practices of FFS and non-FFS farmers in respect of IPM. His study at sadar upazilla under Mymensingh district revealed that the FFS farmers had a significant higher knowledge on IPM than the non-FFS farmers.

Rahman (1995) conducted a study on farmers' knowledge on improved practices of potato cultivation. His study at Kajipur thana under Sirajgonj district revealed that 54% of the potato growers possessed good knowledge, 34% poor knowledge and the rest 12% possessed excellent knowledge on improved practices of potato cultivation.

Mannan (2001) conducted a study on Proshika farmers' knowledge about food and nutrition. His study at Alokdia union under Madhupur upazilla of Tangail district revealed that majority (75%) of the Proshika farmers had medium knowledge of food and nutrition, while 9% had low knowledge and the rest 16% possessed high knowledge.

2.2 Relationship between farmers' characteristics and their knowledge on Agricultural technologies

2.2.1 Age and knowledge

Bhaskaram and Mahajan (1968) reported that young farmers had gained more information on agricultural technology. Haque (1984) studied adoption of improved sugarcane practices of some selected areas in Jessore district. The findings of the study indicated a positive relationship between the age of the farmers' and their practices. Similar observations were made by Hossain (2000) in his study.

Islam (1993) in his study concluded that age of the Sub Assistant Agriculture Officer had no significant relationship with their knowledge on modern agricultural **technologies**.

2.2.2 Education and knowledge

Banerjee (1976) have reported the relationship between education and knowledge of the farmers.

Baodgaonkar (1983) and Ralhore and Shakawal (1990) reported in their studies that farmers' education was significantly related with their knowledge.

Kashcm (1987) in his study revealed that there was no significant relationship between education of the farmers and their agricultural knowledge.

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Islam (1993) found that the general education of the Sub Assistant Agriculture Officer had no significant relationship with their knowledge on modern agricultural technologies.

Mossain (2000) found that farmers' education of the respondents had significant positive relationship with their knowledge on Binadhan-6.

2.2.3 Farm size and knowledge

Ahmed (1974) concluded that there was a significant relationship between farm size of the farmers' and their agricultural knowledge. The relationship was positive which indicated that agricultural knowledge increased with the increase of farm size.

Hossain (2000) found that farm size of the farmers had no relationship with their knowledge of Binadhan-6.

2.2.4 Area under ecological farming and knowledge

No finding was noticed on this aspect to the researcher at the time of reviewing literature.

2.2.5 Farming experience and knowledge

No finding was noticed on this aspect to the researcher at the time of reviewing literature

2.2.6 Experience in ecological farming and knowledge

No finding was noticed on this aspect to the researcher at the time of reviewing literature

2.2.7 Annual income and knowledge

Singh (1991) found in his study that income of the farmers was associated with the level of knowledge on plant protection measures. He also found that low income farmers had a greater tendency to apply less than the recommended dose and lack of knowledge was found as a major reason for non-adoption.

Hossain (2000) found that family income of the farmers had no relationship with their knowledge of Binadhan-6.

2.2.8 Training exposure and knowledge

Setty's study (1973) revealed that there was no association between overall knowledge of gramsevaks about extension program planning and their frequency of in-service training. Similar was the case with their specific knowledge of various aspects of extension program planning.

2.2.9 Extension contact and knowledge

Ahmed (1974) found that there was a significant positive relationship between extension contact of the farmers and their agricultural knowledge.

Ali (1984) found that contact and non-contact farmers differed significantly in respect of their media exposure. He observed that media exposure of the contact and non-contact farmers had significant contribution towards their agricultural knowledge.

Kaur (1988) found that extension contact and mass media exposure had significant influence upon opinion and level of knowledge of selected programme of rural women.

Rahman's (1995) study on farmers' knowledge on improved practices of potato cultivation by the farmers of Kajipur upazilla of Sirajgonj district. The study indicated a significant relationship between extension contact of farmers and their knowledge on improved practices of potato cultivation.

Hossain (2000) concluded that media exposure of the farmers had a significant relationship with their knowledge of Binadhan-6.

Venugopal (1977) found that there was a significant association between the overall knowledge of agricultural extension officers in respect of rice cultivation and type of training received by them.

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The findings of the study of Manjunatha (1980) revealed that the trained farmers had higher knowledge level and adopting behaviour compared to untrained farmers.

Rayaparcddy and Jayaramaish's (1989) working on Village Extension Officer's (VE06) knowledge on rice production technology revealed that training had significant positive relationship with the knowledge level of VEOs.

The Conceptual Framework of the Study

In scientific research, selection and measurement of variables constitute an important task. The hypothesis of a research when constructed properly contains at least two important elements i.e. a dependent variable and an independent variable. A dependent variable is that factor which appears, disappears or varies on the researcher introduces, removes or varies the independent variables. An independent variable is that factor which is manipulated by the researcher in this attempt to ascertain its relationship to an observed phenomenon. A simple conceptual framework for the study is shown in figure.

INDEPENDENT VARIABLES

Selected characteristics

- Age, education, farm size, area under ecological farming, farming experience, experience in ecological farming, annual income, training exposure and extension contact

DEPENDENT VARIABLES

Use of communication media by the farmers in receiving information on ecological farming

Figure 2.1 The Conceptual Framework of the Study

CHAPTER 3

METHODOLOGY

Use of proper methodologies is very important in a scientific investigation. It requires a very careful consideration on the part of the researcher to collect valid and reliable data and to analyze the same properly to arrive a meaningful conclusion. The methods and procedures followed in conducting present study are discussed in this chapter.

3.1 Location of the Study

There are 121 Area Development Centers (ADCs) of Proshika throughout the country. Among these 121 ADCs Dhamri under Dhaka district were selected as the locales of the present study.

3.2 Population and Sampling Procedure

The total number of Proshika farmers who were involved in ecological agriculture programme under the Dhamri ADC is the population of the study. In the study area it was found that 125 farmers were practicing ecological farming under Dhamri Proshika office. Due to time and resource limitation 100 farmers (80 percent) were randomly selected for this study.

3.3 The Research Instrument

For the purpose of data collection an interview schedule was prepared keeping the objectives of the research in view. The schedule contained both open and closed

form questions. Most of the questions were simple and direct, while some scales were included in the schedule to collect data regarding the knowledge on ecological agricultural practices and relevant matters. The draft schedule was prepared in Bangla and pre-tested before using it for collection of data.

Based on the pre-test experience, necessary corrections, addition, alterations and rearrangements were made in the schedule. Thus the schedule was prepared for final use. The schedule was prepared both in the Bangla and English version. The Bangla version of interview schedule was multiplied as per requirements to collect data from the respondents. An English version of the interview schedule has been presented at Appendix-1.

3.4 Variables and their Measurement

3.4.1 Measurement of independent variables

Nine characteristics of Proshika farmers were selected as independent variables of this study.

Procedures followed in measuring the selected characteristics are described in the subsequent sections.

3.4.1.1 Age

Age of an individual was defined as the period of time from the birth to the time of interview and was operationally measured in terms of years. It was located in the serial no. 1 of the interview schedule.

3.4.1.2 Education

Education of a respondent was measured by the highest grade of formal schooling completed by him or her in any educational institute. If a respondent was found illiterate, he/she was given a score of "0". In case of can sign only the score was given "0.5". A score of 1 was assigned for each class one

formally completed or passed. The literate assigned for each class one formally completed or passed. The literate respondents with no formal schooling were assigned scores that seemed appropriate. This variable appears in the serial no. 2 of the interview schedule.

3.4.1.3 Farm size

Farm size of a respondent was measured as the size of his/her farm on which he/she continued his farming operations during the period of study. It included the area of farm owned by her/him, farm area given or taken under share cropping (borga), lease or mortgage. The farm size of a respondent was measured by using the following formula:

Farm size = $A_1 + A_2 + A_3 + Vi (A_4 + A_5) - A_6$ Where,
 A_1 = Homestead Area (with pond)

A_2 = Own land under own cultivation A_3 = Land taken from others as rented in or lease in

A_4 = Land taken from others on half share basis

A_5 = Own land given to others on half share basis

A_6 = Own land given to other as rented out or lease out

This variable appears in the serial no. 3 of the interview schedule.

3.4.1.4 Area under ecological farming

Area under ecological farming of a respondent was measured in terms of percentage of one's total farm area. A respondent's area under ecological farming in a season was converted in percentage of his total farm size in order to get the figure. This variable appears in the serial no. 4 of the interview schedule.

3.4.1.5 Farming experience

Experience in farming was operationalised by counting the number of years a respondent actively involved in farming (i. e., in crop production including animal husbandry and fish farming). For each

year of farming experience the respondents was assigned by a score of 1 and so on. It was located in the item number 5 of the interview schedule.

3.4.1.6 Experience in ecological farming

Experience in ecological farming was operationalised by counting the number of years a respondent actively involved in ecological farming programme. For each year, the score of the respondent was assigned by 1 and so on. It is located in the item number 6 of the interview schedule.

3.4.1.7 Annual income

Family annual income of a respondent was measured in terms of Taka. Income from all sources by all the earning family members were added together to obtain family annual income. A family annual income score was computed by assigning one (1) point for each thousand Taka. It was located in the item number 7 of the interview schedule.

3.4.1.8 Training exposure

Training experience was measured by the total number of days a respondent received training in his life under by Proshika and different organizations or agencies. A score of 1 (one) was given to a respondent for every day of training. It was located in the interview schedule serial no. 8.

3.4.1.9 Extension contact

It was defined as one's extent of exposure to 15 selected information sources (extension medium) related to agricultural teaching methods. A 4 point scale was developed of respondent was asked to choose one response among four point scale, namely frequently, occasionally, rarely and not at all. These four options for each medium were defined specifically to each medium considering the situation, rationality and result of pre-test. Scores were assigned for all extension media in the following manner:

Extent of contact	Weighting system
Frequently	3
Occasionally	2
Rarely	1
Not at all	0

The extension contact score of respondent was, therefore, determined by adding the total responses against 15 selected extension media. Thus the extension contact score could range from 0 to 45. where 0 indicating no extension contact and 45 indicating highest contact. It was located in the item number 9 of the interview schedule.

3.5 Measurement of Dependent Variables

There was one dependent variables in this study, namely farmers' knowledge on ecological agriculture practices. Measurement procedures of this variable has been presented in the following sections.

3.5.1 Knowledge on ecological agriculture

Proshika farmers' knowledge on ecological agriculture programme was measured by asking them fifteen questions on different aspects of ecological agriculture. The total marks for all the question was 22. A respondent answering a question correctly obtained the full marks, while for a partial correct answer he/she was given marks proportionately. The total knowledge score obtained by a respondent was taken as his ecological agricultural knowledge score. This score could range from 0 to 22 indicating no knowledge and 22 highest knowledge.

3.6 Hypothesis

A null hypothesis states that there is no relationship between the concerned variable. If a null hypothesis is rejected on the basis of statistical test, it is concluded that there is a relationship between the concerned variables. However, following null hypotheses was formulated for the present study:

1. There was no relationship between the selected characteristics of the farmers and their knowledge on ecological agriculture.

The selected characteristics are: age, education, farm size, area under ecological farming, farming experience, experience in ecological farming, annual income, training exposure and extension contact.

3.7 Collection of Data

Data were collected by the researcher himself during f 1a 3 P¹ August 2007. In a gel valid pertinent information the researcher made all possible efforts to explain the purpose of the study to the respondents.

Interviews were conducted with the respondents in their homes and farms. While starting interview with respondent, the researcher look all possible care lo establish rapport with him/her so that she/he did not feel hesitant or hesitate to furnish proper response to the questions and statements in the schedule. The questions were clearly explained wherever any respondent felt difficulty in understanding properly. The Economic Development Workers (ECO), the field agents of Proshika, rendered good cooperation in arranging appointments with the respondents.

3.8 Compilation of Data

After completion of field survey data from all the interview schedules were compiled, tabulated and analyzed according to the objectives of the study. In this process, all the responses in the interview schedule were given numerical coded values. Local units were converted into standard units. The responses to the questions in the interview schedules were transferred to a master sheet to facilitate tabulation. Tabulations and cross tabulations were done on the basis of categories developed by the investigator himself.

CHAPTER 4

FINDINGS AND DISCUSSION

The findings of the study and related interpretations have been presented in three separate sections of this chapter. The first section deals with the selected individual characteristics of the respondents while the second section deals with the dependent variables i.e., farmers knowledge on ecological agricultural practices.

The third section deals with the relationship between the respondents' selected characteristics and their knowledge of ecological agricultural practices.

4.1 Individual Characteristics of the Respondents

In this section the findings on the respondents' individual characteristics have been discussed.

Descriptive statistics of 9 selected characteristics of the respondents have been presented in Table

4.1

Characteristics	Measuring unit	Minimum	Maximum	Mean	Standard deviation
Age	Years	25	60	39.34	7.11
Education	Score	0	10	2.63	2.28
Farm size	Hectare	0.17	2.50	0.76	0.37
Area under ecological agriculture	% score	0.08	0.48	0.20	0.08
Fanning experience	Years	06	40	21.36	6.12
Experience in ecological agriculture	Years	1	6	4.68	0.827
Annual income	Unit score	12000	312000	74858.80	46078.10
Training exposure	Days	1	2	1.89	0.31
Extension contact	Score	5	13	8.90	1.50

Table 4.1 Descriptive statistics of the respondents' selected characteristics

Mean values of the respondents' individual characteristics along with standard deviation and t-test have been separately presented in Table 4.2 to determine the significant of the parameters. The result indicated that all the variables were significant individually and the probability of each variable was 1 percent level.

Table 4.2 Means and standard deviation of respondents' selected characteristics with the results of t-test for the difference of means

Characteristics and measuring unit	Mean	Standard deviation	t-value
Age (year)	39.34	7.11	55.30**
Education (score)	2.63	2.28	11.51**
Farm size (hectare)	0.76	0.37	20.50**
Area under ecological agriculture (score)	0.20	0.08	23.72**
Fanning experience (year)	21.36	6.12	34.88**
Experience in ecological agriculture (year)	4.68	0.827	56.57**
Annual income (unit score)	74858.80	46078.10	16.25**
Training exposure (day)	1.63	0.485	60.10**
Extension contact (score)	8.90	1.50	59.30**

** Significant at 0.01 level of probability

4.1.1 Age

Age of all respondent ranged from 25 and standard deviation was 7.11. Based on their age, the categories and distribution of the respondents was presented in

Table 4.3. Figure

4.1 indicated that young and middle aged farmers were 41 and 54

to 55 years with the average of 39.34 years

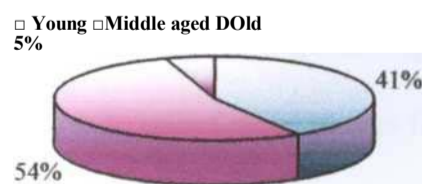


Fig. 4.1 Distribution of the respondent according to age

percent, respectively while only 5 percent farmers were found old aged. However, the average age of the respondents (39.34) years) indicated that Proshika preferred relatively younger farmers for its ecological agriculture programme.

Table 4.3 Distribution of the respondents according to their age

Categories	Respondents		Mean	SD
	Number	Percent		
Young (25 to 35)	41	41	39.34	7.11
Middle aged (36-50)	54	54		
Old (Above 50)	05	05		
Total	100	100		

4.1.2 Education

Education of a farmer was measured by

the level of his formal education i.e.

□ Illiterate 9 Sign only □ Primary (1-5) □ 6-S.S.C/HSC

highest grade (class) passed by him.

The education score of the respondents ranged from 0 to 12 with the average of 2.63 and standard deviation of 2.28.

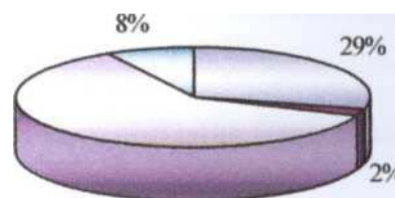


Fig. 4.2 Distribution of respondent according to educational level

Based on their level of education, the categories and distribution of the respondents was presented in Table 4.4. Figure

4.2 indicated that about 29 percent farmers were illiterate. The highest respondent was found in primary level and it was 61 percent while only 2 percent was found in sign only level.

Categories	Respondents		Mean	SD
	Number	Percent		
Illiterate	29	29	2.63	2.28
Sign only	02	2		
Primary (1 -5)	61	61		
6 - S.S.C/HSC	08	8		
Total	100	100		

4.1.3 Farm size

The farm size of the selected farmers in the study area varied from 0.17 to 2.5 hectares. The average farm size was 0.760 ha with a standard deviation of 0.37. Based on their farm size the respondents were classified into three categories as in Table 4.5. Fig.

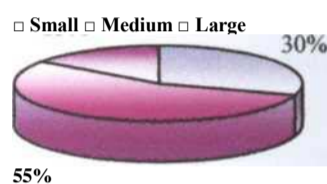


Fig. 4.3 Distribution of farmers according to farm size

4.3 revealed that majority of the farmers had medium farm size followed by small farm and large farm. It was found that the average farm size of the respondents was 0.76 ha. As the small holders have little option to convert their considerable amount of land into ecological system, Proshika emphasizes medium to large farmers for its ecological agriculture program.

Farm categories	Respondents		Mean	SD
	Number	Percent		
Small (0.17 to 1 ha)	30	30	0.760	0.370
Medium (1.01-2.50)	55	55		
Large(Above 2.50)	15	15		
Total	100	100		

4.1.4 Area under ecological agriculture

Area under ecological agriculture of the selected farmers was slightly change in past and present year and it was 0.20 and 0.22 ha, respectively (Table 4.6). Table also revealed that 26.3 percent of the total land was under ecological agriculture.

Table 4.6 Distribution of the respondents according to their area under ecological agriculture

Categories	Mean	Standard Deviation	% of total land
Ecological agriculture (Last)	0.20	0.084	26.3
Ecological agriculture (Present)	0.22	0.087	

4.1.5 Farming experience

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Farming experience was divided into 3 categories and ranged from 0-23. The average experience of the selected farers was 21.36 years and standard deviation was 6.12. The highest percentage (39 per cent) of the respondents had farming experience was found in high and moderate category while 22 per cent farmers was found in low category (Table 4.7).

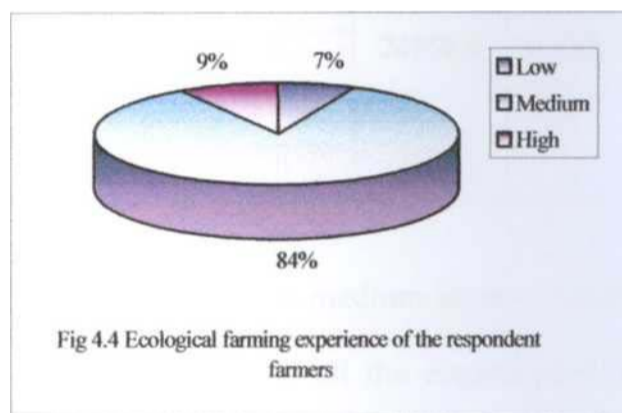
Table 4.7 Distribution of the respondents according to their farming experience

Category of farming experience	Respondents		Mean	SD
	Number	Percent		
Low (0-18 years)	22	22	21.36	6.124
Moderate (19-22 years)	39	39		
High (Above 23 years)	39	39		
Total	100	100		

4.1.6 Experience of ecological farming

According to their experience in ecological agriculture, the respondents were classified into three

categories as shown in Table 4.8 and it indicated that ecological farming was highest (84 percent) in medium category whereas only 7 and 9 percent, respectively was found in low and high category. It was also found in the study that the medium



farmers were mainly interested on ecological farming practices due to available of land and extra income.

Table 4.8 Distribution of the respondents according to their experience in ecological fanning

Categories	Respondents		Mean	SD
	Number	Percent		
Low (0.5-3) year	7	7	4.68	0.83
Medium (4-5) years	84	84		
High(Above 5 years)	9	9		
Total	100	100		

Annual income of a respondent was determined by his income from agriculture, service and other sources during a year. The range of annual income score was 12000-100000 with an average of 74858.8 and standard deviation of 46078.09.

Based on their annual income, the categories and distribution of the respondents was presented in Table 4.9.

Table 4.9 Distribution of the respondents according to their annual income

Categories	Respondents		Mean	SI)
	Number	Percent		
Low income (12000-52000)	37	37	74858.8	46078.10
Medium income (52001-100000)	46	46		
High income (100000 and above)	17	17		
Total	100	100		

Table indicated that majority of the respondents fell into medium income category .Farmers having high income were only 17 percent of all the respondents. The overall picture showed that Proshika preferred relatively high income groups for its ecological agriculture programme. This might be due to the assumption that farmers with relatively high income and larger farm size have more proneness to take risk in ecological farming. As there was a risk in ecological farming for getting lower yields in the beginning years, Proshika might have deliberately preferred farmers with high income and large land size for this programme. Once these farmers get success in ecological practice, it would be easier for the low income farmers to convert their farms into ecologically managed.

4.1.8 Training exposure

Training received scores of the respondents ranged from 0-30 with an average of 1.63 and a standard deviation of 0.485. Based on their training received scores of the respondents are classified into three groups: “no training”(0), “medium training” (1-7) and “high” (above 7). The distribution of the farmers is shown according to their classified groups in Table 4.10

Table 4.10 Distribution of jute growers according to their training received

Categories	Respondents		Mean	Standard deviation
	Number	Percent		
No Training (0)	63	63	1.63	0.485
Medium Training (1-7)	25	25		
High Training (Above 7)	12	12		
Total	100	100		

The majority i.e. 63 percent of the respondents did not receive any training; while, about 37 percent received medium to high training. Thus most of the respondents had low level of exposure to agricultural training. It also proved that there is always a relationship between training exposure and change knowledge towards ecological agriculture. Because training received develops the farmers to Knowledge, Skill and Attitude in positive manner. The findings suggest that training experience might be the most important factor for the respondents to change their knowledge towards Ecological agriculture.

Table 4.11 received that 15 types of media was used under three types of communication like individual, group and mass to determine the extension contract. In this regard, extension contract was assess by 4 categories such as frequently, occasionally, rarely and not at all. It was found from the study that 97 percent respondent were occasionally contract with Proshika Technical Workers. It was also observed from the study that he most of the respondent did not make any contract with the different media.

Table 4.12 revealed that extension contact score of the respondent ranged from 5 to 13 against the possible range from 0 to 45, the average was 8.90 with a standard deviation of 1.50. The highest proportion (80%) of the respondent had medium extension contact.

Table 4.12 Distribution of the respondents according to their extension contact

Categories	Respondents		Mean	SD
	Number	Percent		
Low (up to 7)	13	13	8.90	1.50
Medium (8-10)	80	80		
High (Above 10)	7	7		
Total	100	100		

4.2 Dependent variables

Farmer's knowledge on ecological agricultural practices was the only dependent variable for the study. The means, standard deviation and computed t-value was

13.70, 3.35 and 40.90, respectively. The level of significant of the variable was 1%.

Farmer's knowledge on ecological agricultural practices was the only dependent variable for the study. The means, standard deviation and computed t-value was

13.70, 3.35 and 40.90, respectively. The level of significant of the variable was 1%.

4.2.1 Farmers' knowledge on ecological agricultural practices

Based on the knowledge scores the respondents were classified into three categories, which have been presented in Table 4.13. The score of knowledge on ecological agriculture practices could range from 0-22, while the observed score of knowledge of the farmers ranged from 10-22. The mean was 13.70 and standard deviation 3.35. Table 4.13 also revealed that majority (68 percent) of the farmers' possessed medium knowledge on ecological agriculture while only 9 percent was

in low category. The ecological agriculture practice is mainly depends on farmers motivation and availability of farm area along with the products market. Proshika ecological agriculture program was operated since 7 years in this area and regarding this program there was a significance impact to motivate the farmers on ecological farming as well as ensure the product market with reasonable price.

Categories	Respondent		Mean	SD
	Number	Percent		
Low (0-10)	9	9	13.70	3.350
Medium (11-15)	68	68		
High (16 and above)	23	23		
Total	100	100		

4.3 Relationship between the selected characteristics of the respondents with their knowledge in ecological agricultural practices

This section deals with the relationships between the independent variables and dependent variables of the study. The selected characteristics of the respondents constituted the independent variables while the dependent variables were farmers' knowledge of ecological agriculture practices. Pearson's Product Moment Coefficient of Correlation ('r') has been used to test the null hypotheses concerning the relationships between two variables. At least 0.05 level of significance was used as the basis for rejection of a null hypothesis. The result of correlation test was presented in Table 4.14. However, a correlation matrix for all independent and dependent variables has been included in Appendix-2.

Selected Characteristics (Independent variables)	Computed 'r' value (df=98)
	Farmers' Knowledge on Ecological Agricultural Practices
Age	-0.119 ^{NS}
Education	0.341**
Farm size	0.377**
Area under ecological agriculture (Past)	0.465**
Area under ecological agriculture (Present)	0.473**
Farming experience	-0.054 ^{NS}
Experience of ecological agriculture	0.330**
Annual income	0.406**
Training exposure	-0.214*
Extension contact	-0.275**

NS = Not Significant

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

4.3.1 Relationship between selected characteristics of the respondents and their knowledge on ecological agriculture

4.3.1.1 Age and knowledge on ecological agriculture

The relationship between age of the respondents and their knowledge on ecological agriculture was measured by testing the following null hypothesis:

“■There is no relationship between age of the ecological farmers and their knowledge on ecological agriculture.” The computed value of 'r' (-0.119) was smaller than the tabulated value (r=0.196) with 98 of degree of freedom at 0.05 level of probability as shown in Table 4.14. Thus the concerned null hypothesis was accepted. It was concluded that there was no significant relationship between age of the farmers and their knowledge on ecological agriculture. Also it was negative trend.

4.3.1.2 Education and knowledge on ecological agriculture

Relationship between education of the farmers and their knowledge on ecological agricultural practices was examined by testing the following null hypothesis:

“There is no relationship between education of the ecological and their knowledge on ecological agriculture.” The calculated value of ‘r’ (0.341) was higher than that of the tabulated value ($r^*=0.256$) with 98 degrees of freedom at 0.01 level of probability as shown as Table 4.14. Therefore, the concerned null hypothesis was rejected, hence, the education of Proshika farmers had significant relationship with their knowledge on ecological agriculture.

4.3.1.3 Farm size and knowledge on ecological agriculture

The relationship between the farm size of the farmers and their knowledge on ecological agriculture was studied by testing the following null hypothesis: “There is no relationship between farmers of the ecological farmers and their knowledge on ecological agriculture.” The calculated value of ‘r’ (0.377) was found greater than that of the tabulated value $r^*=0.256$ at level with 98 degrees of freedom as shown in table 4.14. Moreover, the relationship showed a positive trend. So the null hypothesis was rejected. So the result indicated that farm size of the farmers had a positive significant relationship with their knowledge on ecological agriculture. This means that farmers with larger farm size had higher knowledge on ecological agriculture.

4.3.1.4 Area under ecological agriculture and knowledge

Relationship between farmers' area under ecological agriculture and their knowledge on ecological agriculture was determined by testing the following null hypothesis: "There is no relationship between farmers' area under ecological agriculture and their knowledge on ecological agriculture."

The calculated value of r (0.465) for past and present was found higher than that of the tabulated value of (0.256) with 98 degrees freedom at 0.01 level of probability as shown in Table 4.14. The relationship showed a positive trend. So, the null hypothesis was rejected. So the result indicated that farmers' area under ecological farming had a significant positive relationship with their knowledge on ecological agriculture. The result indicated that the farmers of Proshika who had relatively more area under ecological farming, possessed more knowledge on ecological agriculture.

4.3.1.5 Farming experience and knowledge on ecological agriculture

The relationship between farming experience of the farmers and their knowledge on ecological agriculture was examined by testing the concerned hypothesis: "There is no relationship between farming experience of Proshika farmers and their knowledge of the ecological agriculture." The calculated value of ' r '= (-0.054) was found smaller than the tabulated value " r " (0.196) with 98 degrees of freedom at 0.05 level of probability as shown in Table 4.14. Hence the concerned null hypothesis could not be rejected. So the result indicated that farming experience of the farmers had no significant relationship with their knowledge in ecological agriculture.

4.3.1.6 Experience in ecological farming and knowledge on ecological agriculture

The relationship between experience of ecological farming of Proshika farmers and their knowledge on ecological agriculture was tested by using the null hypothesis: “There is no relationship between experience of ecological farming of Proshika farmers and their knowledge on ecological agriculture.” The calculated value of V (0.330) was found higher than that of the tabulated value (0.256) with 98 degrees of freedom at 0.01 level of probability as shown in Table 4.14. So the result indicated that experience of ecological farming of the Proshika farmers had significant relationship with their knowledge on ecological agriculture. In this respect the concerned null hypothesis was rejected.

4.3.1.7 Annual income and knowledge on ecological agriculture

The relationship between annual income of the respondents and their knowledge on ecological agriculture was measured by using the concerned null hypothesis: “There is no relationship between annual income of the farmers and their knowledge on ecological agriculture.” The computed value of ‘ r ’ (0.406) was found larger than that of tabulated value ‘ r ’(0.256) with 98 degrees of freedom at 0.01 level as shown in Tabic 4.14. The relationship showed a positive tend. So the result indicated that annual income of the farmers had a positively significant relationship with their knowledge on ecological agriculture. So the null hypothesis was rejected.

The result indicated that the ecological farmers, who had relatively more annual income possessed higher knowledge on ecological agriculture.

4.3.1.8 Extension contact and knowledge on ecological agriculture

The relationship between extension media contact of the respondents and their knowledge on ecological agriculture was measured by testing the following null hypothesis: “There is no relationship between extension media contact of the farmers and their knowledge on ecological agriculture.” The computed value of ‘r’ (0.275) was higher than that of tabulated value ‘r’(0.256) with 98 degrees of freedom at 0.01 level. It could be concluded from the findings that there was negative significant relationship between the extension media contact of farmers and their knowledge on ecological agriculture.

CHAPTER 5

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Summary of Finding

The title of the study was “**Farmers’ Knowledge on Ecological Agricultural Practices**”. The **main objectives were** (i) To determine Proshika farmers’ knowledge on ecological agriculture (ii) To determine selected characteristics of the ecological farmers working under supervision of Proshika. The nine characteristics were: age, education, farm size, area under ecological farming, farming experience, experience in ecological farming, annual income, training exposure and extension contact (iii) To determine the relationships between farmers’ knowledge on ecological agriculture with their selected characteristics. Dhamrai upazilla under Dhaka district was the locale of the present study. Data were collected from 100 ecological farmers, who were practicing ecological agriculture under supervision of Proshika. A pre-tested interview schedule was used in data collection during 01 to 31 August, 2007. A summary of the major findings is given below:

Age: Age of the respondents ranged from 25 to 55 years and the average being of 39.34 with a standard deviation of 7.11. The highest proportion (54%) of the respondents were middle aged.

Education: Education score of the respondents ranged from 0 to 12 with an average of 2.63 and standard deviation of 2.28. The highest proportion (61%) of the respondents had primary level education.

Farm size: Farm size of the respondents ranged from 0.17 to 2.50 hectare and the average was 0.76 ha with a standard deviation of 0.37. The highest proportion (55%) of the respondents had medium farm size.

Areas under ecological agriculture: Area under ecological agriculture of the selected farmers was slightly changed in past and present year and it was 0.20 and 0.22 ha, respectively. The study also revealed that 26.3 percent of the total land was under ecological agriculture.

Farming experience: Farming experience of the respondents ranged from 0 to 23 years and the average was 21.36 with a standard deviation of 6.124. The highest proportion (39%) of the respondents had both moderate and high farming experience.

Experience in ecological agriculture: Experience in ecological agriculture of the respondents ranged from 0.5 to 6.0 years, the average being 4.68 years with a standard deviation 0.83. The highest proportion (84%) of the respondents had 4-5 years experience in ecological farming.

Annual income: Annual income score (in '000 Tk.) of the respondents ranged from 12.0 to 312.0, the average was 74.86 with a standard deviation of 46.08. The highest proportion (46%) of the respondents had medium income.

Training exposure: The study indicated that 89 percent of the respondent had not received training on ecological farming whereas only 11 percent received training.

Extension contact: Extension contact score of the respondents ranged from 5 to 13

against the possible range from 0 to 45, the average was 8.90 with a standard deviation of 1.50. The highest proportion (80%) of the respondents had medium extension contact.

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Knowledge on ecological agriculture: Knowledge score in ecological agriculture of the respondents ranged from 10 to 22. This was ranged the average was 13.70 and standard deviation 3.35. The highest proportion (68%) of the respondents had medium knowledge.

5.2 Conclusion

i) The study revealed that a remarkable number of farmers were practicing ecological farming under the supervision of Proshika and were the respondents of the study had medium knowledge on ecological agriculture. Only few farmers were found having high knowledge on it. For a relatively complex type of farming like ecological agriculture, the finding is not encouraging. It could be concluded the farmers should have considerably higher knowledge on ecological farming.

ii) Out of a number of crops, farmers were found practicing only vegetable

using ecological practices. For cereals and fruits they were found blending

ecological practices with conventional practices wherever possible. The

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reason was (lull Proshika was emphasizing only vegetable for its ecological programme in the initial stages. It could be concluded that knowledge on ecological agricultural practices will also be more speedy if emphasis would be given on other crops as well.

iii) As marketing of ecological products are important for its dissemination and popularization among farmers, Proshika was found helping farmers in marketing their ecological products albeit the extent was limited.

iv) As age was found negatively related to the knowledge of ecological agricultural practices, it might be concluded that for the promotion of ecological agricultural practices NGOs should intensively work with the younger farmers. However, considering the fact that most of the farmers belonged to the middle aged group, it would also be wise to work with comparatively larger number of middle aged farmers. >

v) Finding revealed that possession of small farms was not favourable for improvement of knowledge on ecological agriculture. It may therefore, be concluded that involving more medium to large farmers in this programme would be helpful for its adoption. *i*

vi) Annual income of the ecological farmers showed a positive and significant relationship with knowledge on ecological agricultural practices. Again annual income and farm size were also found highly correlated. So both the factors were significantly related with the knowledge of ecological practices. It could be concluded that for ecological agricultural programme, farmers of high income should also be considered; even they do not belong to usual target groups of Proshika.

5.3 Recommendations

Based on the findings and conclusion of the study, the following recommendations have been put forward:

5.3.1 Recommendation for policy implication

- i) Extensive awareness campaign should be organized and implemented by GOs and NGOs considering ecological agriculture is a production technology which is friendly for environment as well as for the consumers.
- ii) Proshika has so far been emphasized on vegetable production for its ecological agricultural programme. Other crops including cereals, fruit, fishes and livestock should be brought under this programme so that a holistic approach of ecological agriculture can be developed.
- iii) To increase the knowledge level of the farmers, proper counseling, training, demonstration should be provided along with Proshika's regular adult literacy programme.
- iv) To ensure proper prices for ecological agricultural products, marketing support should be ensured.
- v) In order to strengthen on-going ecological agricultural movement, an integrated approach should be developed involving concerned government and private sector agencies.
- vi) It is a need to create leadership among the respondents for making ecological agriculture a social movement.

5.3.2 Recommendation for Further Study

- i) The present study was carried in only one upazilla of a particular district. Similar studies should be conducted in other parts of the country, which could be helpful for more understanding and generalization.
- ii) Relationship of nine selected characteristics of Proshika farmers with their knowledge on ecological agricultural practices have been investigated in this study. Further research should be conducted to explore the relationship of other characteristics of the respondents with their knowledge on ecological agricultural practices.
- iii) Researches on other aspects of ecological agriculture etc. such as farmers' adoption, problems in adoption, farmers' attitude towards it should be undertaken.
- iv) Similar studies should be conducted taking other organizations, who are involved in ecological agriculture in Bangladesh.

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APPENDIX 1

Department of Agricultural Extension & Information System Shcr-E- Bangla Agricultural University Shcr-E-Bangla Nagar, Dhaka-1207

An interview schedule on “Adoption of Farmers Knowledge on Ecological Agricultural Practices”

Serial No.: -----

Date: -----

Name of the respondent: -----

Village: ----- Union: -----

Upa/ila :----- District: -----

Please answer the following question:

1. Age:

What is your present age? -----year

2. Academic qualification:

Please mention your educational status from the following:

a) Do not know reading and writing.

b) Did ----- not go to school but can read and write, which would be equivalent to class -----

c) I have passed class -----

3. Farm size:

Sl. No.	Nature of level are	Area of the land	
		Local unit	Hectarc
1	Homestead area with pond		
2	Cultivated land owned by the farmer		
3	Area given to this on barga system		
4	Area taken form this on barga system		
5	Area taken from this on lease		
6	Others		

4. Area under ecological farming:

I low much land do you cultivate under ecological agriculture system?

Last year— --- local unit/ hectare.

This year-----local unit/ hectare.

5. Farming experience ----- years.

6. Experience in ecological farming -----years.

7. Annual income:

Please mention your annual income in take from the following sources.

1. Field Crops	Income source	Total production	Cost (Taka)	Amount of income
*	Rice			
*	Wheat			
*	Mai/.e			
*	Sugarcane			
*	Jute			
*	Potato			
*	Groundnut			
*	Banana			
*	Pulse			

2.	fruit				
3.	vegetables				
4.	Cow rearing				-----
5.	Goat rearing				
6.	Poultry rearing				
7.	Fish culture				
8.	Bee rearing (Apiculture)				
9.	Business				
10.	Job				
11.	Labour				
12.	Other				
Total					

X. Training exposure:

I have you ever participated in any training program?

Yes -----/No -----

If yes, please mention the following particulars.

Sl. No.	Name of training course	Duration of training (day)	Sponsoring organization
1			
2			
3			
4			

9. Extension contact:

Please indicate the extent of contact by you on with this following media to receive information.

Types of Communication	Name of Media	Extension of contact (Times)			
		Frequently	Occasionally	Rarely	Not all
Individual	1. Model Farmer	More than 12 times/year	7-12 times/ months	1-6 times/ year	0 time/year
	2. Input Dealer	4 times/months	1-2 times/2 months	At least 1-6 times/ year	0 time/year
	3. Proshika Technical Worker	4 times/months	1-2 times/2 months	At least 1-6 times/ year	0 time/year
	4. Sub Assistant Agriculture Officer (SAAO)	4 times/months	1-2 times/2 months	At least 1-6 times/ year	0 time/year
	5. Upazila Agriculture Officer (U AO)/ Agricultural Extension Officer (ALiO)	At least 1 time/months	At least 1 times/months	At least 1-2 times/ year	0 time/year
Group	6. Participation in group meeting/discussion	1-2 times/months	1-2 times/6 months	At least 1 time/year	0 time/year
	7. Attending/participation in Result demonstration meeting	1 time/months	1 time/6 months	At least 1 time/year	0 time/year
	8. Participation in method demonstration	1 time/months	1 time/6 months	At least 1 time/year	0 time/year
	9. Participation in field day, farmers' rally etc.	2 times/6 months	1 time/9 months	At least 1 time/year	0 time/year
Mass	10. Participation in training programmes	1 time/2 months	1 time/6 months	At least 1 time/year	0 time/year
	11. Listening agricultural programmes in Radio	1-2 times/ week	1-2 times/ months	At least 1-2 times/ year	0 time/year
	12. Watching agricultural programmes in television	1-2 times/ week	1-2 times/ months	At least 1-2 times/ year	0 time/year
	13. Reading agricultural magazines like Krishi Katha, Krishi Barta etc.	1 time/ month	1 time/6 months	1 time/ year	0 time/year
	14. Reading other printed	1 time/ month	1 time/6	1 time/ year	0 time/year

materials like Icallct, bullcting, booklet on agriculture		months		
15. Reading agricultural news in newspapers	1 time/ month	1 time/6 months	1 time/ year	0 time/year

Please answer the following questions:

SI.No.	Ideological farming practices	Rxtent of use				No. ykurs using
		frequently	Occasionally	Rearly	Not at all	
1	Use of compost					
2	Use of mulching					
3	Use of botanical pesticide					
4	Use of green manuring					
5	Use of multi-layer crop					
6	Use of disease and pest resistance varieties					
7	Use of mechanical control of pests					

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11. Knowledge on ecological agriculture

SI. No.	Question	Full Marks	Obtained Marks
1	What do you mean by ecological agriculture?	2	
2	Why we need crop rotation?	2	
3	What is the role of cow-dung in soil?	2	
4	Mention the name of two botanical pesticides	2	
5	What are the harmful effects of chemical fertilizer?	2	
6	What are the harmful effects of pesticides?	2	
7	Name two Green Manuring crops.	2	
X	Mention the name of two beneficial insects	2	
<)	Mention the component of II'M?	2	
10	What are the benefits of mulching?	2	
11	What are the benefits of mixed cropping?	2	
12	What types of organic Fertilizers are to be used in your Farm?	2	
13	flow compost Fertilizer helps for the improve the Soil?	2	
14	What are the Materials needed for compost preparation?	2	
15	How repellent plant function in the field?	2	
	Total	30	

Thank you for your kind co-operation.

Signature of the interviewer Date

APPENDIX 2

Matrix Correlation of different parameters

Parameters	Age	Education	Farm size	Ecological Farm	Farm Experience	Ecological Farm Experience	Annual Income	Training Experience	Knowledge on Ecological Farming	Extension Contact
Age	1									
Education	-0.3991	1								
Farm size	0.054	0.182	1							
Ecological Farm	-0.114	0.332**	0.706**	1						
Farm Experience	0.832**	-0.473**	-0.007	-0.172	1					
Ecological Farm Experience	0.362**	-0.392**	-0.191	-0.108	0.511**	1				
Annual Income	-0.054	0.109	0.661**	0.524**	-0.082	-0.095	1			
Training Experience	0.080	0.041	-0.110	-0.094	-0.053	-0.175	-0.068	1		
Knowledge on Ecological Farming	-0.119	0.341**	0.377**	0.465**	-0.054	-0.330**	0.406**	-0.214*	1	
Extension Contact	0.041	-0.108	-0.146	-0.095	0.163	0.348**	-0.175	-0.195	-0.275*	1

1 Significant at 0.01 level *
Significant at 0.05 level

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