

**ADOPTION OF INTERCROPPING WITH JACKFRUIT BY  
THE FARMERS OF BHALUKA UPAZILLA UNDER  
MYMENSINGH DISTRICT**

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Master of Science  
In  
Agricultural Extension and Information System

Department of Agricultural Extension and Information System  
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June-2013

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Registration No. 05-1739  
Semester: Jan-June/2013

Thesis Submitted in Partial Fulfillment of the Requirement for the Degree of  
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## Certificate

This is to certify that Thesis entitled. **“ADOPTION OF INTERCROPPING WITH JACKFRUIT BY THE FARMERS OF BHALUKA UPAZILLA UNDER MYMENSING DISTRICT”**. Submitted to the faculty of Agriculture, Sher-e-Bangla Agricultural University, Dhaka 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 bonafide research work carried out by MD. MOSHARRAF HOSSEN, **Registration No. 05-1739** 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 been duly acknowledged.

Dated :

Place : Dhaka Bangladesh  
Bhniyan)

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Supervisor

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The Author

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## **ABBREVIATIONS AND ACRONYMS**

AEO	:	Agriculture Extension Officer
AAEO	:	Assistant Agriculture Extension Officer
BAU	:	Bangladesh Agricultural University
BBS	:	Bangladesh Bureau of Statistics
BINA	:	Bangladesh Institute of Nuclear Agriculture
DAE	:	Department of Agriculture Extension
d. f.	:	Degree of Freedom
e. g.	:	Example
HYV	:	High Yielding Variety
SAPPO	:	Sub-assistant Plant Protection Officer
SD	:	Standard Deviation
Sq	:	Square
UAO	:	Upazilla Agriculture Officer
%	:	Percentage

# **ADOPTION OF INTERCROPPING WITH JACKFRUIT BY THE FARMERS OF BHALUKA UPAZILLA UNDER MYMENSHING DISTRICT**

## **ABSTRACT**

The main purpose of the study was to determine and describe the extent of adoption of intercropping with jackfruit by the farmers in two selected unions of Bhaluka Upazila under Mymensingh District. Attempts were also made to describe some of the selected characteristics of the intercrop farmers and their relationship with their adoption of intercropping. Data were obtained from 117 randomly selected farmers from total of 503 intercrop growers of selected villages of two unions Kachina and Habirbari. An interview schedule was used for collecting data during the period of 2 May to 26 May, 2013. The findings of the study indicate that majority (82.9 percent) of the growers had low adoption while 15.4 percent had medium adoption and 1.7 percent had high adoption of intercropping with jackfruit. Correlation analysis indicates that among the selected characteristics education, farm size, income from jackfruit and intercrop, cosmopolitaness and innovativeness showed significant relationships with their adoption of intercropping with jackfruit. On the other hand, age, received advice on intercropping and crop diversification shows no significant relationship with their adoption of intercropping with jackfruit.

***DEDICATED  
TO  
MY BELOVED PARENTS***

# ***CHAPTER 1***

## ***INTRODUCTION***

# **CHAPTER 1**

## **INTRODUCTION**

### **1.1 General Background**

Agriculture is the heart of Bangladesh economy. About 148 million people live on 144000 sq. kilometers area. It has a climate both sub-tropical and tropical with a wide range of rainfall in monsoon season. Both modern and traditional agricultural systems are practiced by the farmers. Modern agriculture is mainly monoculture system with high yield of specific produces based on high technology that require high external plant nutrients and had intensive intercultural operations for insect and disease control. Monocrop system of agriculture causes exhaustion of soil fertility in a short period of time. On the other hand indigenous agricultural system is based on local ecology, high recycling of nutrients, low external inputs and labor intensive, linked with local culture and overall sustainable. Farmers of Bangladesh neither practice absolutely modern agriculture nor absolutely indigenous agriculture. They practice indigenous technology with exogenous technology. Based on regional topography they practice a number of cropping systems and cropping patterns. They grow field crops such as cereal crops, fiber crops, pulse crops, oilseeds, sugarcane, tobacco etc. and horticultural crops such as vegetables, fruits and flowers. In fact farmers practice integrated farming practices. But cereal crops occupy more than three-fourths of cultivable land.

Due to scarcity of land and rice being the staple food, farmers of Bangladesh hardly give serious attention to cultivate vegetables, fruits, spices and other crops to uplift his/her family income. Necessity is the mother of invention. So, farmers themselves developed the practice of intercrop in their fields. Matching with principle crops traditionally they cultivate aus with broadcast aman, tomato/potato with sugarcane, leafy vegetables with potato, aus with banana etc. Farmers of high land grow spice crops and fruits associated with mango or jackfruit orchard.

Jackfruit (*Artocarpus heterophyllus*) is the national fruit of Bangladesh. It is rich in vitamin A and C, contains moderate qualities of minerals and high qualities of protein, calcium, thiamin, riboflavin and carotene. The jackfruit trees provide suitable ecology for the under layer crops and also produce other basic requirements of the growers such as food, fuel, wood and timber.

In spite of having many advantages the farmers are losing their interest in Jackfruit cultivation system due to some problems like low income, land scarcity and high labor price etc. To solve these problems, a number of crops can be cultivated in the same land at the same time which will lead to high net income return, will reduce land scarcity and will reduce above mentioned problems. Here, the practice is called intercropping. Intercropping is a type of multiple cropping. It is the judicious utilization of time and space to increase total crop output per unit area. The process of growing and harvesting a short duration crop before canopy development and growth phase of main crop is very much helpful for farmers to avert risk of crop failure.



This means intercropping in many countries is essentially considered and used by the farmers as a tool for risk aversion in agriculture. Intercropping is a very good practice to increase total yield balancing the nutritional requirements, higher monetary return, and greater resource-utilization and to fulfill the diversified needs of the farmers. As a result, farmers are leading to intercropping system, more particularly, jackfruit-pineapple, jackfruit-zinger, jackfruit-turmeric, jackfruit-banana or jackfruit-pineapple-zinger-turmeric-banana system.

Intercropping not only maximizes the income generation but also ensures the maximum utilization of our land. One more factor is important that is intercropping has brought a great result such as, it has been recorded that if zinger, turmeric, banana, pineapple are intercropped with jackfruit then it improves the micro-climate in the plantation. Some positive steps should be taken to improve its production and management practices. Before giving any policy options on the development of intercropping system, relevant and adequate information on various aspects of the system at farm level is required. But such information is very limited due to lack of adequate research in this field.

## 1.2 Statement of the Problem

Among all other agricultural practices only intercropping has been taken as present research topic. Bangladesh is one of the most densely populated countries of the world. There exists a little scope of horizontal expansion of land for increasing agricultural productivity. To increase farm income the only way thus remains is to undertake intensive use of land through scientific farming and multiple cropping.

In Bangladesh, intercropping is a common and a known practice. But the level of raising intercrops scientifically is far from satisfaction. Some farmers have realized these benefits and responded very positively to adopt this practice. They were very much keen to get along with the practice of. Some farmers in contrast, showed totally reverse attitudes. This study is, therefore, designed to making an in-depth analysis of the extent adoption of intercropping by the farmers.

This research also examined the relationship between selected personal and socio-economic characteristics of farmers and their extent of adoption of intercropping. Any person who is experienced in how change occurs is aware of innovations, some of which become popular very soon and some very slowly. Yet there are some innovations, which despite immense promotional efforts hardly find their way to the end users. This experience is common in promotion of change in any area of human behavior but particularly in the field of agriculture. One therefore, is tight to ask why one farm practice is more readily adopted than others. There might be some innate characteristics of the practice itself which may accelerate or retard its rate of adoption.

In order to understand the process underlying the adoption of crop diversification, the researcher undertook an investigation entitled “Adoption of Intercropping with Jackfruit by the Farmers in two selected unions of Bhaluka Upazila under Mymensingh District.” The present investigation is concerned with the adoption of intercropping which is a major concern in agricultural extension. This was done by seeking answer to the following questions:

1. What was the extent of adoption of intercropping with Jackfruit by the farmers?
2. What were the characteristics of intercropping farmers?
3. What were the relationships between selected characteristics of intercropped farmers and extent of adoption of intercropping with Jackfruit?

With a view to have an understanding on the extent of adoption of intercrop with jackfruit by the farmers, the researcher undertook a study entitled “Adoption of Intercropping with Jackfruit by the Farmers of Bhaluka Upazila under Mymensingh District.” The purpose of the study was to determine the extent of adoption of intercropping with jackfruit cultivation and also to ascertain the relationships of the selected characteristics of the jackfruit growers with their adoption of intercropping with jackfruit cultivation. The present investigation is concerned with the adoption of intercropping which is a major concern in agricultural extension.

### 1.3 Specific Objectives of the Study

To conduct the research properly the following specific objectives have been set forth:

1. To determine the extent of adoption of intercropping with Jackfruit.
2. To determine and describe the selected characteristics of intercrop growers. The selected characteristics were: age, education, farm size, income from jackfruit and intercrop, cosmopolitaness, innovativeness, crop diversification and received advice on intercropping.
3. To explore the relationships between the selected characteristics of the farmers and their adoption of intercropping with Jackfruit.

#### 1.4 Limitations of the study

To make the study meaningful, the following limitations were taken into consideration:

1. The study area was confined to Bhaluka Upazila under Mymensingh District because this area was reputed for intercropping with jackfruit.
2. The study was confined to 10 villages of Bhaluka Upazila, which were selected by random sampling.
3. To reach the above listed objectives, the researcher depended on information furnished by the respondents. Face-to-face interview was conducted by using interview schedule.
4. Reluctance of the farmers to provide information was overcome by establishing rapport and careful observation.
5. There were many attributes or characteristics of intercropped farmers, but only (8) were selected for investigation in this study as stated in the objectives. This was done to complete the study within limited resources and time.

#### 1.5 Justification of the study

Intercropping with jackfruit was not an old phenomenon. But extension services and research institutes know it as a new phenomenon. The research would be justified if the:

1. The findings of the study is considered by the extension services and incorporate into its annual crop production programme.

2. Agricultural research institutes undertake research program on various issues of intercropping such as fertilizer management, plant population, insect and disease control etc.
3. Respondents would be encouraged to be engaged in intercropping more scientifically.

At present there is a lack of adequate information to influence farmer's adoption of intercropping with jackfruit. This fact indicates the need for an investigation to ascertain the relationship of the characteristics of the farmers with their adoption of intercropping with jackfruit. This study will be helpful to the researchers for further studies of similar nature and to the extension personnel who are directly involved in different agricultural development programmers and to the planners for effective plans.

### 1.6 Assumptions of the Study

During the study the following assumptions were taken into consideration:

1. The randomly selected respondents were competent enough to provide proper responses to the questions concerned with intercropping.
2. The views and opinions furnished by the respondents were the representative views and opinions of all the farmers of that area.
3. The researcher was well adjusted to the environment of the study area. So, the collection of data from the respondents was free from bias.
4. The responses furnished by the respondents were reliable.
5. The researcher who acted as interviewer was well adjusted to the environment of the study area. Hence the collection of data was absolutely reliable.

## 1.7 Statement of Hypothesis

A hypothesis is a tentative statement about the relationship between two or more variables. Hypotheses may be broadly divided into two categories, namely, research hypothesis and null hypothesis. In studying relationships between variables an investigator first formulates research hypothesis which states anticipated relationships between the variables. However, for statistical test it becomes necessary to formulate null hypothesis. A null hypothesis states that there is no relationship between the concerned variables.

The following null hypothesis was formulated to explore the relationships of the selected characteristics of the farmers with their adoption of intercropping with jackfruit cultivation:

"There is no relationship between the selected characteristics of the farmers and their adoption of intercropping of jackfruit cultivation".

## 1.8 Definition of Important Terms

For clarity of understanding certain terms frequently used throughout the study are defined and interpreted as follows:

### Adoption

When an individual takes up a new idea as the best course of action and practices it, the phenomenon is known as adoption. Adoption is a decision to make full use of an innovation as the best cause of action available. Adoption is the implementation of a decision to continue the use of an innovation. However adoption of intercropping in jackfruit cultivation refers to one's use of the intercropping practice with jackfruit and one's decision of use in future. It is an individual decision-making process.

## Intercropping

When two crops are grown together on the same land at the same period, in space between rows of main crop, the system of cultivation is known as intercropping. One of the crops is known as the principal crop and is generally of long duration and other crop is known as the intercrop or additional crop having shorter duration. Usually a deep rooted crop is selected as principle crop and a shallow rooted one is chosen as intercrop. In this study jackfruit has been considered as the principle crop and pineapple, banana, zinger and turmeric were considered as the intercrops.

## Education

Education is the production process of human behavior towards desired goal. Education creates a favourable mental atmosphere for accepting new practices. It is the most important influencing force-factor in adoption of innovation. But it's lacking creates hindrance in adoption of innovation (Bhuiyan, M. H. 2012). But for this study education is defined as the ability of an individual to read and write or formal education received upto a certain standard. Education was measured in terms of actual year of successful schooling.

## Farm size

The term refers to the cultivated area either owned by a farmer or obtained from others on share-cropping system, or lease the area being estimated in terms of full benefit to the farmers. The right of the farmers on land taken on lease from other is regarded as ownership in estimating the farm size. Farm size was measured in terms of acres.

## Income from jackfruit and intercrop

An intercropped farmer cultivate zinger, turmeric, banana, pineapple with jackfruit. So, the sale proceedings of intercrops become the income from intercrops during a year. It was expressed in taka. However a unit scores of one (1) was assigned for each thousand taka income.

## Cosmopoliteness

Empirically it refers to the number of times a person pays visit to places out of her/his own locality. It refers to the orientation or exposure or involvement of an individual respondent which are external to his own social system. Cosmo politeness of a respondent is measured by computing a cosmopoliteness score. The cosmopoliteness score is assigned on the basis of different places and frequency of his visit external to and outside his own social system.

## Innovativeness

Innovativeness is the degree to which an individual is relatively earlier in adopting agricultural innovations, new ideas, practices and things than the other members of a social system. This was comprehended by the quickness of accepting innovations by an individual in relation to others and was measured on the basis of time dimension. In this study innovation was referred to how the intercrop adopters were relatively earlier in adoption of intercrops than other members.



## Crop diversification

It refers to the degree of diversity of crop raised by the farmers. Crop diversification is a common means of reducing risk in agriculture, taking advantage of asynchronous variation in yield-response and prices to minimize risk. Crop diversification in agriculture means to increase the total crop productivity in terms of quality, quantity and monetary value under specific, diverse agro-climatic situations world-wide. Crop diversification can be a useful means to increase crop output under different situations. Crop diversification at national level will demand more resources and require selection and management of a specific crop or a group of crops sold freshly or value added to achieve higher profits.

## Received advice on intercropping

It refers to the way by which respondents become accessible to the influence of different information media through different extension teaching methods. It refers to an extension staff's contact with individuals to disseminate new technologies among the farmers. It also refers to solution of problems of intercropping by the extension workers. Advice on Intercropping is the way to access to the communication process through various extension methods and communication channels during one year prior to data collection. Farmers get advice on intercropping from extension officers, subject matter specialists and other advisers.

***CHAPTER 2***  
***REVIEW***  
***OF***  
***LITERATURE***

## **CHAPTER 2**

### **RIVIEW OF LITERATURE**

The purpose of this chapter is to review the literature having relevance to the present study. This present study is primarily concerned with the adoption of intercropping with jackfruit. The researcher made an elaborate search of available literature for this purpose but a very few study dealing with the relationship of the characteristics of jackfruit growers with their adoption of intercropping with jackfruit cultivation was available in course of the review of literature. Considerable work has been done in the field of adoption of improved varieties of crops and other agricultural innovations in USA and other foreign countries. In Bangladesh, research in adoption of agricultural innovations ( intercropping with jackfruit may be regarded as innovations) has also started and some studies have already come out from the Bangladesh Agricultural University, Mymensingh, Sher-e-Bangla agricultural University and other agricultural research organizations. However this chapter is divided into following three sections:

Section 1: Review of Literature on General Context of Adoption

Section 2: Relationship of the selected characteristics of the farmers with their adoption of different innovations

Section 3: Conceptual framework of the study

## 2.1 Review of Literature on General Context of Adoption

Kashem *et al.* (1992) conducted a study on adoption behavior of sugarcane growers of Zilbangla Sugar mill, Jamalpur, Bangladesh. They found that, among the sugarcane growers, 89 percent had high level of adoption of recommended practices of sugarcane.

Singh *et al.* (1992) undertook a study in India on factors affecting the adoption of improved sugarcane production technology. They observed that majority of sugarcane growers had the medium level of adoption and adopted scientific recommendation of sugarcane production technology.

Khan (1993) carried out a research programme on adoption of insecticides and related issues in the village of Pachar union, Madaripur district. He observed that among the farmers, 7 percent had no adoption, 57 percent had low adoption, 32 percent had medium adoption and only 14 percent had high adoption.

Hasan (1996) in his study found that the highest proportion (44 percent) of respondents perceived the existing ones of medium adoption, compared to 26 percent low adoption and 30 percent high adoption in respect of selected agricultural technologies.

Muttaleb (1995) conducted a study on the extent of the adoption of improved technologies of potato cultivation by the farmers in Haibatpur

Union under Sadar thana of Jessore district. The study revealed that 8 percent of the potato growers had high adoption of improved technologies, 43 percent had medium and 49 percent had low adoption.

Islam (1996) carried out a study on farmer's use of Indigenous Technical Knowledge (ITK) in the context of sustainable agricultural development. He found that extent of use of ITK by individual farmers having the highest proportion (42.73 percent) of the respondents belonged to the lower user category as compared to 41.82 percent in the higher user category respectively.

Alam (1997) studied the extent of use of improved farm practices by the rice growers in Anwara thana of Chittagong district. The study revealed that 43.0 percent of the respondents had medium use of improved farm practices and 50.0 percent of the respondents had low use of improved farm practices and only 7.0 percent of the respondents had high use of improved farm practices.

Bashar (1993) conducted a study on the adoption of intercropping in sugarcane cultivation and revealed that, about half (48.57 percent) had medium adoption of intercropping compared to 19.05 percent having low and 32.38 percent having high adoption of intercropping.

From the above literature it is obvious that, all the researchers in their research found adoption occurred. In some case, extent of adoption was low, in some case was medium and in some other cases the extent of adoption was high.

## 2.2 Relationship of the selected characteristics of the farmers with their extent of adoption of intercropping

The findings of studies dealing with the relationship of the characteristics of the farmers with their adoption of different innovations were of interest to the researcher and it was deemed pertinent to review the findings of such studies in brief.

Eight characteristics of the jackfruit growers were selected as independent variables of this study. The researcher made utmost effort to search out studies dealing with the relationships of each of the selected characteristics with the adoption of innovations. This section presents a review of expert opinions and past studies relating to the association between the selected independent variables and adoption of innovations. The presentation has been made in eight sub-sections. Each of the sub-sections dealing with the literature on the relationship of one of the independent variables and adoption of innovation.

### 2.2.1 Age and Adoption of Innovation

Bashar (1993) conducted a study on the adoption of intercropping in sugarcane cultivation and found a negative relationship between age and adoption of intercropping.

Beal and Sibley (1967) conducted a combined study on the adoption of agricultural technology by the Indians of Guatemala indicated that there was a significant negative relationship between the age score and farm practice adoption score. Similar findings between age and adoption of improved farm practices had also been reported by Krishna (1969) and Bezborra (1980).

Haque (1984) conducted a study on the adoption of improved farm practices in sugarcane cultivation in some selected areas of Jessore district. He found a significant positive relationship between age and the adoption of improved practices.

Iqbal (1963) found that elderly farmers were more apt to adopt modern agricultural practices as compared to other age groups. Similar positive relationship between age and adoption of innovations had also been reported by Islam (1971).

Reddy and Kivlin (1968) found that age was not a significant factor in respect of adoption of either ten agricultural practices considered collectively or that of HYV alone. Similar findings between age and adoption of improved farm practices had also been reported by Hossain (1971) and Singh (1989).

Karim (1973) found no relationship between age and adoption of fertilizers. Similar findings between age and adoption of improved farm practices of the farmers had also been reported by Rahman (1973), Sobhan (1975), Razzaque (1977), Hossain (1981), Ali and Chowdhury (1983) and Singh (1989).

Shetty (1968) undertook a study on agricultural innovations of rice farmers and found that age was negatively related to the innovation. Similar findings between age and adoption of new farm practices had also been found by Lionberger (1966), Shamsuzzoha (1967) and Ali (1993).

Veeranna (2000) found that the majority (66 percent) of the respondents had medium level of adoption followed by low (22 percent) and high (12 percent) levels of adoption of scientific goat rearing practices. The extent of adoption was 61.33 percent. Two trails viz. age and knowledge of scientific rearing practices and positive and highly significant relationship with adoption of scientific goat rearing practices.

Islam (2002) conducted a study on adoption of modern agricultural technologies by the farmers of Sandip. He found that age of the farmers was not related to their adoption of modern agricultural technologies.

Rahman (2001) observed that there was no significant relationship between age and adoption of Aalok-6201 hybrid rice cultivation practices. Fodder (1999) and Hossain (1999) have found similar results in their respective studies.

Hussen (2001) conducted a study which concluded that age of the sugarcane growers had a significant negative relationship with their adoption of modern sugarcane cultivation practices. Rahman (1995) also found similar result in his study.

Out of 27 studies, 10 studies showed negative relationship between age and adoption of agricultural innovations of the farmers, 4 studies showed positive relationship and 13 studies showed no relationship. So, according to literature majority said that, age does not influence adoption of agricultural innovations in great extent but some said that, there is a relationship between age and adoption of innovation.



According to most of the studies, whether the farmer is young or middle aged or old, it will not affect the adoption of agricultural innovations. Farmer of any age can adopt an innovation. But, still we all know that, young farmers are more receptive to new ideas and innovations than the old farmers.

### 2.2.2 Education and Adoption of Innovation

Bashar (1993) found a positive and highly significant relationship between education and adoption of intercropping in sugarcane.

Marsh and Coleman (1955) revealed a significant positive relationship between educations of the farmers with their adoption of recommended practices. Similar findings between education of the farmers and adoption of different agricultural practices had also been reported by Dimit (1957), Rahim(1961), Bose and Saxena (1965), Chaudhary et al (1968), Reddy and Kivlin (1968), Hossain (1971), Rao (1976), Halim (1982), and Haque (1984).

Mannan (1972) did not find any significant relationship between education of farmers and adoption of IR-20. Similar findings had also been found by Singh (1989).

Sobhan (1975) found that education of the farmers had no relationship with their adoption of winter vegetable cultivation. Similar findings were also observed in other studies (Islam, 1971; Hossain, 1981; and Ali, 1993).

Sarker (1997) conducted a study to determine the relationship between selected characteristics of potato growers and their adoption of improved potato cultivation practices in five villages of Comilla district.

He found that education of potato growers had significant relationship with their adoption of improved potato cultivation practices.

Chowdhury (1997) found positive significant relationship between the education of the farmers and their adoption of selected BINA technologies. Similar results were found by Halim (1985), Islam (1993), Hoque (1993), Pal (1995), and Ali *et al.* (1986).

Rahman (2001) conducted a study on Knowledge, attitude and adoption of the farmers regarding Aaiok-6201 hybrid rice in Sadar upazila of Mymensingh district. He found that academic qualification of the farmers had a significant positive relationship with their adoption regarding Aalok-6201 hybrid rice.

Aurangozeb (2002) conducted a study on adoption of integrated farming technologies by the rural women in RDRS. He found that there was a positive relationship between education and their adoption integrated farming technologies.

Sardar (2002) conducted a study on adoption of IPM practices by the farmers under PETRRA project of RDRS. He found that education of the farmers had a positive significant relationship with their adoption of IPM practices.

Out of 27 studies, 21 studies showed positive relationship between education and adoption of agricultural innovations of the farmers and 6 studies showed no relationship. So, according to the literature, it is clear that, education has a great influence in adoption of agricultural innovations.

According to most of the studies, when the farmer was educated or had the primary or secondary education, then it was comparatively easier for him/her to adopt the innovation or to apt the technique than the farmer who had not education. It is also revealed that, education helped them in decision making as well as clear understanding of the innovation.

### 2.2.3 Farm Size and Adoption of Innovation

Ali and Chowdhury (1983) found a positive significant relationship between family land holding size (i.e. farm size) and adoption behavior of sugarcane growers. Similar relationships between the farm size and adoption of improved farm practices of the farmers had also been reported by Reddy and Kivlin (1968) and Haque (1984).

Wilson and Gallup (1955) reported that percentage of farmers and home makers adopting new practices and rate of adoption of such practices tended to increase with the increase in size of farm i.e. positive relationship between size of the farm and adoption of new practices in his study. Similar finding between farm size and adoption of improved farm practices of the farmers had also been reported by Rahim (1961), Ali (1962), Lionberger (1966), Beal and Sibley (1967), Ahmed (1968), Gaikward et al. (1969), Hossain (1971), Karim (1973).

Inayetullah (1962) did not find any relationship between size of farm and the potential. This finding is very much in agreement with that of Islam (1972). However, Sobhan (1975), Singh (1989) and Ali (1993) found that there was no significant relationship between farm size of the farmers and their adoption of improved farm production technologies.

Sarkar (1997) found that farm size of the potato growers had a significant positive relationship with their adoption of improved potato cultivation practices. Similar findings on adoption of selected BINA technologies were also reported by Chowdhury (1997).

Rahman (2001) conducted a study on knowledge, attitude and adoption of the farmers regarding Aalok 6201 hybrid rice in sadar upazila of Mymensingh district. He found that size of the farm had a significant and positive relationship with their adoption regarding Aalok 6201 hybrid rice.

Aurangozeb (2002) conducted a study on adoption of integrated homestead farming technologies by the rural women in RDRS. He found that farm size had no relationship with adoption of integrated homestead farming technologies.

Sardar (2002) conducted a study on adoption of IPM practices by the farmers under PETRRA project of RDDDS. He found that the farm size of the farmers and a positive significant relationship with their adoption of IPM practices.

Out of 21 studies, 15 studies showed positive relationship between farm size and adoption of agricultural innovations of the farmers and 6 studies showed no relationship. So, literature says that, farm size affects adoption of agricultural innovations. It is natural that, when someone has plenty of land or sufficient amount of land, then he will think about something new or innovative ideas. If a farmer has much amount of land, then he/she will think about more diversified use of it.

#### 2.2.4 Income from Jackfruit and Intercrop and Adoption of Innovation

Bashar (1993) observed that no significant relationship between the adopters of intercropping in sugarcane and their annual family income.

Thomson (1968) found a positive relationship between the income and adoption of farm practices. Similar results had also been found by Rogers and Shoemaker (1971) and Rahman (1973).

Haque (1984) conducted a study on the adoption of improved practices in sugarcane cultivation and found a positive relationship between annual income and adoption of improved practices. Similar findings had also been reported by Al-Mogel (1985).

Beal and Sibley (1967) in their combined study did not find any significant relationship between value of principal crops score (i.e. income) and the farm practice of adoption. Similar findings between income and adoption of improved practices of the jute growers had also been reported by Hossain (1981).

Pal (1995) in his study found a positive significant relationship between income of the farmers and their adoption of recommended practices in sugarcane cultivation.

Chowdhury (1997) found that the annual income of the respondents had a positively significant relationship with their adoption of selected BINA technologies. Similar findings were reported by Sarker (1997) and Alam (1997).

Islam (2002) conducted a study on adoption of modern agricultural technologies by the farmers of Sandip. He observed that the annual income of the farmers had no relationship with their adoption of modern agricultural technologies.

Aurangozeb (2002) conducted a study on adoption of integrated homestead farming technologies by the rural women in RDRS. He found that there was a positive significant relationship between annual income of the respondent and their adoption of integrated homestead farming technologies.

Out of 12 studies, 9 studies showed positive relationship between income from intercrop and adoption of agricultural innovations of the farmers and 3 studies showed no relationship. It is very obvious that, when a farmer has sufficient income then this is very easy for him to take an innovation because he/she can take the risk. If his income is very poor then, he/she will think twice before adopting any innovation.

#### 2.2.5 Received Advice and Adoption of Innovation

Bashar (1993) revealed a positive relationship between the adoption of sugarcane growers and extension contact.

Donelan (1985) found that improvement of extension services to the farmer is one factor that can help to raise cane yield per acre and thus produce required tonnage smaller acreage. Similar positive relationship between extension contact and adoption of innovation of the farmers had also been reported by and Gallup (1955), Beal and Sibley (1967), Reddy and Kivlin (1968), Muhammad (1974), Halim (1982) and Naik and Rao (1989).

Ali (1993) conducted a study and found a significant positive relationship between extension contact and adoption. Similar results had also been found by Fliegel (1956), Hardee (1965), Mouliket et al. (1966), Rao (1976), Bezborra and Grewal (1980), Hossain (1981), Haque (1984), Osunlogun *et al.* (1986), Mustafi *et al.* (1987) and Igodan *et al.* (1988).

Sarkar (1997) found that extension advice of potato growers had a positive significant relationship with their adoption of improved potato cultivation practices. Chowdhury (1997) also observed similar findings.

Alam (1997) studied use of improved farm practices of rice cultivation by the farmers of Anwara thana of Chittagong district. The study indicated no significant relationship with their use of improved farm practices in rice cultivation.

Hussen (2001) conducted a study on farmer's knowledge and adoption of modern sugarcane cultivation practices. He found that extension contact of the growers had significant relationship with their adoption of modern sugarcane cultivation practices.

Out of 23 studies, 22 studies showed positive relationship between extension advice and adoption of agricultural innovations of the farmers and 1 study showed no relationship. So, according to the literature, it is clear that, extension advice has a great influence in adoption of agricultural innovations. According to these studies, when the farmers had some advice about what to do, how to do, then it was comparatively easier for them to adopt the innovation or apt the technique than the farmer who had not extension advice.

Extension advice helped them in decision making on what the innovation they will take and what should they do in future for better result.

### 2.2.6 Cosmopolitaness and Adoption of Innovation

Islam (2002) conducted a study on adoption of modern agriculture technologies and found a significant positive relationship between cosmopolitaness and adoption.

Pal (1995) conducted a study on Adoption of Recommended Sugarcane Cultivation Practices and found a positive relationship between cosmopolitaness and adoption.

Haque (1993) revealed a positive relationship between the adoption of improved practices of sugarcane and cosmopolitaness.

Chowdhury (1997) in their combined study did not find any significant relationship between cosmopolitaness and adoption of selection of BINA technologies the farm practice of adoption.

Sobhan (1975) found that crop diversification of the farmers had no relationship with their adoption of winter vegetable cultivation.

Rahman (2001) conducted a study on knowledge, attitude and adoption of the farmers regarding Aalok 6201 hybrid rice. He found that Cosmopolitaness of the farmers had a significant and positive relationship with their adoption of Aalok 6201 hybrid rice.



Aurangogeb (2002) conducted a study on the adoption of integrated homestead farming technologies by the rural women in RDRS. He found a significant relationship between cosmopolitanism and adoption of integrated homestead farming technologies.

Islam (2002) conducted a study on adoption of modern agricultural technologies by the farmers of Sandip. He found that cosmopolitanism of the farmers had significantly positive relationship with their adoption of modern agricultural technologies.

Out of 8 studies, 6 studies showed positive relationship between cosmopolitanism and adoption of agricultural innovations of the farmers and 2 studies showed no relationship. Studies revealed that, when there was cosmopolitanism there was adoption. People who were used to visit relatives, other unions or village fair were earlier in adopting an innovation. It made them able to have information and knowledge, take decision and have suggestion for implement the innovation.

### 2.2.7 Innovativeness and Adoption of Innovation

Rahman (1973) revealed a positive relationship between the adoption of farm practices and innovativeness.

Muhammad (1974) conducted a study on adoption of insect management and found a positive relationship between innovativeness and adoption.

Islam (2002) conducted a study on adoption of modern technologies and found a positive relationship between innovativeness and adoption.

Rahman (1973) conducted a study on the adoption of intercropping in pineapple cultivation and found a positive relationship between innovativeness and adoption.

Sharma and Sonoria (1983) observed higher average innovativeness among contact farmers than the non contact farmers. They also found that contact farmers' adoption of innovations differed significantly with their variation in innovativeness.

Out of 5 studies, 5 showed positive relationship between innovativeness and adoption of agricultural innovations of the farmers. It is natural that, when someone is innovative in character, he/she will surely adopt new ideas. The studies also revealed that, in most of the cases if there was innovativeness, and then adoption occurred.

#### 2.2.8 Crop Diversification and Adoption of Innovation

Ali and Chowdhury (1983) found a positive significant relationship between crop diversification and adoption behavior of sugarcane growers. Similar relationships between crop diversification and adoption of improved farm practices of the farmers had also been reported by Reddy and Kivlin (1968).

Haque (1984) conducted a study on the adoption of improved practices in sugarcane cultivation and found a positive relationship between crop diversification and adoption of improved practices.

Bashar (1993) revealed a positive relationship between the adoption of sugarcane growers and crop diversification.

Islam (2002) conducted a study on adoption of modern agriculture technologies and found a significant positive relationship between crop diversification and adoption.

Sobhan (1975) found that there was no relationship between crop diversification and adoption winter vegetable cultivation. Similar findings were also observed in other studies (Islam, 1971; Hossain, 1981; and Ali, 1993).

Chowdhury (1997) found positive significant relationship between the crop diversification of the farmers and their adoption of selected BINA technologies. Similar results were found by Halim (1985), Islam (1993), Hoque (1993), Pal (1995), and Ali *et al.* (1986).

Rahman (2001) conducted a study and found that there was no relationship between crop diversification and adoption.

Aurangozeb (2002) conducted a study on adoption of integrated farming technologies by the rural women in RDRS. He found that there was a positive relationship between crop diversification and their adoption integrated farming technologies.

Out of 17 studies, 12 studies showed positive relationship between crop diversification and adoption of agricultural innovations of the farmers and 5 studies showed no relationship. So, literature says that, crop diversification affects adoption of agricultural innovations. Again, some also says that, there is no affects of crop diversification on adoption. But, the fact is, when there is more and more crop diversification, there will be more and more chances for adoption like intercropping. If a farmer has much amount of land, then he/she will think about more diversified use of it and adoption like intercropping will occur.

### 2.3 The Conceptual Framework of the Study

The review of literature discussed above depict that events happen in the universe are the results of causes and effects. It is true in respect of human behavior also. The uniqueness of individuality and the environmental factors simultaneously causes certain behavior of a person. Behavior is the total quality of an individual. The total quality consists of his/her age, education, heredity, environment, sociability, communication skill adjustment, attitude, neighbor, social status, income, dogmatism, fatalism, courage, problem confrontation, knowledge, politics, religion, innovativeness and many other socioeconomic characteristics. The qualities constantly influence each other. Development of technology is a great work of scientists, teachers, extentionists and others. Its diffusion and adoption among people is a great work. Diffusion of technology absolutely depends upon adoption behavior of the adopters.

The foregoing discussion on review of literature manifested that adoption behavior of people is influenced by their total quality (Characteristics).

Present study would be tried to focus on two concepts; first, the farmer's selected characteristics and the second, their adoption of intercropping in jackfruit cultivation. Adoption of intercropping with jackfruit cultivation of an individual may be influenced and affected through interacting forces in his surroundings. Adoption of intercropping with jackfruit cultivation may also be influenced by his/her personal, economic, social and physiological characteristics. In this study, farmer's characteristics have only been taken into consideration. Age, education, farm size, income from intercrop, innovativeness, cosmopolitaness, extension advice and knowledge on crop diversification were the independent variables of this study, while adoption of intercropping with jackfruit being the main focus of the study and constituted the only dependent variable.

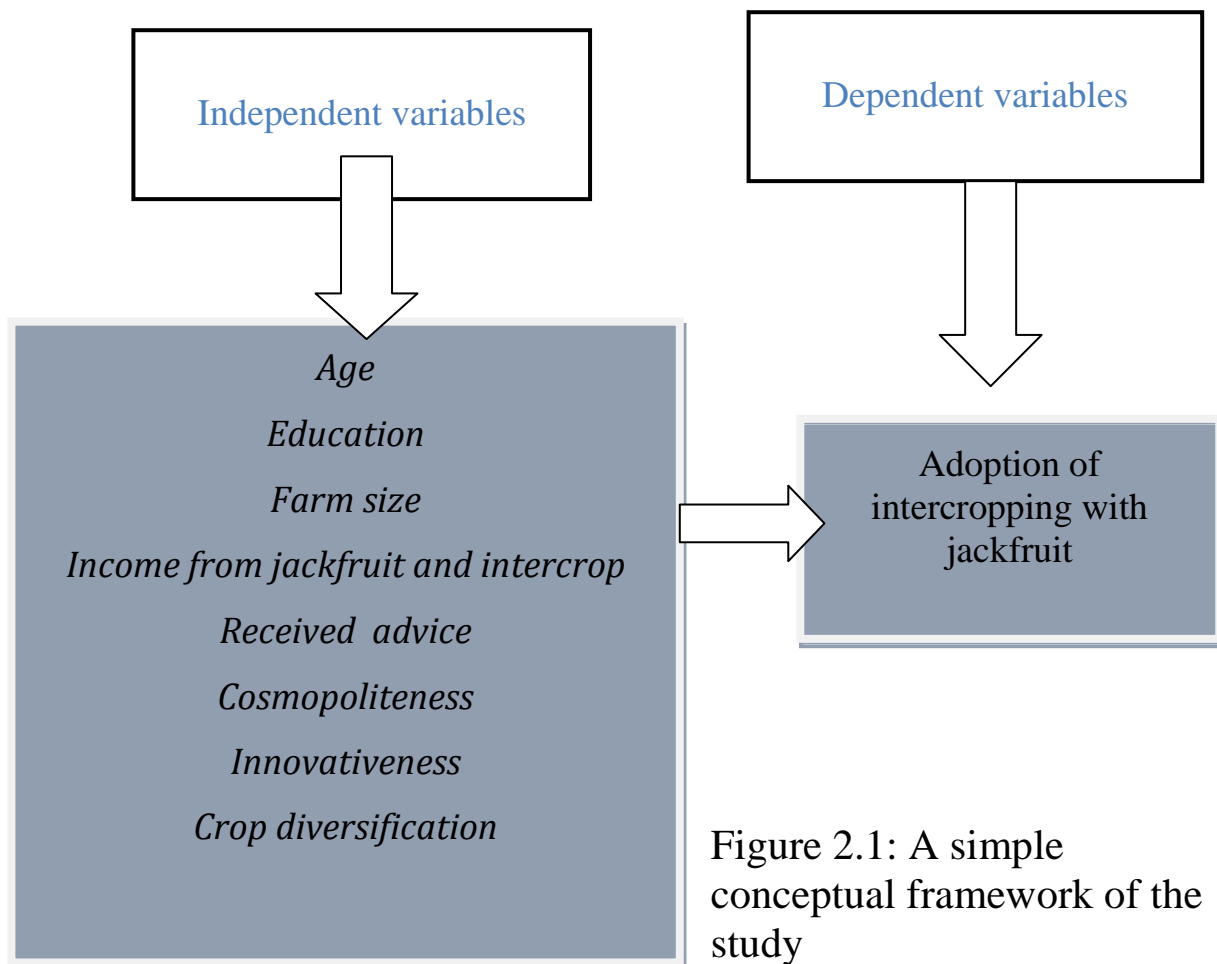


Figure 2.1: A simple conceptual framework of the study

***CHAPTER 3***  
***METHODOLOGY***

# **CHAPTER 3**

## **METHODOLOGY**

### **3.1 Locale of the Study**

Bhaluka upazilla of Mymensingh district was purposively selected as the study area. In Bhaluka jackfruit grows in abundance. There are 11 unions in the Upazila. Out of 11 unions 2 unions were selected randomly. The unions were Kachina and Habirbari. There were 17 villages in two unions from which 10 villages were selected randomly by 5 taking from each.

### **3.2 Population and Sampling**

Jackfruit growers of selected villages were the population of the study. An upto date list of all the jackfruit growers of the village was prepared with the help of UAO office. Sub-Assistant Agriculture Officer (SAAO) and Sub-Assistant Plant Protection officer (SAPPO) helped the researcher in this respect. Total number of jackfruit growers was 503 which constituted the population of the study (Table 3.1). One hundred and seventeen jackfruit growers were selected randomly using random table. They all had intercrop with jackfruits. Beside one hundred and seventeen jackfruit growers, a reserve list of total 23 intercrop farmers was made at the rate of 20 percent from the population.



Figure 3.1. A map of Bhaluka upazilla showing the study area.



Table 3.1: Distribution of Jackfruit-Intercrop growers of selected 10 villages with a reserve list.

<i>Name of the union</i>	<i>Name of the village</i>	<i>Number of Intercropper</i>	<i>Intercropper</i>	
			<i>Sample</i>	<i>Reserve list</i>
Habirbari	Habirbari	78	19	4
	Battazur	54	10	2
	Tamait	47	16	3
	Labanghora	62	11	2
	Shishtur	45	09	2
Kachina	Talgaon	60	15	3
	Gilarchcla	42	16	3
	Kajigor	51	10	2
	Masterbari	32	06	1
	Pakuria	32	05	1
	Total	503	117	23

### 3.3 Research Instrument

In order to collect relevant information an interview schedule was carefully designed keeping in view the objectives of the study. The interview schedule was designed in English. At the time of interview it was converted into Bengali version. Appropriate scales were developed to operationalize the selected characteristics of the farmers and the dependent variable as well. The interview schedule was pre-tested by administering among fifteen jackfruit growers of the study area. The pre-test was helpful to identify faulty questions and statements in the draft schedule. Necessary addition, correction, alteration and adjustment were made in the schedule on the basis of the pre-test experience. The schedule was multiplied in its final form for the collection of data.

### 3.4 Collection of Data

The researcher himself collected data from the farmers by using the interview schedule. The interviews were conducted individually in the houses of the respondents during their leisure period. Only 7 jackfruit farmers of the original list were not available during interview and they were replaced from the reserve list. Advanced information was given to the respondents before going to them for interviewing. The researcher took all possible care to establish rapport with them. While any respondent faced difficulty in understanding any question, the researcher took utmost care to explain the issue. He obtained excellent cooperation from the respondents and others concerned during the time of interview. The entire process of collecting data took 25 days from the May 2, to the May 26, 2013.

### 3.5 Variables

Variables can be defined as any aspect of a theory that can vary or changes as part of the interaction within the theory. In an experiment, the independent variable is the variable that is varied or manipulated by the researcher, and the dependent variable is the response that is measured. Any event or condition can be conceptualized as either an independent or a dependent variable.

#### 3.5.1 Independent Variables

The independent variable refers to the status of the presumed cause. The selected individual characteristics of the Jackfruit farmers were the independent variables for this study. The characteristics were: age, education, farm size, income from jackfruit and intercrop, cosmopolitaness, innovativeness, crop diversification, received advice on intercropping.

#### Measurement of independent variables

The measurement of the independent variables is an important task. In accordance with the objectives the procedures of measurement of independent variables are stated below:

##### 3.5.1.1 Age

The age of a respondent was measured in terms of actual years from his/her date of birth. A score of one (1) was assigned for each year of age. In this study age of jackfruit growers with intercropping was measured. For example, if age of a respondent was 50 his/her age score was calculated as 50.

### 3.5.1.2 Education

Education of a respondent was measured on the basis of her/his years of schooling. If a respondent passed class 4, his/her education score was given as 4. If a respondent did not know how to read and write his education score was given as zero (0). A score of 0.5 was given to that respondent who could sign his name only.

### 3.5.1.3 Farm size

Farm size of a respondent was determined as the total area of his/her farm (including jackfruit and other crops). It included summation of the area of homestead (including pond), own land under own cultivation, land taken from others on lease, land taken from others on share cropping and land given to others on share cropping where the unit of measurement was in acre. The following formula was used in measuring the farm size:

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

$A_1$  = homestead (including pond)

$A_2$  = own land under own cultivation

$A_3$  = land given to others on share cropping

$A_4$  = land taken from others on share cropping

$A_5$  = land taken from others on lease

### 3.5.1.4 Income from jackfruit and intercrop

The following items were taken into consideration for measurement of income.

- a) Total income    b) Income from main crop    c) Income from intercrop

Yearly earnings of all the family members from jackfruit and intercrop were added together to calculate the actual income of the respondent. A score of 1 was assigned for the income of ‘thousand’ taka.

### 3.5.1.5 Received advice on intercropping

The extension advice on intercropping was measured by asking a respondent to what extent he/she receives advice from extension personnel such as UAO, AEO, AAEO, SAAO and NGO. The extent of received advice was categorized into four viz. regularly, occasionally, rarely and not at all. The scores were assigned in the following way:

Extent of advice	Assigned score
Not at all	0
Rarely	1
Occasionally	2
Regularly	3

The received advice on intercropping of a respondent was, therefore, determined by adding the total responses against five selected extension personnel. The score could range from 0 to 15, where 0 indicating no extension advice and 15 indicating very high received advice.

### 3.5.1.6 Cosmopolitaness

Cosmopolitaness was measured by asking a respondent to what extent he/she visits to the relative/friends, other villages, other union, own upazila sadar to meet UAO, AEO, AAEO, SAAO, own zila sadar, the capital city, upazila agriculture fair, village fair to acquire knowledge of intercropping. The extent of visits were designated as regularly, occasionally, rarely, not at all (no visit) and scores assigned against these categories were as 3, 2, 1 and 0 respectively. Logical frequencies of visits were assigned for each alternative response.

Cosmopolitaness score of a respondent was obtained by summing up the weights for his/her visits to the 10 items. The cosmopolitaness score could range from 0 to 30, while 0 indicating no cosmopolitaness and 30 indicating high cosmopolitaness.

### 3.5.1.7 Innovativeness

Innovativeness of a respondent was measured on the basis of the period of adoption of improved practices from the period he first listened about the innovation. Scores were assigned on the basis of time required for an individual to adopt each of the eight technologies in the following manner:

<i>Duration of adoption</i>	<i>Assigned score</i>
No adoption	0
Within 1 year after listening	4
Within 1-3 years after listening	3
Within 3-6 years after listening	2
After 6 years of listening	1

Thus the innovativeness score of a respondent was obtained by adding the score of all items and it ranged from 0 to 24, 0 indicating no innovativeness and 24 indicating very high innovativeness.

### 3.5.1.8 Crop diversification

Crop diversification was determined from the numbers of crops the respondent intercropped with jackfruit during the last 5 years on his/her crop land. In the study area, number of crops was cultivated by the intercrop farmers. The intercrop farmers intercropped different crops with sugarcane and maize also. But, discussing with farmer and studying the study area the researcher identified 10 crops such as turmeric, zinger, papaya, mango, litchi, banana, chilli, pineapple, tomato and brinjal, which were intercropped only with jackfruit. So, the number of crops can be cultivated is 10.

The following formula was used to measure crop diversification:

$$\% \text{Crop diversification} = \frac{\text{Number of crops cultivated}}{\text{Number of crops can be cultivated}} \times 100$$

As example, suppose an intercrop grower can cultivate 10 crops and he cultivated 6 crops then his percentage of crop diversification will be 60%.

### 3.5.2 Dependent Variable

Dependent variable refers to the status of the 'effect' (or outcome) in which the researcher is interested.

## Measurement of dependent variable

The composite adoption of intercropping with jackfruit cultivation by the farmers was the dependent variable of this study. Composite adoption of intercropping with jackfruit cultivation was measured by computing a composite adoption score. Assigned composite adoption score was consisted of three sub-score dimensions, *viz.*

1. Area sub-score of jackfruit cultivation.
2. Number of crops sub-scores a respondent intercropped.
3. Duration sub-score of practicing intercrop.

Sub-scores were computed for the said dimensions. Procedures followed in computing the three sub-scores have been presented below:

### 3.5.2.1 Area sub-score

Area sub-score was determined on the basis of the land area having used for adoption of intercropping in jackfruit cultivation. Scoring was made as follows:

<i>Land area used for adoption of intercropping in jackfruit cultivation</i>	<i>Score Assigned</i>
Land used up to 0.80 acre	1
Land used from 0.81 to 1.6 acre	2
Land used from 1.61 to 2.4 acre	3
Land used above 2.4 acre	4



### 3.5.2.2 Number of intercrops sub-score

Number of crops sub-score was computed on the basis of how many crops did he intercropped with Jackfruit. Scoring was made in the following manner:

<i>Number of crops with jackfruit</i>	<i>Score Assigned</i>
1-2	1
3-4	2
5-6	3
> 6	4

### 3.5.2.3 Duration sub-score

Duration sub-score was computed on the basis of the period during which an individual practicing intercropping with jackfruit cultivation in the study area. Scoring was made in the following manner:

<i>Duration of practicing intercropping</i>	<i>Assigned Score</i>
$\leq 2$ years	1
> 2-4 years	2
> 4-6 years	3
> 6 years	4

Finally the composite adoption of intercropping was determined by the following formula:

Adoption of Intercropping = Area sub-score  $\times$  Number of crops sub-score  $\times$  Duration sub-score.

The lowest adoption score would be 1 (one) and the highest adoption score would be 64 (Sixty four).

### 3.6 Statistical Treatments

Data collected from respondents for this study were compiled, coded tabulated and analyzed in accordance with the objectives of the study. The statistical measures such as, number and percentage distribution, range, mean, frequency distribution and standard distribution were used in describing the selected independent and dependent variables.

Pearson's product moment correlation co-efficient ( $r$ ) were used in order to explore the relationships between concerned variables. Correlation matrix was computed to determine the interrelationships among the variables.

***CHAPTER 4***  
***FINDINGS***  
***AND***  
***DISCUSSION***

## **CHAPTER 4**

### **FINDINGS AND DISCUSSION**

In this Chapter, the findings of the study and interpretation of their meaning are presented. This chapter has been discussed in the following three sub-sections according to the objectives of the study. First section deals with selected personal and socio-economic characteristics of the intercrop farmers, second section deals with extent of adoption of intercropping by the farmers and third section deals with relationship between the selected personal and socio-economic characteristic of the respondents and their extent of adoption.

#### **4.1 Selected characteristics of the intercrop farmers**

The characteristics of the farmers were selected to find out their relationship with the adoption of intercropping in jackfruit cultivation. The selected characteristics included their Age, Education, Farm size, Income from intercropping, Cosmopolitaness, Innovativeness, Crop diversification, Extent of advice on intercropping. The salient features of the characteristics are shown in Table 4.1.

*Table 4.1: Independent and Dependent Variable Characteristics Profile*

<i>Characteristics</i>	<i>Unit</i>	<i>Observed score</i>	<i>Possible score</i>	<i>Mean</i>	<i>SD</i>
Age	Years	Unknown	23-78	45.97	14.32
Education	Level of schooling	Unknown	0-16	5.03	4.78
Farm size	Actual (acre)	Unknown	0.21-6	2.12	1.36
Income from jackfruit and intercrop	Actual (in '000' Tk.)	Unknown	2-400	78.16	88.17
Received advice	Computed score	0-15	0-14	4.48	2.67
Cosmopolitaness	Computed score	0-30	3-12	6.52	2.10
Innovativeness	Computed score	0-32	2-24	9.25	4.85
Crop Diversification	Computed score	0-100	14-100	60.83	28.22
Adoption	Computed score	Unknown	1-64	11.76	10.43

#### 4.1.1 Age

Age score of the farmers ranged from 23 to 78. The average being 45.97 with the standard deviation 14.32. Based on their age score, the farmers were classified into three categories as shown in table 4.1.1

Table 4.1.1: Distribution of intercrop farmers according to their age.

<i>Categories</i>	<i>No</i>	<i>%</i>
Young (up to 35)	37	31.6
Middle age (36-50)	35	29.9
Old (> 50)	45	38.5

Data presented in table 4.1.1 indicated that the highest proportion (38.5 percent) of the respondents were in old aged category compared to 29.9 percent middle aged and 31.6 percent young aged category.

The findings indicate that a large proportion (61.5 percent) of the farmers were young to middle aged. The young and middle aged farmers have a favorable attitude towards new ideas. Most of the researches show that, middle aged farmers are proportionately higher than two other categories. But in this study old aged respondents are formed to be majority. Conclusion can be drawn that, old aged farmers are experienced and as the intercrop is a complex process they can confront any problem arise from it successfully and as old category constitute the largest proportion of the respondents so, the older respondents because of their longer farm experience might have valuable opinions in regard to adoption and as a result adoption of intercropping with jackfruit will occur.

#### 4.1.2 Education

Education scores of farmers ranged from 0 to 16. The average score was 5.02 with the standard deviation 4.78. Based on their score, the farmers were classified into five categories as shown in table 4.1.2

Table 4.1.2: Distribution of intercrop farmers according to their education.

Categories	No	%
Illiterate (0)	28	23.9
Can sign only (0.5)	22	18.8
Primary level (1-5)	18	15.4
Secondary level (6-10)	32	27.3
Above secondary (> 10)	17	14.6

Data presented in table 4.1.2 indicate that a large proportion (27.3 percent) of the respondents fell under category of “secondary level” compared to 23.9 percent "illiterate", 15.4 percent "Primary level", 18.8 percent “Can sign only” and 14.6 percent "above secondary level" where 42.7 percent did not have functional literacy. Matter of concern is approximately 24 percent farmers having no education. Of course the poor literacy categories may have some difficulties compared to educated categories in case of deciding on a matter related to problem solving but, the difficulties can be compensated by different training and giving knowledge on how to intercrop. So, it would be wise to undertake literacy program for these respondents before launching any agricultural extension programs in near future. Reading materials in the form of booklets, leaflets and other such extension teaching materials will be then used by this no education farmer groups. The findings reveal that the literacy rate was lower than national average 56.7 percent (BBS, 2011) in the study area.

#### 4.1.3 Farm size

The farm size score of the farmers in the study area ranged from 0.21 to 6, the average being 2.12 with the standard deviation 1.36. Based on their farm size, the farmers were classified into three categories as shown in table 4.1.3

Table 4.1.3: Distribution of intercrop farmers according to their farm size.

Categories	No	%
Marginal (.05-.49 )	12	10.3
Small farm (0.50-2.49)	63	53.8
Medium (2.50-5)	42	35.9

Data presented in the table 4.1.3 show that the 10.3 percent marginal, the 53.8 percent small farm and 35.9 percent medium farm. The majority (53.8 percent) of the farmers of the study area had small farms. The farm size was highly associated with adoption. It contributes to gross and net income. Medium farmers are more associated with different groups and organizations. It is noted that most of the medium farmers were one step ahead of other people of the society. They usually lease their land to other farmers as borga. Farmer from medium size farm category will play a vital role in promoting intercropping. A respondent who has medium size farm has greater chance of intercropping as he has large space compared to that has small farm. Again, intercropping in large or medium size farm of a respondent will lead to much more income and ultimately will lead to adoption by others.

#### 4.1.4 Income from jackfruit and intercrop

Income score of the farmers ranged from 2 to 400 (Taka in thousands) with the mean of 78.16 and standard deviation 88.17. On the basis of the Income from intercropping the farmers were classified into three categories as shown in table 4.1.4

Table 4.1.4: Distribution of intercrop farmers according to their income from jackfruit and intercrop.

Categories	No	%
Low income (up to 150)	104	88.9
Medium (151-300)	10	8.5
Large income (>300)	3	2.6



Data presented in table 4.1.4 indicate that the highest proportion (88.9 percent) of the respondents had small annual income compared to 2.6 percent high income and 8.5 percent had medium income.

The overwhelming majority of the respondents belong to “low income” category. This might be because of proceeding towards land scarcity day by day. The average income of the study area is much higher than the average per capita income of the country i.e. 818 US dollar (BBS, 2011). This might be due to they were engaged with other sources, such as services, business etc. which helped them to adopt a new innovation, increased their risk bearing ability.

#### 4.1.5 Received advice

Extension advice scores of the respondents ranged from 0 to 14 against the possible score range from 0-15 with a mean of 4.48 and standard deviation of 2.67. On the basis of extension contact scores, the respondents were classified into four categories as shown in table 4.1.5

Table 4.1.5: Distribution of intercrop farmers according to received advice.

Categories	No	%
No extension advice (0)	7	6
Low (1-4)	59	50.4
Medium (5-9)	47	40.2
High (>10)	4	3.4

Data presented in the table 4.1.5 indicate that about one half of the respondents (50.4percent) of the study area had low extension advice, while other half had medium (40.2 percent) to high (3.4 percent) extension advice. Only 6 percent had not received extension advice from the national extension service. The findings of the study indicate that most of the farmers had extension advice. It also indicates that, there is a proper flow of information and knowledge between DAE and intercrop farmers but not sufficient. Intercropping is a complex cropping system. Farmers need expert suggestions for intercropping. In this regard, subject matter specialists should be developed to provide larger service to the intercrop growers.

#### 4.1.6 Cosmopolitaness

The observed Cosmopolitaness scores of the farmers ranged from 3-12 against the possible score range from 0-30 with a mean of 6.52 with standard deviation of 2.10. On the basis of Cosmo politeness scores, the respondents were classified into three categories as shown in table 4.1.6

Table 4.1.6: Distribution of intercrop farmers according to cosmopolitaness.

Categories	No	%
Low cosmopolitaness (3 to 6 )	69	59
Medium cosmopolitaness (7-10)	43	36.7
High cosmopolitaness (> 10)	5	4.3

Data presented in table 4.1.6 indicate that the highest proportion (59 percent) of the respondents had low cosmopolitanism compared to 36.7 percent had medium cosmopolitanism and 3.4 percent had high cosmopolitanism. It is noted that, about three-fifths of the farmers are introvert and rest of the two-fifths are more or less extrovert. Now a day's agricultural occupations have become risky but commercial oriented. It is no more occupation for family consumption only. Technologies are being evolved rapidly. Farmers who have high cosmopolite characteristics become aware of the technologies and acquire how-to-knowledge and principal knowledge.

#### 4.1.7 Innovativeness

Innovativeness scores of the farmers ranged from 2 to 24 against the possible score range from 0-32. The mean score was 9.24 and standard deviation of 4.85. On the basis of innovativeness scores, the respondents were classified into three categories as shown in table 4.1.7

Table 4.1.7: Distribution of intercrop farmers according to innovativeness.

Categories	No	%
Low innovativeness (up to 8)	64	54.7
Medium innovativeness (9-16)	45	38.5
High innovativeness >17	8	6.8

Data presented in table 4.1.7 indicate that the highest proportion (54.7 percent) of the farmers had low innovativeness compared to 38.5 percent had medium innovativeness and 6.8 percent have high innovativeness. Findings of the study indicate that, all the respondents were innovative ranged from low to high.

It is true that all the farmers will not be similar innovative to all types of innovations. Some would be more innovative toward power tiller than tractor and some would be more inclined to paddle thresher than power tiller and so on.

#### 4.1.8 Crop diversification

Crop Diversification scores of the farmers ranged from 14 to 100 against the possible score range from 14-100 with a mean of 60.83 and the standard deviation of 28.22. Based on the scores, the farmers were classified into three categories as shown in table 4.1.8

Table 4.1.8: Distribution of intercrop farmers according to crop diversification.

Categories	No	%
Low Diversification (up to 33)	17	14.5
Medium Diversification (34-66)	48	47.9
High Diversification (> 67)	52	37.6

Data presented in table 4.1.8 reveal that the highest proportion (47.9 percent) of the farmers fell under the medium adoption category while 14.5 percent had low adoption and 37.6 percent had high adoption of crop diversification. It is noted that, an overwhelming majority (85.8 percent) of the farmers had medium to high adoption of crop diversification. The findings also reveal that, the intercrop growers are in favor of crop diversification. If the crop diversification program of DAE includes Bhaluka Upazilla the farmers are supposed to welcome the extension service.

## 4.2 Adoption of intercropping with jackfruit.



Figure 4.1: Adoption of intercropping by the intercrop farmers

Adoption scores of the farmers ranged from 1-64 with a mean of 11.76 and the standard deviation of 10.43. Based on the observed scores, the farmers were classified into three categories as shown in table 4.2.

Table 4.2: Distribution of intercrop farmers according to adoption.

Categories	No	%
Low adoption (up to 21)	97	82.9
Medium adoption (21-43)	18	15.4
High adoption (> 44)	2	1.7

Data presented in table 4.2 reveal that the highest proportion (82.9 percent) of the farmers fell under the low adoption category while 15.4 percent had medium adoption and 1.7 percent had high adoption.

It is noted that, 17.1 percent of the farmers had medium to high adoption with the influence of all characteristics and 82.9 percent of the farmers had low adoption.

Table 4.2.1: Correlation Co-efficient between the Selected Characteristics of the Farmers and their Adoption of Intercropping

<i>Dependent variables</i>	<i>Independent variables</i>	<i>Computed value</i>	<i>Tabulated value of "r" at 115 df</i>	
			0.05	0.01
Adoption	Age	-.112 NS	0.182	0.238
	Education	0.368**		
	Farm size	0.199*		
	Income from intercrop	0.545**		
	Cosmopolitaness	0.306**		
	Innovativeness	0.395**		
	Crop Diversification	0.135 NS		
	Extent of Advice	0.124 NS		

NS = Non significant

\* = Correlation is significant at the 0.05 level \*\* = Correlation is significant at the 0.01 level

### 4.3 Relationship between selected characteristics of the farmers and their adoption of intercropping with jackfruit

#### 4.3.1 Age and adoption of intercropping with jackfruit

The relationship between age of the farmer and their adoption of intercropping in jackfruit cultivation was examined by testing the concerned null hypothesis.

Co-efficient of correlation between the concerned variables was found to be (-.112 NS) as shown in Table.

This led to the following observation regarding the relationship between the two variables under consideration:

- The relationship showed a negative trend.
- The computed value of "r" (-0.112) was smaller than the tabulated value ( $r = 0.182$ ) with 115 degrees of freedom at 0.05 level of probability.
- Hence the concerned null hypothesis was accepted.

The researcher concluded that age of the farmers had no significant relationship with their adoption of intercropping in jackfruit cultivation.

#### 4.3.2 Education and adoption of intercropping with jackfruit

The relationship between education of the farmer and their adoption of intercropping in jackfruit cultivation was examined by testing the concerned null hypothesis.

Co-efficient of correlation between the concerned variables was found to be (0.368\*\*) as shown in Table. This led to the following observations regarding the relationship between the two variables under consideration:

- The relationship showed a positive trend.
- The computed value of "r" (0.368) was larger than the tabulated value ( $r = 0.238$ ) with 115 degrees of freedom at 0.01 level of probability.
- Hence the concerned null hypothesis was rejected.

The researcher concluded that education of the farmers had significant and positive relationship with their adoption of intercropping in jackfruit cultivation.

Through education one can gain knowledge and understandings and it will expand his/her outlook. Thus adoption may be higher among those farmers who had higher education.

#### 4.3.3 Farm size and adoption of intercropping with jackfruit

The relationship between farm size of the farmer and their adoption of intercropping in jackfruit cultivation was examined by testing the concerned null hypothesis.

Co-efficient of correlation between the concerned variables was found to be (.199\*) as shown in Table. This led to the following observations regarding the relationship between the two variables under consideration:

- The relationship showed a positive trend.
- The computed value of "r" (0.199) was larger than the tabulated value ( $r = 0.182$ ) with 115 degrees of freedom at 0.05 level of probability.
- Hence the concerned null hypothesis was rejected.

Farm size showed highly significant relationship might be due to the fact that, large level of farm size enables the farmers to allocate extra land for the practice of adoption of intercropping with jackfruit cultivation.

#### 4.3.4 Income from jackfruit and intercrop and adoption of intercropping with jackfruit



The relationship between annual income of the farmers and their adoption of intercropping in jackfruit cultivation was examined by testing the concerned null hypothesis.

Co-efficient of correlation between the concerned variables was found to be 'r' = (0.545\*\*) as shown in Table. This led to the following observation regarding the relationship between the two variables under consideration:

- The relationship showed a positive trend.
- The computed value of "r" (0.545) was larger than the tabulated value (r = 0.238) with 115 degrees of freedom at 0.01 level of probability.
- Hence the concerned null hypothesis was rejected.

The researcher concluded that income of the farmers had highly significant relationship with their adoption of intercropping in jackfruit cultivation. Raise in income enable the intercrop farmers to invest for the high cost technology related to the adoption of intercropping with jackfruit cultivation.

#### 4.3.5 Received advice and adoption of intercropping with jackfruit

The relationship between extension contact of the farmers and their adoption of intercropping in jackfruit cultivation was examined by testing the concerned null hypothesis.

Co-efficient of correlation between the concerned variables was found to be  $r = (0.124 \text{ NS})$  as shown in Table. This led to the following observation regarding the relationship between the two variables under consideration:

- The relationship showed a positive trend.

- The computed value of "r" (0.124) was smaller than the tabulated value ( $r = 0.182$ ) with 115 degrees of freedom at 0.05 level of probability.
- Hence the concerned null hypothesis was accepted.

The researcher concluded that extension advice had no significant relationship with their adoption.

#### 4.3.6 Cosmopolitaness and adoption of intercropping with jackfruit

The relationship between cosmopolitaness of the farmers and their adoption of intercropping in jackfruit cultivation was examined by testing 'the concerned null hypothesis.

Co-efficient of correlation between the concerned variable was found to be "r" = (0.306\*\*) as shown in Table. This led to the following observation regarding the relationship between the two variables under consideration:

- The relationship showed a positive trend.
- The computed value of "r" (0.306) was larger than the tabulated value ( $r = 0.238$ ) with 115 degrees of freedom at 0.01 level of probability.
- Hence the concerned null hypothesis was rejected.

The researcher concluded that cosmopolitaness of the farmers had significant relationship with their adoption. Through high cosmopolitaness behavior farmers become aware and motivated to adopt adoption of intercropping with jackfruit cultivation.

#### 4.3.7 Innovativeness and adoption of intercropping with jackfruit

The relationship between innovativeness of the farmers and their adoption of intercropping in jackfruit cultivation was examined by testing the concerned null hypothesis.

Co-efficient of correlation between the concerned variable was found to be "r" = (0.395\*\*) as shown in Table. This led to the following observed regarding the relationship between the two variables under consideration:

- The relationship showed a positive trend.
- The computed value of "r" (0.395) was larger than the tabulated value ( $r = 0.238$ ) with 115 degrees of freedom at 0.01 level of probability.
- Hence the concerned null hypothesis was rejected.

The researcher concluded that innovativeness of the farmers had highly significant relationship with their adoption.

#### 4.3.8 Crop diversification and adoption of intercropping with jackfruit

The relationship between Crop Diversification of the farmers and their adoption of intercropping in jackfruit cultivation was examined by testing the concerned null hypothesis.

Co-efficient of correlation between the concerned variable was found to be 'r' = (0.135 NS) as shown in Table. This led to the following observed regarding the relationship between the two variables under consideration:

- The relationship showed a positive trend.

- The computed value of "r" (0.135) was smaller than the tabulated value ( $r = 0.182$ ) with 115 degrees of freedom at 0.05 level of probability.
- Hence the concerned null hypothesis was accepted.

The researcher concluded that crop diversification of the farmers had no significant relationship with their Adoption.

***CHAPTER 5  
SUMMARY,  
CONCLUSION AND  
RECOMMENDATION***

## **CHAPTER 5**

### **SUMMARY OF THE FINDINGS, CONCLUSION AND RECOMMENDATION**

This chapter presents the summary of findings, conclusion and recommendation of the study.

#### **5.1 Summary of the findings**

The major findings of the study are summarized below:

##### **5.1.1 Selected characteristics of the jackfruit farmers**

###### **Age**

The highest proportion (38.5 percent) of the respondents was in old aged category compared to 29.9 percent middle and 31.6 percent young aged category.

###### **Education**

Large proportion 27.3 percent of the respondents fell under category of “secondary level” compared to 23.9 percent "illiterate", 15.4 percent "Primary level" 18.8 percent “Can sign only” and 14.6 percent "above secondary level".

## Farm size

The majority (53.8 percent) of the farmers of the study area had small farms, 10.3 percent had marginal and 35.9 percent had medium size farm.

## Income from jackfruit and intercrop

The highest proportion (88.9 percent) of the respondents had small annual income compared to 2.6 percent high income and 8.5 percent had medium income.

## Extension advice

The highest proportion (50.4percent) of the respondents of the study area had the low extension advice. While, 40.2 percent had medium extension advice and 3.4 percent had high extension advice and 6 percent had no extension advice.

## Cosmopolitaness

The highest proportion (59 percent) of the respondents had low Cosmopolitaness compared to 36.7 percent had medium Cosmopolitaness and 3.4 percent had high adoption.

## Innovativeness

The highest proportion (54.7 percent) of the farmers had low innovativeness compared to 38.5 percent had medium innovativeness and 6.8 percent having high innovativeness.

## Crop diversification

The highest proportion (47.9 percent) of the farmers fell under the medium adoption category while 14.5 percent had low adoption and 37.6 percent had high adoption.

### 5.1.2 Adoption

The highest proportion (82.9 percent) of the farmers fell under the low adoption category while 15.4 percent had medium adoption and 1.7 percent had high adoption.

### 5.1.3 Relationship between the selected characteristics of the farmers with their adoption

#### Age and adoption of intercropping in jackfruit cultivation

The relationship showed a negative trend and the null hypothesis was accepted. Hence, the farmers had no significant relationship with their adoption of intercropping in jackfruit cultivation.

#### Education and adoption of intercropping in jackfruit cultivation

The relationship was positive and the null hypothesis was rejected. Hence, the researcher concluded that education of the farmers had significant and positive relationship with their adoption of intercropping in jackfruit cultivation.



### Farm size and adoption of intercropping in jackfruit cultivation

The relationship showed a positive trend and the null hypothesis was rejected. Hence farm size had highly significant relationship with their adoption of intercropping in jackfruit cultivation.

### Income from jackfruit and intercrop and adoption

The relationship is positive and the null hypothesis was rejected. Hence, the researcher concluded that Income of the farmers had highly significant relationship with their adoption of intercropping in jackfruit cultivation.

### Received advice and adoption

The relationship was positive and the null hypothesis was accepted. Hence, the researcher concluded that extension advice had no significant relationship with their adoption.

### Cosmopolitaness and adoption

The relationship was positive and the null hypothesis was rejected. Hence, the researcher concluded that cosmopolitaness of the farmers had significant relationship with their adoption.

### Innovativeness and adoption

The relationship was positive and the null hypothesis was rejected. Hence, the researcher concluded that innovativeness of the farmers had highly significant relationship with their adoption.

## Crop diversification and adoption

The relationship was positive and the null hypothesis was accepted. Hence, the researcher concluded that Crop Diversification of the farmers had no significant relationship with their Adoption.

The results indicate that income from intercrop, education, cosmopolitaness, innovativeness and farm size had significant positive relationship with adoption of intercropping. Other three variables namely, age, crop diversification and extension advice had no significant relationship with adoption of intercropping.

## 5.2 Conclusions

1. Findings indicate that, the highest proportion (82.9 percent) of the farmers fell under the low adoption category while 15.4 percent had medium adoption and 1.7 percent had high adoption. Therefore, it may be concluded that the adoption behavior of the farmers in respect of intercropping presents a promising picture, but there is a further scope for increasing the extent of adoption regarding the innovation.
2. Farm size of the intercrop farmers had significant relationship with their adoption of intercropping with jackfruit cultivation. It was because, that with the increase of farm size increased the adoption of intercropping with jackfruit cultivation.

3. Income of the farmers showed significant relationship with their adoption of intercropping with jackfruit cultivation. Higher income could increase the ability of purchasing input for intercropping. As a result they could adopt at higher rate of intercropping.
4. Education of the intercrop farmers had significant positive relationship with their adoption of intercropping with jackfruit cultivation. In the light of above findings, it may be concluded that necessary steps should be taken to promote education in the rural areas and that would have a favorable effect on the adoption of intercropping with jackfruit cultivation.
5. Innovativeness of the farmers had significant and positive relationship with their adoption of intercropping in jackfruit cultivation. This means that with increase of innovativeness, the adoption also increases. Frequent contact with extension and extension media can make farmers more innovative which will ultimately lead to adopt modern practices. This situation is quite favorable for the implementation of agricultural development programmes in the study.

### 5.3 Recommendation

Based on the findings and conclusions of the study, the following recommendations are presented below:

1. The level of adoption of intercropping with jackfruit cultivation was encouraging. It is recommended to the extension agencies of the nation and the intercrop farmers that, there is a need of efforts for wide adoption of intercropping with jackfruit cultivation.

2. Department of Agriculture Extension and other research organizations can take motivational programmes to increase adoption of intercropping with jackfruit by motivating the intercrop growers.
3. Arrangements should be made by the GO's and the NGO's for increasing the education level of the respondents. Education may be increased by arranging training like Farmer's Field School programme or such other trainings.
4. Department of Agriculture Extension can inform the intercrop growers about the new innovations and will ascertain that, the farmers are getting relevant information and improved technique for better farming.

#### 5.4 Recommendations for further study

A small piece of study as has been conducted cannot provide all the information for the proper understanding of the farmers towards the adoption of intercropping with jackfruit cultivation. Therefore, the following recommendations were made for further study:

1. The present study was conducted in Bhaluka Upazila under Mymensingh district. It is recommended that similar studies could be conducted in other jackfruit growing areas of Bangladesh.

2. This study investigated the relationships of eight characteristics of the farmers with their adoption of intercropping with jackfruit cultivation as dependent variable. Therefore, it is recommended that further study be conducted with other independent and dependent variables.
  
3. In the present study the variables like age, extension advice and crop diversification had no significant relationship with their adoption of intercropping in jackfruit cultivation. In this context, further verification is necessary.
  
4. Studies need to be undertaken for establishment and maintenance of nursing organization in the rural areas of Bangladesh.
  
5. Research should also be undertaken to identify the factors causing hindrance towards the adoption of intercropping in jackfruit cultivation.

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## APPENDICES

### Appendix A. An English Version of the Interview Schedule

Department of Agricultural Extension and Information System  
Sher-e-Bangla Agricultural University  
Dhaka-1207

An interview schedule on “ADOPTION OF INTERCROPPING WITH JACKFRUIT BY THE FARMERS OF BHALUKA UPAZILLA UNDER MYMENSING DISTRICT”

Name of the respondent..... Serial No.....  
Father’s name..... Date.....  
Village.....P.O. .... District.....

Please answer the following questions:

#### 1. Age

How old are you? .....years

#### 2. Educational Qualification

Please mention your educational attainment by putting (✓) mark against the appropriate answer.

- a) Don’t know reading and writing (.....)
- b) Don’t know reading and writing but can sign only (.....)
- c) Passed class (.....)

## 2. Farm Size

Please furnish your land information according to use.

Sl. No.	Topics of land	Area	
		Local	Acre
1.	Homestead (including pond)		
2.	Own land under own cultivation		
3.	Land taken from others on lease		
4.	Land taken from others on share cropping		
5.	Own land given to others on share cropping		
	Total		

## 4. Income from jackfruit and intercrop

Please mention your last year income from intercrop

a) Jackfruit.....Tk.

b) Intercrop.....Tk.

Total.....Tk.

## 5. Cosmopolitaness

Please indicate your visit to acquire the knowledge of intercropping.

Sl No.	Places of visit	Extent of visits			
		Regularly	Occasionally	Rarely	Not at all
1.	Relative/friends	Above 6 times/ month	5-6 times/ month	3-4 times/month	1-2 times/month
2.	Other village	Above 6 times/ month	5-6 times/ month	3-4 times/ month	1-2 times/ month
3.	Other union	Above 6 times/ month	5-6 times/ month	3-4 times/ month	1-2 times/ month
4.	Own Upazila sadar to meet UAO. AEO, AAEO, SAAO	Above 6 times/ month	5-6 times/ month	3-4 times/ month	1-2 times/ month
5.	Other Upazila sadar to meet UAO. AEO, AAEO, SAAO	Above 6 times/year	5-6 times/year	3-4 times/year	1-2 times/year
6.	Own Zilla sadar to meet SMS, TO	Above 6 times/year	5-6 times/year	3-4 times/year	1-2 times/year
7.	Other Zilla sadar to meet SMS, TO	Above 6 times/year	3 times/year	2 times/year	1 times/year
8.	Capital city	Above 6 times/year	3 times/year	2 times/year	1 times/year
9.	Upazila/village fair	Weekly once	Monthly once	2 times/year	1 times/year
10.	Upazila agricultural fair	Weekly once	Monthly once	3-4 times/year	1-2 times/year

## 6. Innovativeness

Sl no.	Name of practices	Not adopted	Duration of adoption			
			Within 1 year after listening	Within 1-3 year after listening	Within 3-6 year after listening	After 6 year of listening
1.	IPM					
2.	Balanced dose of urea, phosphate and potash					
3.	Use f power tiller					
4.	Use of solar power					
5.	Compost					
6.	Paddle thresher					

7. Crop diversification.

Mention how many crops you cultivated last 5 years.

i.....

ii.....

iii.....

iv.....

v.....

vi.....

vii.....

viii.....

ix.....

x.....

$$\% \text{Crop diversification} = \frac{\text{Number of crops cultivated}}{\text{Number of crops can be cultivated}} \times 100$$

### 8. Extent of received advice

State the extent of advice for your intercropping .

Sl. No.	Name of the sources	Regularly	Occasionally	Rarely	Not at all
1.	UAO	More than 6 times/year	5-6 times/year	3-4 times/year	1-2 times/year
2.	AEO	More than 6 times/year	5-6 times/year	3-4 times/year	1-2 times/year
3.	AAEO	More than 6 times/year	5-6 times/year	3-4 times/year	1-2 times/year
4.	SAAO	More than 6 times/year	5-6 times/year	3-4 times/year	1-2 times/year
5.	NGO workers	More than 6 times/year	5-6 times/year	3-4 times/year	1-2 times/year

9. Adoption of intercropping

a) Mention the area of jackfruit cultivation

.....acres.

b) How many crops do you intercrop with jackfruit?

.....

c) For how long are you practicing intercropping with jackfruit?

.....

Sl No.	Duration of practicing (years)	Score
i.	$\leq 2$ years	1
ii.	> 2-4 years	2
iii.	> 4-6 years	3
iv.	> 6 years	4



## APPENDIX B

Correlation matrix of the dependent and independent variables (N= 117)

	1	2	3	4	5	6	7	8	9
1	1								
2	-.231*	1							
3	-.086	.077	1						
4	-.202(*)	.311(**)	.378(**)	1					
5	-.084	.159	.296**	.478(**)	1				
6	-.315(**)	.374(**)	.307**	.509(**)	.386(**)	1			
7	-.126	.029	.009	.010	.026	.041	1		
8	-.172	.134	.073	.155	.173	.112	.074	1	
9	<b>-0.112</b>	<b>0.368**</b>	<b>0.196(*)</b>	<b>0.545**</b>	<b>0.306**</b>	<b>0.395**</b>	<b>0.135</b>	<b>0.124</b>	<b>1</b>

\* Correlation is significant at the 0.05 level (2-tailed).

\*\* Correlation is significant at the 0.01 level (2-tailed).

Note:

1= Age, 2= Education, 3= Farm size, 4= Income from intercrop, 5= Cosmopolitanness, 6= Innovativeness, 7= Crop diversification, 8= Extent of advice, 9= Adoption