

# ADOPTION OF SOYBEAN CULTIVATION BY THE FARMERS OF NOAKHALI DISTRICT OF BANGLADESH

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Master of Science  
in  
Agricultural Extension and Information System

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# **ADOPTION OF SOYBEAN CULTIVATION BY THE FARMERS OF NOAKHALI DISTRICT OF BANGLADESH**

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Registration No. 07-02651  
Semester: Jan.-June/09

Thesis Submitted in Partial Fulfillment of the  
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# ADOPTION OF SOYBEAN CULTIVATION BY THE FARMERS OF NOAKHALI DISTRICT OF BANGLADESH

By

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Registration No. 07-02651

**A Thesis**

Submitted to the Faculty of Agriculture  
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In partial fulfillment of the requirements  
For the degree of  
Master of Science  
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## **Certificate**

This is to Certify that Thesis entitled. **"Adoption of Soybean Cultivation by farmers of Noakhali district of Bangladesh"**. 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 **Mohammad Jashim Uddin, Registration No. 07-02651** 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 by him.

Dated :

Place : Dhaka Bangladesh



**(Prof. Mohammad Hossain Bhuiyan)**

**Supervisor**

*Dedicated to  
My  
Beloved Parents*

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The Author

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## ABBREVIATIONS AND ACRONYMS

BARI	:	Bangladesh Agricultural Research Institute
BAU	:	Bangladesh Agricultural University
BBS	:	Bangladesh Bureau of Statistics
BINA	:	Bangladesh Institute of Nuclear Agriculture
Cm	:	Centimeter
DAE	:	Department of Agricultural Extension
d.f.	:	Degree of Freedom
e.g.	:	Example
EPB	:	Export Promotion Bureau
et. al.	:	And Others
GDP	:	Gross Domestic Product
GOB	:	Government of Bangladesh
HYV	:	High Yielding Variety
IGA	:	Income Generating Activity
Km	:	Kilometer
MCC	:	Mennonite Central Committee
No.	:	Number
SD	:	Standard Deviation
Sq	:	Square
%	:	Percentage



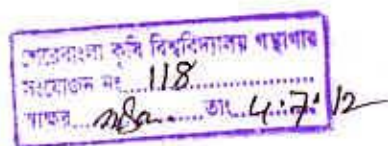
# **ADOPTION OF SOYBEAN CULTIVATION BY THE FARMERS OF NOAKHALI DISTRICT OF BANGLADESH**

## **ABSTRACT**

The main purpose of the study was to determine and describe the extent of adoption of soybean cultivation by the growers in some selected areas of Noakhali district of Bangladesh. Attempts were also made to describe some of the selected characteristics of the soybean growers and their relationship with their adoption of soybean cultivation. Data were obtained from 110 randomly selected farmers formed total of 1100 growers under 12 village, 6 unions of Sadar, Subarna Char and Hatiya upazila of Noakhali district. An interview schedule was used for collecting data during the period time 1 September to 15 October 2009. The findings of the study indicate that majority (52.70 percent) of the growers had medium adoption while 30.90 percent had low adoption and 16.40 percent had high adoption of soybean cultivation practices. Correlation analysis indicate that among the selected characteristics age, education, farm size, extension contact, cosmopolitaness, innovativeness, and attitude of the growers showed non significant relation with their adoption of soybean cultivation. On the other hand, annual family income of the growers showed highly significant relationship and agricultural knowledge of the growers showed significant relationship with their adoption of soybean cultivation. Farmers mentioned that there were 12 problems, which hindered the adoption of soybean cultivation to a great extent. Among the problems three important problems were: less irrigation facilities, high impute cost (seed, fertilizer and pesticides) and non availability of credit.



# CHAPTER 1 INTRODUCTION



## 1.1 General Background

Bangladesh is one of the least developing countries of South east Asia. It is the most densely populated country in the world with a population of over 140.6m. with a growth rate of 1.41 per-cent per annum (BBS, 2007). Among the total population, 57.61 percent live in rural area. Population density is 953 persons per square kilometer (BBS, 2007). It is Asia's 6<sup>th</sup> and world's 9<sup>th</sup> most populous country. The per capita income is about USD 523 and its people have life expectancy of 61 years (BBS, 2008). Agriculture is the backbone of this country. About 59.31% of her population is engaged directly or indirectly in agriculture and agriculture related activities (BBS, 2006). Agriculture related sectors contribute 21.37% to the Gross Domestic Product (GDP) of the country (BBS, 2008). Again agriculture also supplies raw materials for industrial production and food stuff for human and animal consumption.

Increasing agricultural production through expansion of cultivated area is no longer feasible. Because practically all the available arable land is now being used in crop production. So the most logical way is to raise the yields by increasing cropping intensity. These can be done by using crop diversification, use of modern technology, use of High Yielding Variety (HYV), short duration crops and intensive extension network.

Various oil crops are grown in Bangladesh which include mustard, sesame, linseed, sunflower, niger, groundnut etc. These oil crops meet only 30% of the requirement of 140.6 million leaving of deficiency of 70%. The deficit is faced by other oil seed crops like soybean, palm oil etc. from exporting countries. Here soybean is the highest deficit fulfill item. soybean (*Glycine max L. Merrill*) ranks first as an oilseed crop in the world. It has a tremendous value in agriculture as a good source of high quality plant protein and vegetable oils in one hand and nitrogen fixing ability on the

other. Its seed contain 42.45% best quality protein and 20.22% edible oil. In Bangladesh, soybean is not yet popular as a crop but Soybean oil is very popular as cooking oil. It is imported from foreign countries. Extraction of soybean oil from seed is not yet possible for several reasons. So most of the soybean produced in the country are used for making nutritious food items. The food items are soydal, soyakhechuri, soyamisty, soya pollao, soyamilk, soyacakes, soya biscuits and soyabread etc.

Soybean was first introduced in Bangladesh around 1972. The Mennonite Central Committee (MCC) at the preliminary stage began its cultivation in the districts of Noakhali, Laxmipur, Comilla. Later its jurisdiction was extended in other neighboring districts.

A coordinated soybean research and development project was undertaken by Bangladesh Agricultural Research Institute (BARI), Bangladesh Agricultural University (BAU) and Mennonite Central Committee (MCC). In 1981, two soybean varieties Bragg and Davis were approved for general cultivation in Bangladesh; but those varieties became susceptible to yellow mosaic virus disease. Now these two varieties are not recommended for cultivation. In 1990, one variety named Shohag was developed and recommended for cultivation in Noakhali sadar. some information regarding soybean cultivation in Noakhali is shown in Table 1.

Since then Shohag was being diffused among the farmers of Noakhali district. Interested farmers were given training by MCC and other concerned organizations. Now a huge population of Noakhali district is engaged in soybean cultivation. Still then, the benefits of soybean cultivation remained unknown to many farmers. In this condition it is assumed that certain behavior of farmers influence them toward adoption of soybean. A very few research works were undertaken on this issue. So, there is great need to understand the adoption behavior of soybean farmers.

**Table 1.1 Some information of soybean cultivation by the growers under Noakhali district**

SL. No.	Year	Cultivable Land	Land attended for Soybean cultivation	Yield/ ha.	Total yield.
1	2006-07	11451	11451	1.50	17180
2	2007-08	5580	5580	1.50	8649
3	2008-09	10630	10630	1.50	15945
4	2009-10	12889	12889	-	-

Source- DAE- Noakhali

### **1.2 Statement of the problem**

The success of any technology depends on its dissemination among the potential users, which ultimately is measured by the level of adoption of that technology. It is to be anticipated that certain sustainable development can take place in the agriculture of Bangladesh, if the technology can be transferred properly. Other improvement can be ensured by increasing the rate of adoption. In view of the foregoing discussion it is now necessary to increase soybean cultivation in Bangladesh. This situation has largely encouraged the researcher to undertake an empirical study on “Adoption of soybean cultivation by the farmers of Noakhali district of Bangladesh.” The purpose of the study was to determine the extent of adoption of Soybean cultivation and also to ascertain the relationship of the selected characteristics of the soybean growers with their adoption behavior. The economic problems of agriculture in Bangladesh are varied and manifold. Due to the low income, necessary investment cannot be made for improving productivity and procurement of improved quality seed. The availability of quality seed increases yield drastically. The major causes for low yield are mostly due to insufficient quality seed, overdose of fertilizer, inadequate rural credit, lack of soybean cultivation knowledge, attack of several diseases etc.

Thus, it was necessary to understand the present status of the adoption of soybean cultivation practices and the problem faced by the growers with the following research questions:



1. What is the extent of adoption of soybean cultivation in the study area?
2. What are the characteristics of soybean growers?
3. What are the problems faced by the farmers in adoption of soybean cultivation?

In view of the above consideration, the researcher has become interested to undertake the research entitled "Adoption of soybean cultivation by the farmers of Noakhali district of Bangladesh" with the following objectives:

### **1.3 Specific Objective of the Study**

In order to give proper direction of the study, the following specific objectives were formulated.

1. To determine and describe the extent of adoption of soybean cultivation by the farmers of Noakhali district.
2. To determine and describe the selected characteristics of the soybean growers. The selected characteristics were:
  - (i) Age
  - (ii) Education
  - (iii) Farm size
  - (iv) Annual family income
  - (v) Extension contact
  - (vi) Cosmopolitaness
  - (vii) Innovativeness
  - (viii) Knowledge on soybean cultivation practices
  - (ix) Attitude towards soybean Cultivation
3. To explore the relationship between selected characteristics of the farmers and their extent of adoption of soybean cultivation.

#### **1.4 Scope, Limitation and Assumption of the Study**

The study was undertaken in order to have an understanding of the adoption and problems faced by the farmers in cultivation of soybean. In order to conduct the research in a meaningful and manageable way, it became necessary to impose some limitation in regard to certain dimensions of the study also. As already stated, there are several advantages of soybean.

The soybean oil is cholesterol free and an easily acceptable diet. The protein content in soybean is nearly double than other pulses. On an average protein intake in Bangladeshi diet is 8-10 percent originate from animal sources, the rest can be met from plant sources, by increasing the consumption of soybean and pulses. The children who are intolerant to cow's milk, soya-milk can be a healthy alternative. The people who are allergic to cow's milk develop hypolactasia resulting of lactose intolerance; can safely consume soya-milk. This study will be helpful to other researcher for further studies of similar nature and also to extension personnel who are directly involved in different agricultural development programmes. Besides, it would render empirical data to the planners for making effective plans regarding expansion of soybean in future. This can be helpful for the agricultural scientists who are involved in generating technologies of soybean cultivation. The findings would be useful also to the extension workers who disseminate the same to the end users. The researcher felt that the findings of the study will be of much useful to the government, foreign countries, international development agencies, private enterprises, banks, universities and to the administrators of the country including the key decision makers at different tiers of the government. The finding of this piece of research would also render a clear picture and updated information about soybean to the

growers of the country. Further, this will be helpful to formulate effective comprehensive soybean policy programme for the country.

Considering the limitation of time, money and other resource available to the researcher the following limitations have been considered throughout the study.

1. The study was confined to different upazila under Noakhali district.
2. The study was limited to the soybean growers and they constituted the population of the study.
3. The investigation was dependent on the data furnished by the selected soybean growers during their interviews.
4. In some cases the researcher faced unexpected interference from the over interested side talkers while collecting data from the target respondent. However, the researcher tried to overcome the problems as far as possible with sufficient tact and skill.
5. Reluctance of some growers to provide information was overcome by establishing proper rapport.

### **Assumption of the study**

The researcher had the following assumption in mind while carrying out this study.

1. The respondents included in the sample were capable of furnishing proper responses to the questions included in the interview schedule.
2. The researcher who acted as an interviewer was well adjusted to the social and cultural environment of the study area. Hence, the data collected by him from the respondent were free from bias and the respondents furnished their opinion without hesitation.
3. The responses furnished by the respondents were valid and reliable. They expressed the truth while passing their opinions and providing information.
4. The findings of the study will have general implication for the soybean growers from any part of the country where, physical, socio economic and cultural conditions do not differ much from the study area.

5. The adoption of cultivation practices by the Soybean growers is normally and independently distributed with their respective means and standard deviation.

### **1.5 Justification of the study**

The major focus of the study was to assess farmers' adoption of soybean cultivation. soybean has received a great deal of attention all over the world as an important source of protein to alleviate protein deficiency. To meet the nutritional and caloric value of the growing population, increasing employment opportunities and income on the growers, the government of Bangladesh has given much emphasis of diversified oil seed cultivation, particularly on the cultivation of oil seed all the year round. As a result soybean cultivation is getting popularity among the farmers of Bangladesh. Introduction of new hybrid varieties coupled with growing market as human needs have opened a tremendous potentiality of soybean.

The government is also supporting the cultivation of this crop and hence, research is necessary to determine pattern of diffusion of modern soybean cultivation technologies in connection with long-term strategy. Since the time Shohag was being diffused among the farmers of Noakhali district. interested farmers were given training by MCC and other concerned organization. Now a huge population of Noakhali district is engaged in soybean cultivation. Still then, benefits of Soybean cultivation remained unknown to many farmers. In this condition it is assumed that certain behavior of the farmers influence them toward adoption of soybean. Very few research works were undertaken on this issue. So, there is a great need to understand the behavior pattern of soybean adopters. Therefore, the researcher has become usually interested to undertake the research entitled "Adoption of soybean cultivation by the farmers of Noakhali district of Bangladesh".

### **1.6 Hypothesis of the study**

Defined by Goode and Hatt (1952), hypothesis is, “a proposition which can be put to a test to determine its validity. It may be seen contrary to or in accord with a common sense. It may prove to be correct or incorrect. In any event, however, it leads to an empirical test”. However, for statistical test, it becomes necessary to formulate null hypothesis. A null hypothesis states that there is no relationship between the concerned variables. If a null hypothesis is rejected on the basis of statistical test, it is assumed that there is a relationship between the concerned variables.

### **1.7 Definition of Important Terms**

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

**Adoption:** Adoption is the implementation of a decision to continue the full use of an innovation. According to Rogers, (1995). “Adoption is a decision to make full use of an innovation as the best course of action available”. When an individual takes-up a new idea as the best course of action and practices it, the phenomenon is known as adoption.

**According to Ray (1991),** adoption is a decision to make full use of an innovation as the best course of action available. In this study adoption of soybean cultivation and one’s decision to continue the use of the innovation in future was considered.

**Age:** Age of a respondent is defined as the span of her/his life and operationally measured by number of years from his/her birth to the time of interview.

**Education:** Education refers to the ability of the respondents to read and write or having formal education received up to a certain standard. Education was measured on the basis of class a farmer had passed from educational institution.

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

**Annual income:** The term annual income refers to the total earning of the respondent himself from agriculture, livestock, fisheries and other accessible sources (service, business, daily labour etc.) during a year. It was expressed in Taka.

**Extension contact:** Extension contact refers to one's access to the communication process through various extension teaching methods and communication channels during one year prior to data collection.

**Cosmopolitaness:** Cosmopolitaness is defined as the degree to which an individual's orientation is external to a particular social system. Empirically it referred to the number of times a person pays visit to places out of her/his own locality.

**Innovativeness:** Innovativeness refers to the degree to which an individual is relatively earlier in adopting new ideas than the other members of social system (Rogers, 1995). Innovativeness of a respondent was measured in the study on the basis of times of adoption of various practices by the respondents.

**Agricultural knowledge:** It refers to the extent of understanding of an individual about different facts information, causes and effects to crop, vegetables, livestock, fisheries and forestry.

**Soybean growers:** Soybean growers refer to those growers who produce soybean in the area for their cash earning to meet their various kinds of expenditures. They also cultivate other crops besides soybean.

**Attitude towards soybean cultivation practices:** The term attitude towards soybean cultivation of an individual refers to his/her feeling, beliefs and action tendencies towards the various aspects of soybean cultivation. That is  $\text{knowledge} + \text{beliefs} + \text{action} = \text{attitude}$ .

## **CHAPTER- 2**

### **REVIEW OF LITERATURE**

The purpose of this Chapter is to review of literature having relevance to the present study. The researcher made an elaborate search of available literature for this research. The soybean growers, their study focused on relationships between the selected characteristics with the adoption of soybean cultivation. The researcher attempted to search of the literatures and observed that a number of studies have been conducted on the adoption of soybean cultivation. However, literatures relating to concept of use and past studies exploring relationships of the characteristics of the growers with their adoption of Soybean cultivation have been cited in this Chapter. This Chapter is divided into three sections. The first sections deals with the review of literature on general context, the second section deals with the relationship between growers' characteristics and their adoption of soybean cultivation technology and the third section deals with the 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 of insecticides.

Hasan (1996) in his study found that the highest proportion (44 percent) of the 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.

Hossian (1999) studied farmer's perception of the effectiveness of agro-chemical on environment. The study revealed that 64.0 percent of the farmers had medium adoption, 21.0 percent had low adoption and 15.0 percent had high adoption of pesticides.

Hussen (2001) in his study found that the highest proportion (91 percent) of the respondents had medium adoption of modern sugarcane cultivation practices compared to 7 percent had low and only 2 percent had high adoption.

Rahman (2001) observed in his study that the highest proportion (75 percent) of farmers fell under medium adoption category while 18 percent had high adoption 7 percent had low adoption of Aalok 6201 rice cultivation.

Islam (2002) conducted a study on adoption of modern agricultural technology by the farmers' of Sandip. The study revealed that 69 percent of the farmers had medium adoption of modern agricultural technology while 13 percent had low adoption and 18 percent had high adoption of modern agricultural technology.

## **2.2 Relationships between Farmers' Characteristics with their Adoption of Soybean Cultivation**

### **2.2.1 Age and adoption of Soybean Cultivation**

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

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

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 aquaculture technologies.

Hossain (2003) revealed that age of the farmers had a significant and positive relationship with their adoption of modern Boro rice cultivation practices.

Ali (2004) found that there was no relationship between age of the farmers and adoption of aquaculture technologies by them.

### **2.2.2 Education and adoption of Soybean cultivation**

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 (19936), Pal (1995) and Ali *et al.* (1986).

Rahman (2001) conducted a study on knowledge, attitude and adoption of the farmers regarding Aalok-6201 hybrid rice in Sadar Upazila in 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 of 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.

Hossain (2003) conducted a study and found that education of the farmers had a significant and positive relationship with their adoption of modern Boro rice cultivation practices.

Islam (2003) conducted a study on adoption of organic manures. He found that there was a positive and significant relationship between education of the farmers and adoption of organic manures.

### **2.2.3 Farm Size and adoption of Soybean cultivation**

Hussen (2001) conducted an investigation on adoption of modern sugarcane cultivation practices by the farmers of Dewangonj upazila in Jamalpur district. He observed that there was a significant positive relationship between farm size of the farmers and their adoption of modern sugarcane cultivation practices.

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

#### **2.2.4 Annual income and adoption of Soybean cultivation**

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 observed by Sarkar (1997) and Alam (1997).

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.

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.

### **2.2.5 Extension contacts and adoption of Soybean cultivation**

Heong (1996) observed that the lack of adoption of IPM technologies in rice was frequently attributed to lack of sufficient extension.

Rahman (1995) studied farmers' knowledge of improved practices in potato cultivation and found a significant relationship between extension contact and adoption of improved practices.

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.

Islam (2002) conducted a study on adoption of modern agricultural technologies by the farmers of Sandip. He found that extension media contact of the farmers had no significant relationship with their adoption of modern agricultural technologies.

### **2.2.6 Cosmopolitaness and adoption of Soybean cultivation**

Islam (1993) found a significant relationship between cosmopolitaness of the farmers' and their adoption of recommended doses of fertilizer and plant protection measures in potato cultivation.

Hoque (1993) revealed a strong positive relationship between cosmopolitaness of the sugarcane farmers and their adoption of sugarcane cultivation.

Pal (1995) conducted a study on adoption of recommended sugarcane cultivation practices. He observed that the cosmopolitanism of the farmers had significant positive relationship with their adoption of recommended sugarcane cultivation practices.

Chowdhury (1997) conducted a study on the adoption of selected BINA technologies by the farmers of Boira Union in Moymensingh district. He found that there was no significant relationship between the cosmopolitanism and their composite adoption of selected BINA technologies. Similar findings were observed by Muhammad (1974) and Sobhan (1975).

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

Aurangzeb (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.

### **2.2.7 Innovativeness and adoption of Soybean cultivation**

Rahman (1973) found a positive relationship between modernism and adoption of farm practices. Modernism as used by him was synonymous with the innovation proneness or in other words innovativeness of the present study.

Muhammad (1974) conducted a study on the extent of adoption and observed a strong positive relationship between innovativeness and adoption of insect measures.

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

Islam (2002) conducted research study on adoption of modern agricultural technologies by the farmers of Sandip. He found that Cosmopolitaness of the farmers had significant and positive relationship with their adoption of modern agricultural technologies.

#### **2.2.8 Agricultural knowledge and adoption of Soybean cultivation**

Moulik *et al.* (1996) conducted a study on predictive values of some factors of adopting nitrogen fertilizers by north Indian farmers. He found a significant and positive relationship between agricultural knowledge and adoption of nitrogenous fertilizers among the cultivators.

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 62.23 percent. Two traits viz. age and knowledge of scientific rearing practices had positive and highly significant relationship with adoption of scientific goat rearing practices.

#### **2.2.9 Attitude towards Soybean cultivation and adoption of Soybean cultivation technologies**

Hossian (1981) conducted a study on the relationship of selected characteristics of the Jute growers with their adoption of Jute cultivation. He found that there was no relationship between attitude towards Intensive Jute Cultivation Scheme of the jute growers and their adoption of Jute cultivation.



Hasan (1996) conducted a study on adoption of some selected agricultural technologies among the farmers. He found that there was strong positive relationship between attitude towards development and perceived adoption of selected technologies.

Podder (1999) conducted a study on the adoption of Mehersagar banana by the farmers of Gazaria Union Sakhipur Thana of Tangail district. He found that there was no relationship between attitude towards technology of the growers and their adoption of modern agricultural technologies.

#### **2.2.10 Problem confrontation by the farmers and adoption of Soybean Cultivation**

Muhammad (1974) studied adoption of insect control measures. The study indicated a positive relationship between community problem awareness and adoption of insect control measures.

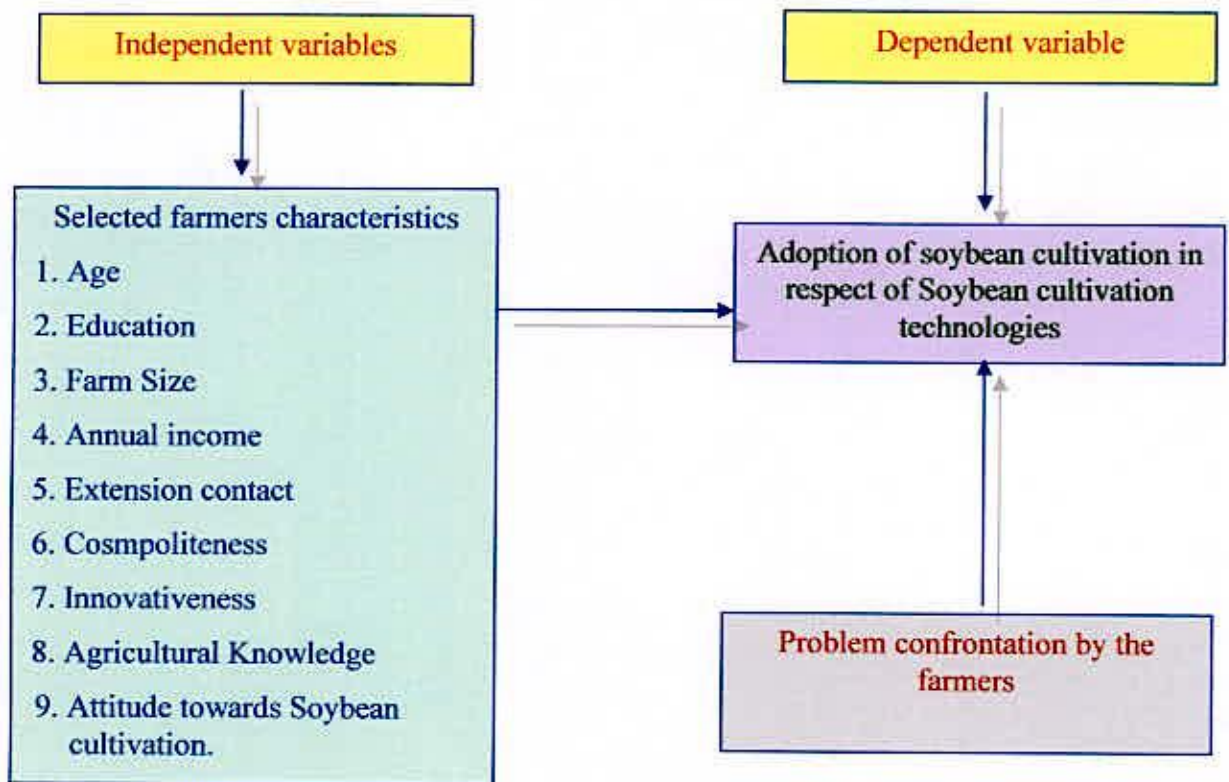
Hossain (1983) studied adoption of HYV rice by the rice farmers in Bhabakhali union under Mymensingh district. The findings indicated no relationship between community problem awareness and adoption of HYV rice.

Kashem and Hossain (1992) studied adoption behavior of sugarcane farmers. The study revealed a positive relationship between community problem awareness and adoption of sugarcane farmers.

### **2.3 The Conceptual Framework of the study**

The present study would be tried to focus two concepts; first the farmer's selected characteristics and the second, their adoption of soybean cultivation.

Adoption of soybean cultivation of an individual may be influenced and affected through interacting forces in his surrounding. Adoption of soybean cultivation and individual farmer may also be influenced by personal, economic, social and physiological characteristics. In this study, farmer's characteristics have only been taken into consideration. Moreover, it is quite impossible to deal with all the characteristics. Selected characteristics were age, education, farm size, annual income, innovativeness, cosmopolitaness, extension contact, agricultural knowledge and attitude towards soybean cultivation. These nine (9) characteristics were the independent variables of this study, while adoption of soybean cultivation being the main focus of the study constituted the only dependent variable. A simple conceptual framework in this connection has been given in Figure (2.1)



**Figure 2.1 The conceptual framework of the study**

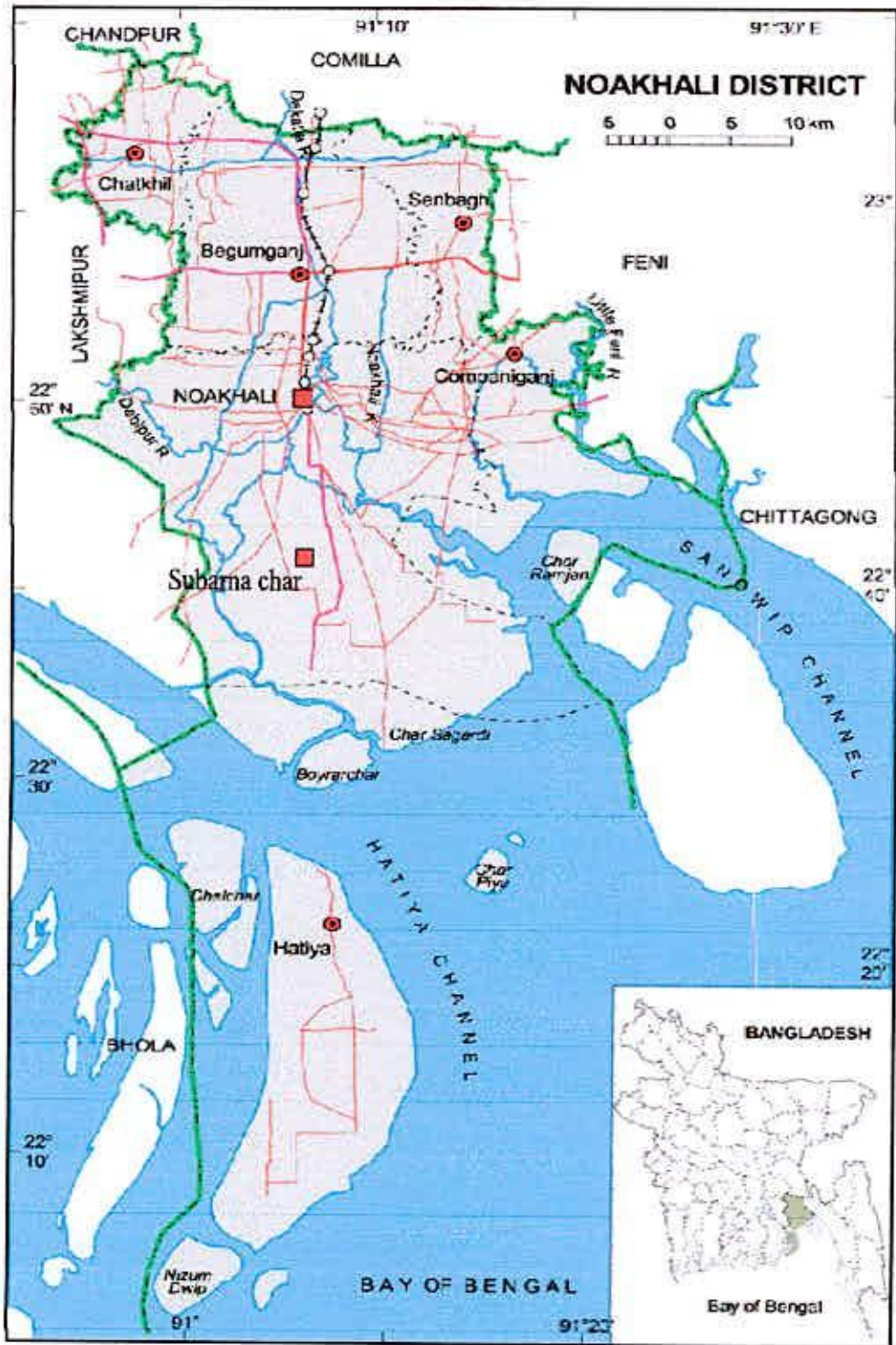
## CHAPTER- 3 METHODOLOGY

Methods and procedures used in conducting research need very careful consideration. Methodology should be such that it enables the researcher to collect the valid information and to analyze the same properly to arrive at correct decisions. The methods and procedures followed in conducting this research are described in this Chapter in the following sections.

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

Considering the soybean growing area, the study was conducted in twelve villages under three Upazila of Noakhali district. These villages were purposively selected. The name of villages were Mohobbatupr, Sonapur, 93 Char Shalla, Batirtak, Char Sulluakia, Karamulla, Char Bata, Bhuiyarn hat, Char Jabbli, Char Cashopia, Dashpara & 22 No. Gram. The map of Noakhali district showing Sadar, Subarna Char and Hatiya Upazila and a map of Sadar (Sadar-Subarna char), Hatiya Upazila of the study area have been shown in Fig. 3.1, Fig. 3.2 and Fig. 3.3 respectively.





**Fig. 3.1 A Map of Noakhali District Showing the Sadar, Subarnachar And Hatia Upazila of the Study Area**

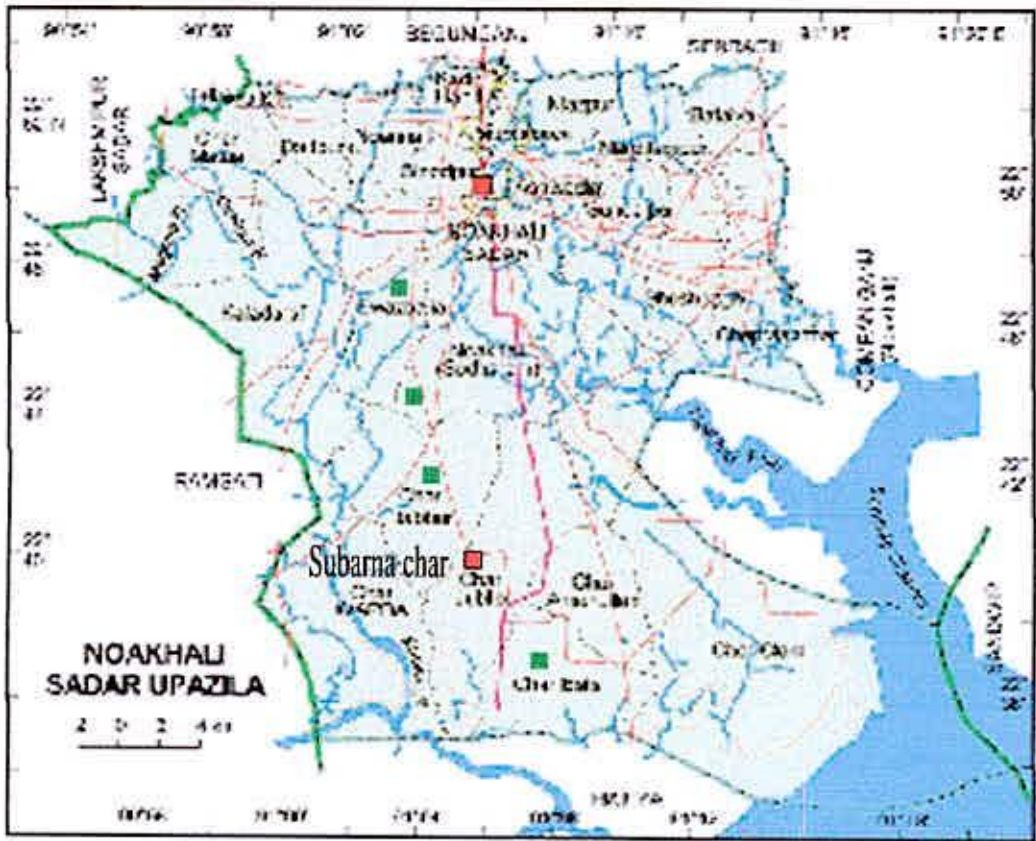


Fig. 3.2 A map of Sadar & Subarna Char Upazila of Noakhali District showing the study area

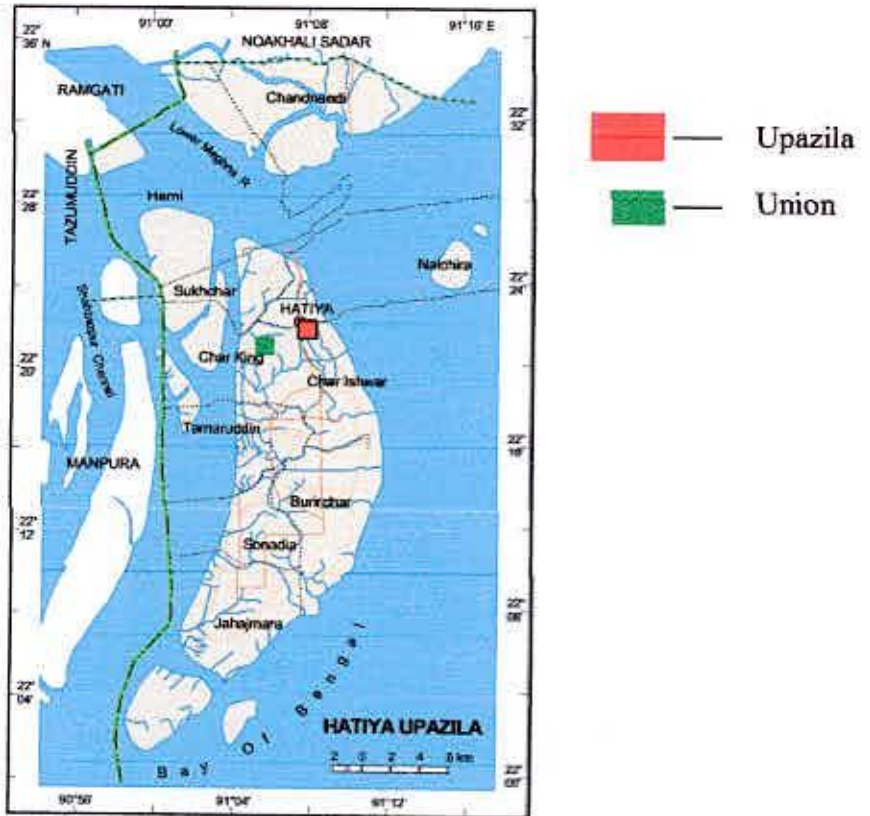


Fig. 3.3 A map of Hatiya Upazila of Noakhali District showing the study area

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### 3.2 Populations and Sampling Design

All the soybean growers of the selected village constituted the population of the study. A list of the growers of these villages was prepared with the help of local Sub-Assistant Agricultural Officer of the concerned area. The number of soybean growers in the specified villages were 1100. Out of them 10% of the population were considered as the representative of the Six unions of Sadar, Subarnachar & Hatiya Upazila.

Besides, a reserve list of soybean growers was also prepared. Growers of the reserved list were used only when a respondent included in the original list was not available during data collection. Distribution of the growers constituting population, sample and reserve list are shown in the Table 3.1.

**Table 3.1 Distribution of soybean growers constitution the population, sample and reserve list in different villages of six union of Sadar, Subarnachar and Hatiya Upazila**

Name of Upazila	Name of the union	Name of the Village	Name of Soybean growers	Soybean growers	
				Sample	Reserve list
Sadar	Noakhali	Mohobbatpur	150	15	02
		Sonapur	142	14	1
	Dhormopur	93 Char Shalla	121	12	2
		Batirtak	101	11	1
	8 Awasbalia	Char Sullakia	89	10	1
		Karamulla	85	9	2
Subarnachar	Char Bata	Char Bata	82	8	1
		Bhuiyarn hat	73	7	1
	Char Jabbar	Char Jubbli	70	7	1
		North Cashopia	66	6	1
Hatiya	Charking	Dashpara	64	6	1
		22 No. Gram	57	5	1
<b>Total</b>			<b>1100</b>	<b>110</b>	<b>15</b>

### **3.3 Variable of the study**

In a descriptive social research, selection and measurement of the variables is an important task. In this connection, the researcher reviewed literature as far as possible to widen his understanding about the nature and scope of the variables relevant to his research. A variable is any measurable characteristic, which can assume varying or different values in successive individual cases (Ezekiel and Fox 1959). The hypothesis of a research, when constructed properly contains at least two important elements, viz. a dependent variable is often called the 'criterion' or 'predicted variable', whereas the independent variables are called treatment, experimental or antecedent variable (Deobold, 1973).

### **3.4 Independent Variables**

The selected individual characteristics of the soybean growers were the independent variables for this study. These were age, education, farm size, annual income, extension contact, cosmopolitaness, innovativeness, agricultural knowledge and attitude towards soybean cultivation practices.

#### **3.4.1 Measurement independent variables**

The measurement of the independent variables is also an important task as well as their selection. In accordance with the objectives it was necessary to measure the nine selected independent variables as follows:

##### **3.4.1.1 Age**

Age of a respondent was measured in terms of actual years from his birth to the time of interview on the basis of his response. A score of one (1) was assigned for each year of age.

##### **3.4.1.2 Education**

Education of a respondent was measured on the basis of classes s/he has who passed. If s/he passed class 5, his/her education score was assigned 5. If a respondent did not know to read and write his/her education score was taken



as zero '0'. A score of 0.5 was given to that respondent who could sign her/his name only. If a respondent passed the SSC examination, his educational score was given as 10.

### 3.4.1.3 Farm Size

Farm size of a respondent was determined as the total area of her/his farm (including soybean and other crops) on which s/he continued her/his farming operations during the period of this study). It included the area of farm owned by her/him as well as those obtained from others as borga, lease of mortgage. The area was being estimated in terms of full benefits to the farmers and the unit was measured in hectare. The farm size of a respondent was measured by using the following formula.

$$\text{Farm Size} = F_1 + F_2 + \frac{1}{2}(F_3 + F_4) + F_5$$

Were,

FS= Farm Size

F<sub>1</sub>= Homestead (including pond)

F<sub>2</sub>= Own land under own cultivation

F<sub>3</sub>= Land taken from other on borga

F<sub>4</sub>= Own land given to others on borga

F<sub>5</sub>= Land taken from other on lease



### 3.4.1.4 Annual Family Income

Annual family income of a respondent was measured on the basis of total yearly earning from agricultural and other sources (service, business, daily labour etc.) by the respondent himself and other family members. The value of all the agricultural products encompassing crops, livestock, fisheries, fruits, vegetables etc. were taken into consideration. For calculation a score of one (1) was assigned for each one thousand taka.

#### **3.4.1.5 Extension contact**

Extension contact was defined as one's extent of exposure to different extension teaching methods. The extent of contact was determined against four (4) point rating scales as not at all, rarely, occasionally and frequently against which score was assigned as 0, 1, 2 and 3 respectively. Here the researcher used extension contact items as personal group and mass media contact. For all the 12 selected extension contact, it has been described as follows:

<b>Extent of contact</b>	<b>Assigned score</b>
Not at all	0
Rarely	1
Occasionally	2
Frequently	3

The extension contact of a respondent was, therefore, determined by adding the total responses against 12 selected extension media. The extension contact score could range from 0 to 3, where 0 indicating no extension contact and 26 indicating very high contact.

#### **3.4.1.6 Cosmopolitaness**

Cosmopolitaness is defined as the degree of external exposure of an individual outside of her/ his social system. A cosmopolitaness score was computed for each respondent to determine the degree of his exposure on the basis of her/his number of visit to different types of places. Each respondent was asked to indicate the number of visit to seven different types of places and to give tick against four responses weighting 0,1,2, and 3 respectively according to the extent of visits as presented below:

Place of visit	Weighting system
1. Visit to other village	0= 0 time per month 1= 1-3 times per month 2= 4-6 times per month 3= 7 times or more per month
2. Upazila Agriculture office	0= 0 time per month 1= 1-2 times per month 2= 3-4 times per month 3= 5 times or more per month
3. Other Upazila Office	0= 0 time per month 1= 1-2 times per month 2= 3-4 times per month 3= 5 times or more per month
4. Own district town	0= 0 time per month 1= 1-2 times per month 2= 3-4 times per month 3= 5 times or more per month
5. Other district town	0= 0 time per month 1= 1 At least time per year 2= 2-3 times per year 3= 4 times or more per year
6. Capital city	0= 0 time per year 1= 1 At least 1 time per year 2= 2 times per year
7. NGO office	0= 0 time per year 1= 1-3 time per year 2= 4-5 times per year 3= >6 times or more per year

Cosmopolitanism score of a respondent was obtained by summing the weights for her/his visit to the 7 types of places. The cosmopolitanism score could range from 0 to 24 where 0 indicates no cosmopolitanism and 17 indicates highest level of cosmopolitanism.

#### **3.4.1.7 Innovativeness**

Innovativeness is the degree to which an individual adopts an innovation relatively earlier than other members in a social system (Rogers, 1995). Hence, innovativeness of a respondent was measured on the basis of the period of adoption of soybean cultivation from the period he first listened about the innovation. Scores were assigned on the basis of time required by an individual to adopt each of the technology in the following manner:

<b>Period of adoption</b>	<b>Assigned score</b>
Do not use	0
1 year after listening	4
2-3 years after listening	3
4-5 years after listening	2
6 years and above after listening	1

Thus the innovativeness score of a respondent was obtained by adding the scores of all items and it could range from 0 to 28, 0 indicating no innovativeness and 28 indicating very high innovativeness.

#### **3.4.1.8 Agricultural knowledge in soybean cultivation practices**

Agricultural knowledge of a respondent was measured by asking 20 questions related to different components of agriculture. It was measured assigning score. The total assigned scores of all the questions were 40. A score of 2 was assigned for each correct answer, 1 for partially correct answer and 0 (Zero) for the wrong answer. However, for correct response to all the questions a respondent could get a total score of 40, while for wrong response to all the question he could get '0' (zero) where '0' indicating no agricultural knowledge and 40 indicating high agricultural knowledge.

#### **3.4.1.9 Attitude towards soybean cultivation**

An attitude may be defined as predisposition to act towards an object in a certain manner. Attitude of farmers towards soybean cultivation included her/his belief, feeling and action towards the various aspects of modern agricultural technologies. It was measured by constructing 10 statements (five positive and five negative). A statement was considered positive if it possessed an idea favorable towards soybean cultivation. On the other hand, a statement was considered negative if it was unfavorable towards soybean cultivation. The respondents were asked to express their opinion in the form

of “strongly agreed”, “agreed”, “undecided”, “disagreed” and “strongly disagreed”. A score of 4 was given to “strongly agreed”, 3 to “agreed”, 2 to “undecided”, 1 to “disagreed” and 0 to “strongly disagreed”, if the statement was positive. A reverse scoring method was followed in case of statements considered negative. Attitude score of a respondent was determined by summing up the scores obtained by himself for all the items in the scale. The score of attitude towards soybean cultivation of the respondents could range from 0 to 40 where ‘0’ indicating very unfavorable and ‘40’ very favorable attitude towards soybean cultivation.

**3.4.2 Measurement of dependent variable**

**Adoption of Soybean:**

- a) Determining the duration of adoption
- b) Land allotted for soybean cultivation.

First duration of adoption of respondent was measured in the following manner.

**Duration of adoption of soybean**

Varieties	Duration (Year)			
	Up to 5	6-10	11-15	16-20
Bangladesh Soybean 4				
Shohag				

Each respondent adopted either Bangladesh Soybean 4 or Shohag. There was no non-adoption and no respondent used two varieties together. The duration of adoption score was assigned as 1, 2, 3 and 4 for 1-5, 6-10, 11-15 and 16-20 years of adoption respectively.

The percentage of land allotted was measured using the following formula

$$\frac{l}{L} \times 100,$$

Where l = Allotted for soybean cultivation  
 L = Potential land for soybean cultivation

### **Duration of adoption of soybean**

Variety is the key factor to increase soybean production. Variety score was measured on the basis of nature of one's adoption in the different varieties. The following scale was used for computing variety score:

<b>Duration of adoption</b>	<b>score</b>
1-5 years	1
6-10 years	2
11-15 years	3
16-20 years	4

### **Land allotted for soybean**

The land allotted for soybean cultivation of an individual farmer could range from 0-100, where 0 indicating no adoption and 100 indicating very high adoption. However, the percentage of land allotted was categorized in the following manner:

<b>Category</b>	<b>Assigned score</b>
Low land use (1-25)	1
Medium land use (26-50)	2
High land use (51-75)	3
Very high land use (76-100)	4

Then the score obtained from duration of adoption and score obtained from percentage of land allotted by each respondent were multiplied. That is, if the obtained score against duration of adoption was 4 and the percentage of land allotted obtained 4 then adoption score would be  $4 \times 4 = 16$ . The adoption would range from 1-16 against the possible score.

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### **3.5 Measurement of problem confrontation of the growers in soybean cultivation**

The growers were asked to mention the problems they encountered in the adoption of soybean cultivation. It was measured by using closed form of questions. A four point modified Likert type scale was used for computing the problem confrontation score. Weights on responses against the applicable ones of the 12 problems of a farmer were assigned in the following way.

<b>Extent of confrontation</b>	<b>Assigned score</b>
Not at all	0
Little	1
Much	2
Very Much	3

The weight of responses of all the problems they faced was added together to obtain the problem confrontation score. Thus the possible problem confrontation score of the respondents could range from 0 to 36, where 0 indicating no problem confrontation, 36 indicating high confrontation.

### **3.6 Statement of the hypothesis**

A null hypothesis states that there is no relationship between the concerned variables. The following null hypothesis was formulated to explore the relationship of the selected characteristics of the growers with their adoption of soybean cultivation. There is no relationship between the selected characteristics of the growers and their adoption of soybean cultivation.

### **3.7 Instrument for collecting of data**

In order to collect relevant information an interview schedule was carefully designed keeping the objectives of the study in mind. The interview

schedule was designed in Bangla to ensure easy communication between the researcher and the respondent. The interview schedule was pre-tested by administering the same to ten soybean growers of the study area. The pre-test was helpful to identify faulty questions and statements in the draft schedule. Necessary additions, correction, alteration and adjustments were made in the schedule on the basis of the pre-test experience. The schedule was multiplied in its final form for collection of data. An English version of the Interview Schedule has been presented in the Appendix A.

### **3.8 Collection of data**

The researcher himself collected data from the soybean growers by using the interview schedule. The interviews were conducted individually in the houses of the respondents during their leisure period. Only ten soybean growers of the original list were not available during interview and hence ten soybean growers were replaced from the reserve list. Prior 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 45 days from 30 August to 15 October, 2009.

### **3.9 Data processing**

A detail coding plan was prepared. Data were coded into a coding sheet. These were then compiled, analyzed in accordance with the objectives of the study. Qualitative data were converted into quantitative form by means of suitable scoring techniques for the purpose of analysis.



### 3.10 Statistical analysis

The statistical measures such as, number and percentage distribution, range, mean, frequency distribution, standard deviation and rank order were used in describing the variables of the study. To find out the relationship between the adoption of soybean cultivation and the selected characteristics of the farmers, the Pearson's Product Moment Correlation was computed. Correlation matrix was also computed to determine the interrelationships among the variables. Five percent (0.05) and one percent (0.1) levels of significance were used as the basis of statistical significance. If the computed value of co-efficient 'r' was equal to or greater than table value of co-efficient at designated level of significance for the relevant degree of freedom, the null hypothesis was rejected and it was concluded that there was significant relationship between the concerned variables. However, when the computed value of co-efficient of correlation was found to be smaller than the tabulated value at the designated level of significance of the relevant degrees of freedom, it was concluded that the null hypothesis could not be rejected and hence there was no relationship between the concerned variables.



## **CHAPTER 4**

### **FINDINGS AND DISCUSSION**

In this Chapter, the findings of the study and the interpretations of their meaning are presented. These are conveniently presented in three sections in accordance with the objectives of the study. In the first section, the selected characteristics of the soybean growers have been discussed. The second section deals with relationships between soybean growers' selected characteristics and their adoption of improved practices have been discussed.

#### **4.1 Selected Characteristics of the Soybean Growers**

Behavior of an individual is determined to a large extent by their personal characteristics. The characteristics of an individual are an important factor in developing mental make up for making decisions about various issues of livelihood. More particularly decisions related to farming activities are being influenced largely by different characteristics of an individual. The characteristics of the growers were selected to find out their relationship with the adoption of improved practices. The selected characteristics included their age, education, farm size, annual income, extension contact, cosmopolitaness, innovativeness and agricultural knowledge. These characteristics of the growers have been described in this section. Distributions of the growers according to their different selected characteristics has been shown in Table 4.1

#### 4.1.1 Age

Age scores of the farmers ranged from 18 to 70 years having an average of 39.85 years, with a standard deviation of 12.89 as shown in Table 4.1. Age of the respondent, were categorized into three namely, young aged (18-35), middle aged (36-50) and old aged (50 above), the highest proportion of farmers were in the young category (44 percent), followed by middle age (34 percent) and the old (23 percent). The adoption of soybean cultivation rate among young farmers was formed to be reasonable. Data in Table 4.1. indicate that 77.28 percent of the growers in the study area were young to middle aged. Sarkar (1994). Hussen (2001), Islam (2002) and Hossain (2003) also found similar findings in their studies.



**Table 4.1 Salient features of individual characteristics of soybean growers**

Characteristics	Scoring System	Range		Categories	Respondents		Mean	Standard deviation
		Possible	Observed		Frequency	Percentage		
1. Age	Actual years	Unknown	18-70	Young aged (up to 35) Middle aged (36-50) Old aged (above 50)	48 37 25	43.64 33.64 22.73	39.85	12.89
2. Education	Year of Schooling	Unknown	0-15	No education (0) Can Sign only (0.5) Primary (1-5) Secondary (6-10) Above secondary (above 10)	12 15 41 26 16	10.91 13.64 37.27 23.64 14.55	5.03	4.35
3. Farm Size	Hectare	Unknown	0.4-9.5	Small Farm (0.21-1.00) Medium Farm (1.01-3) Large farm (above 3)	19 69 22	17.27 62.73 20.00	2.26	1.47
4. Annual Income	Actual (in '000 Tk.)	Unknown	50.0-310.0	Low income (up to 70) Medium income (71-120) High income (Above- 120)	52 45 13	47.27 40.91 11.82	92.80	44.88
5. Extension contact	Computed Score	0-26	2-24	Low Contact (up to 7) Medium Contact (8-14) High Contact (15 & Above)	44 51 15	40.00 46.36 13.64	10.23	4.82
6. Cosmopolitaness	Computed Score	0-24	5-17	Low (up to 10) Medium (11-15) High (above 15)	44 53 13	40.00 48.18 11.82	11.02	3.53
7. Innovativeness	Computed Score	0-28	6-22	Low (up to 8) Medium (9-15) High (16and above)	19 59 32	17.27 53.64 29.09	12.14	4.29
8. Agricultural knowledge	Computed Score	0-40	10-32	Low (up to 20) Medium (121-25) High (above 25)	57 37 16	51.82 33.64 24.55	18.18	7.04
9. Attitude towards Soybean cultivation	Computed Score	0-48	7-28	Slightly favorable (up to 15) Moderately favorable (16-19) High favorable (20and above)	36 50 24	32.73 45.45 21.82	16.35	5.67

#### **4.1.2 Education**

Education scores of soybean growers ranged from 0 to 15. The average score was 5.03 with the standard deviation of 4.35. Based on their score, the growers were classified into five categories: no education (0), can sign only (0.5), primary (1-5), secondary (6-10) and above secondary (above 10) as shown in table 4.1.

Although there were approximately 11.0 percent farmers having no education primary (37 percent), secondary (24 percent) and above secondary (15 percent) constituted about 76 percent respondents but one fifth of them (24 percent) did not have functional literacy. It would be wise to undertake literacy program for these respondents when agricultural extension programmers would be launched 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 and low literate client groups.

The findings related to education of the respondents reveal that the literacy rate was higher than national average (65.5 percent) in the study area.

#### **4.1.3 Farm size**

The farm Size of the growers of the study area ranged from 0.4 to 9.5 hectares (ha.). The average farm size was 2.26 ha. with the standard deviation of 1.47. Based on the farm size, the growers were classified into three categories, small farm (0.21-1.0), medium farm (1.01-3.0) and large farm (above 3) as shown in Table 4.1.

Data presented in Table 4.1 show that 62.73 percent respondents had medium farm, 20.00 percent, large farm and 17.27 percent small farm. Data also revealed that majority (80.00 percent) of the growers of the study area had small to medium farms. Thus, most of the growers were in possession of

medium and small farms. The farm size was highly associated with soybean farm size. It contributes to gross and net income. Larger farmers are more associated with different village based groups or organizations. It is noted that total percentages of small and medium farms comprised about 80 percent of the total farm size. It might be an indication that small and medium farmers were more interested for cultivation of soybean. One thing is very much important to note that most of the large farmers were landlords and escorts of the society. They are not interested to cultivate their own land rather they lease their land to other farmers as borga.

#### **4.1.4 Annual family income**

Annual income of a respondent was determined on the basis of his total earnings from agriculture and non agriculture sectors. Annual income of the growers ranged from Tk. 50.00 to 310.00 (Taka in thousand) with the mean of Tk. 92.80 thousand and standard deviation of 44.88. On the basis of the annual income the growers were classified into three categories as low income, (up to 70), medium income (71-120) and high income (above 120) as shown in Table 4.1.

Data presented in Table 4.1 indicate that highest proportion (47.27 percent) of the respondents had low annual income compared to 40.91 percent having medium income, indicating that adoption of soybean cultivation is usually done by the growers having comparatively higher economic standings.

The average income of the study area is much higher than the average per capita income of the country i.e. 523 US dollar (BBS, 2008). This might be due to the fact that the growers in the study area were not only engaged in agriculture. They also earned from other sources, such as services, business etc. Generally higher income gives an individual better status in society.

Otherwise, farmers with low income generally hesitate to adopt new innovations because of their lower income, they have also low risk bearing ability and inability to make necessary financial investment.

#### **4.1.5 Extension contact**

Extension contact scores of the respondents ranged from 2 to 24 with an average of 10.23 and standard deviation of 4.82. On the basis of extension contact scores, the respondents were classified into three categories as low contact (up to 7), medium contact (8-14) and high contact (15 and above) as shown in Table 4.1.

Data presented in Table 4.1. indicated that highest proportion (46.36 percent) of the respondents of the study area had the medium extension contact, while 40.00 percent had low extension contact and 13.64 percent had high extension contact. The findings of the study indicate that most of the respondents had medium extension contact and thereby enough knowledge about soybean production and production technologies. Sometimes several projects offer them to give seed and money perhaps they contact them and receive trainings. Hussien (2001) and Islam (2002) observed the similar findings in their study.

#### **4.1.6 Cosmopolitanness**

The observed cosmopolitanness scores of the growers ranged from 5 to 17 with an average of 11.02 and standard deviation of 3.53. On the basis of cosmopolitanness scores, the respondents were classified into three categories as low (up to 10), medium (11-15) and high (above 15) as shown in Table 4.1.

Data presented in Table 4.1 indicate that the highest proportion (48.18 percent) of the respondents had medium cosmopolitanness compared to 40.00

percent having low cosmopolitanness and 11.82 percent had high cosmopolitanness. Data also revealed that (60.00) percent of the growers were under medium and high cosmopolitanness. People differ in their travelling behavior. Despite the innate characteristics of travelling, farmers were much concerned about their basic needs and they extensively visit to other place time to time as because in most of the cases there is good communication network. So, the farmers of this study area have an opportunity to visit different places. Chowdhury (1997) also observed the similar findings in their study.

#### **4.1.7 Innovativeness**

Innovativeness scores of the growers ranged from 6 to 22 against the possible range of 0 to 28. The mean score was 12.14 and standard deviation was 4.29. On the basis of innovativeness scores, the respondents were classified into 3 categories of low innovativeness (up to 8), medium innovativeness (9-15) and high innovativeness (16 and above) as shown in Table 4.1.

Data indicated that the highest proportion (53.64 percent) of the growers had medium innovativeness compared to 29.09 percent high innovativeness, and 17.27 percent low innovativeness. Data also revealed that majority (83.00 percent) of the respondents in the study area had high to medium innovativeness.

Chowdhury (1997) and Podder also observed similar findings in their study.

#### **4.1.8 Agricultural knowledge**

Agricultural knowledge of a farmer is the foundation of his farming business. Agricultural knowledge of the growers varied from 10 to 32 against the possible range of 0 to 40. The average agricultural knowledge score was found to be 18.18 and standard deviation was 7.04. Based on the



observed overall agricultural knowledge score, the respondents were classified into three categories as low (up to 20), medium (21-25) and high (above 25) as shown in Table 4.1.

Data presented in Table 4.1 show that the highest proportion (56.36 percent) of the growers had low agricultural knowledge compared to 38.18 percent had medium agricultural knowledge, and 5.46 percent had high agricultural knowledge. Growers who receive high level of education but less involvement in farming might possess lower agricultural knowledge than the growers who are actively involved in farming for a long period of time.

#### **4.1.9 Attitude towards soybean cultivation practices**

The attitude scores of the growers ranged from 7-28 against the possible scores of 0-48 with an average of 16.35 and a standard deviation of 5.67. Based on the observed attitude towards the soybean scores, the respondents were classified into three categories as Slightly favorable (up to 15), moderately favorable (16-19) and highly favorable (20 and above). The distribution of the respondents according to their attitude towards soybean cultivation practices is shown in Table 4.1.

Data presented in Table 4.1 show that the highest proportion (45.45) of the growers had moderately favorable attitude towards soybean cultivation compared to 32.73 percent had slightly favorable attitude and 21.82 percent had highly favorable attitude. Chowdhury (2003), Sarker (2002), Islam (1996) and Sadat (2002) also were more or less in conformity with the finding of the present study.

#### **4.2. Adoption of Soybean Cultivation by the Soybean Growers**

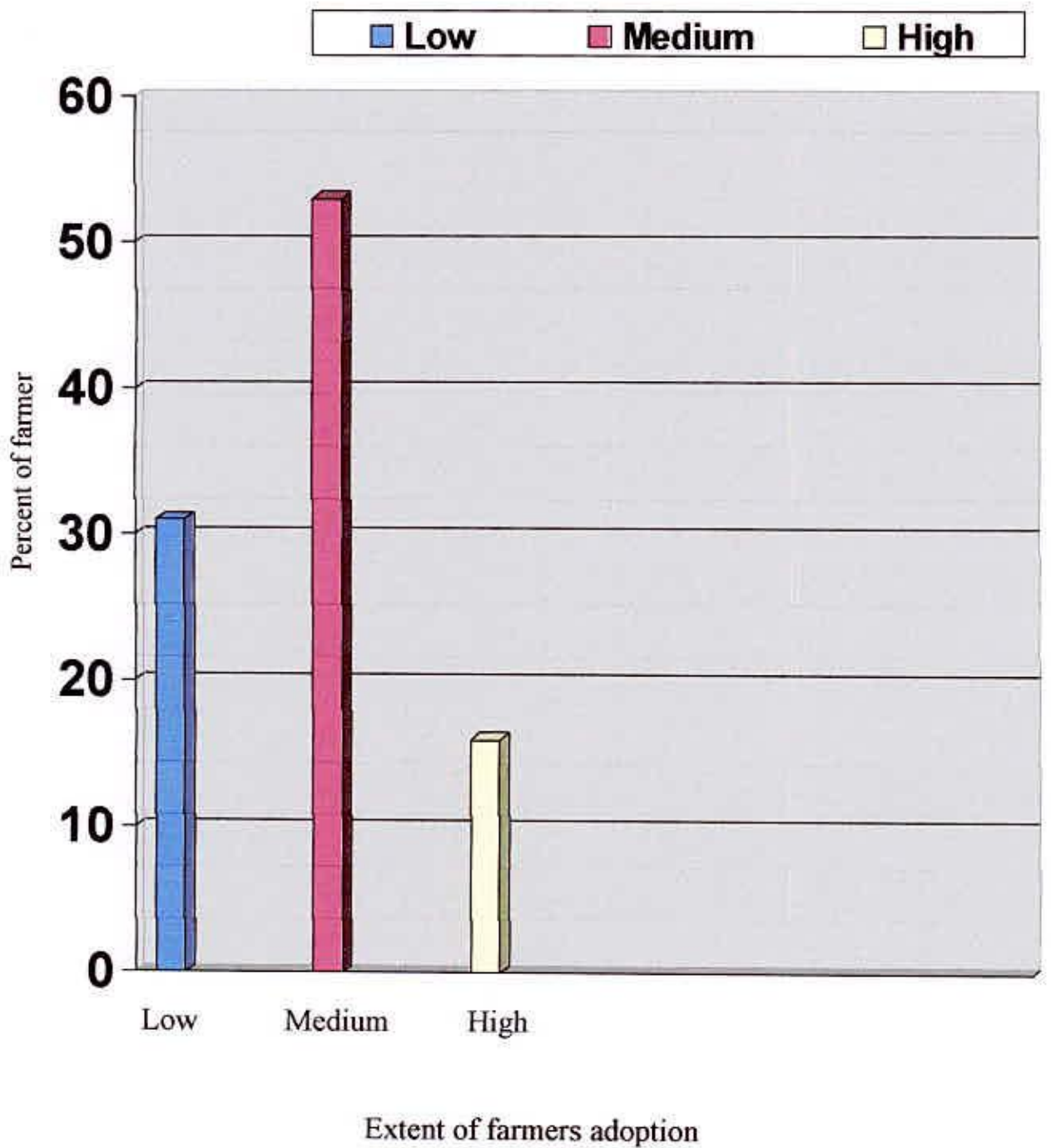
The adoption scores the growers ranged from 6 to 16 with an average of 15.32 and the standard deviation of 5.16. Based on the observed scores, the growers were classified into three categories as shown in Table 4.2.

**Table 4.2 Distribution of the growers according to their adoption of soybean cultivation**

Categories of adoption	Soybean growers		Mean	Standard deviation
	Number	Percentage		
Low adoption (6 - 9)	34	30.9	13.43	5.55
Medium adoption (10-13)	58	52.7		
High adoption (above 13)	18	16.4		
Total	110	100		

Data presented in Table 4.2 reveal that the highest proportion 52.7 percent of the growers fell under medium adoption category, while 16.4 percent had high adoption and 30.9 percent had low adoption. Thus, the overwhelming majority (69.10%) of the growers had medium to high adoption. For clear understanding of the adoption behavior of the soybean growers, all the four selected practices are shown in Table 4.3. For a more vivid presentation of the extent of adoption of soybean cultivation, Fig. 4.1 is also furnished.





**Fig. 4.1 Adoption of soybean cultivation by the soybean growers**

**Table 4.3 Distribution of the soybean growers according to their adoption of selected practices**

**a) Duration of adoption of soybean**

Name of varieties	No. of growers	Percent
Sohag	65	59.09
Bangladesh Soybean 4	45	40.91

**b) Land allotted for soybean**

Land	No. of growers	Percent
Low land use	0	0
Medium land use	25	22.72
High land use	50	45.45
Very high land use	35	31.81

Data in Table 4.3 indicates that highest (59.09%) percent proportion of the growers' cultivated Shohag variety followed by (40.91%) percent Bangladesh soybean 4 variety.

Regarding land allotment, 45.45 percent had high land use, followed by 31.81% very high land use and 22.72% medium land use.

The above findings revealed that the soybean growers made adoption of medium land use in soybean cultivation. The bar graph on this has been presented in Figure 4.1.

**4.3. Problem Confrontation by the Growers in Soybean Cultivation**

The observed problem confrontation scores of the growers ranged from 11 to 25 with an average of 19.57 and standard deviation of 3.33. The possible problem confrontation score were 0 to 36. On the basis of problem confrontation scores, the growers were distributed into three categories as shown in Table 4.4.

**Table 4.4 Distribution of soybean growers according to their problem confrontation**

Categories	Soybean growers		Mean	Standard deviation
	Number	Percentage		
Low confrontation (up to 15)	15	13.64	19.57	3.33
Medium confrontation (18-20)	38	34.55		
High confrontation (above 20)	57	51.82		
Total	110	100		

Data contained in Table 4.4 reveal that the highest proportion (51.82 percent) of the soybean growers had high problem confrontation as compared to 34.55 percent had medium and 13.64 percent low problem confrontation regarding the adoption of soybean cultivation. The findings of the study indicated that overwhelming majority (86.37%) of the growers had medium to high problem confrontation. This will affect the rate of use of adoption of soybean as well as its cultivation.

#### **4.3.1 Rank order of problem confrontation by the soybean growers**

The soybean growers were asked to mention the specific problem faced by them in soybean cultivation. The problems identified by the soybean growers are listed below according to their importance in Table 4.5.

**Table 4.5 Rank order of problem confrontation in soybean cultivation**

S.L No.	Problem	Extent of hindrance caused in farming				Computed Score Rank order	
		Very much	Much	Little	Not at all		
1	Less irrigation facilities	85	15	10	0	295	1
2	High input cost (seed, fertilizer, pesticide)	76	30	4	0	292	2
3	Non availability of credit	70	32	6	2	280	3
4	Less scope for consuming as food	65	31	14	0	271	4
5	Lack of technical information	64	32	10	4	266	5
6	Non availability of land for soybean cultivation	58	28	24	0	254	6
7	Less scope of marketing	55	34	17	4	246	7
8	Less market price of soybean	52	32	22	4	242	8
9	Threshing problem	42	30	28	10	214	9
10	Non availability of hybrid seed	32	40	32	6	208	10
11	Lack of training regarding control measures of pests	28	34	48	0	200	11
12	Damage caused by the man and animals etc. in soybean	20	40	50	0	190	12

Data presented in Table 4.5 indicates that the extent of adoption of soybean cultivation practices was mostly hindered due to less irrigation facilities, high input cost (seed, fertilizer, pesticide), non availability of credit, less scope for consuming as food, lack of technical information, non availability of land for soybean cultivation, less scope of marketing, less market price of soybean, threshing problem, non availability of hybrid seed, lack of training regarding control measures of pests and less damage caused by man and animals etc. in soybean cultivation. The possible interpretation of these problems are furnished below.

Most of the respondents indicated that the irrigation problem was the no.1 problem; it was the most important problem of the study area, actually irrigation was the most important factor for cultivation of soybean, in the

Rabi season irrigation of soybean crop is possible by water supply by shallow tube-wells or other sources to the furrows made between two lines of soybean crop. In irrigation purpose it needs some extra cost and available water sources. But in the study area most of the respondents did not own shallow or deep tube-well, so they faced problem in case of irrigation and it is also shown that they had no available water storage system.

Another major problem was “high input cost”. Most of the respondents in the study area were small and medium farmers sometimes input dealers and agency cheat the growers by taking high price of inputs. So the grower cannot afford to cultivate.

“Non availability of credit” was the third major problem of the study area. Non availability of credit in due time was also a problem to the farmers. Growers should be encouraged through credit support from Government but growers are deprived due to strong rules and regulation of Bank.

Less scope for consuming as food was the 4th major problem of the study area.

“Lack of technical knowledge” was the fifth problem of the study area. Lack of technical information in due time was a problem to growers because at present only limited number of researcher are involved in soybean research and other activities at the growers level. So due cause of time, some problems could not be solved by SAAO or other extension agents.

“Non availability of land” was the sixth problem of the study area. In case of small and medium growers their land is limited and they use traditional cropping pattern in the whole season, as new crop Soybean cultivation needs excess land sometime it was not possible to the growers and they feel shortage of land for soybean cultivation.

“Less scope of marketing” was the seventh problem. Growers mentioned only the selling problem of soybean and its low price because- middle men and "bepari" purchase it for low value from the growers and sell it in high price in the poultry feed industry.

“Less market price of soybean” was the eighth problem. Growers mentioned that sometime smuggled soybean grain enter into the country from India, which create problem of low price of soybean.

“Threshing problem” was ninth problem. Farmers mentioned that power tiller; its cost is high so they have no ability to buy it individually. In this case they faced problem sometimes for threshing.

“Non- availability of hybrid seed” was tenth problem. Non- availability of hybrid seed in due time caused a serious problem mentioned by the growers.

“Lack of training regarding control measures of pests' was the eleventh problem. Since majority of the farmers did not have the access to training course from the Agriculture Extension Personnel, they were unable to <sup>take</sup> control some measures against pest.

And last problems was damage caused by the man, animals etc. in soybean. Sometimes, the yield of soybean was hampered due to the movement of unconscious man as well as domestic animals. However, this was rated a less acute problem compared to other problems.

In view of the urgent need for increasing soybean cultivation, adequate steps should be taken on a priority basis to remove various problems causing hindrance to the cultivation practices.



#### **4.4 Relationship between Selected Characteristics of the Growers and their Adoption of Soybean Cultivation**

##### **4.4.1 Age and adoption of soybean cultivation**

The relationship between age of the farmer and their adoption of soybean cultivation was examined by testing a null hypothesis which states that there is no relationship between the concerned variables. If null hypothesis is rejected on the basis of statistical test, it is assumed that there is a relationship between the concerned variables. The practices in soybean cultivation was examined by testing the concerned null hypothesis. The tabulated value of "r" was measured by 108 degree of freedom.

Co-efficient of correlation between the concerned variables was found to be 'r' = .058 as shown in Table 4.6 this led to the following observation regarding the relationship between the variables under consideration:

- The relationship showed a positive trend.
- The computed value of 'r' (.058) was smaller than tabulated ( $r=0.184$ ) value with 108 degrees of freedom at 0.05 level of probability.
- Hence the concerned null hypothesis could not be rejected.



**Table 4.6 Correlation co-efficient between the selected characteristics of the growers and their adoption of soybean cultivation**

Dependent variable	Independent variables	Computed value of "r"	Tabulated value of "r" of 108 d.f.	
			at 0.05 level	at 0.01 level
Adoption of Soybean cultivation	Age	.058 <sup>NS</sup>	0.184	0.240
	Education	.168 <sup>NS</sup>		
	Farm size	.154 <sup>NS</sup>		
	Annual family income	.346**		
	Extension contact	.082 <sup>NS</sup>		
	Consmopoliteness	.046 <sup>NS</sup>		
	Innovativeness	.130 <sup>NS</sup>		
	Agricultural knowledge of soybean cultivation practices	.195*		
	Attitude towards of soybean cultivations	.095 <sup>NS</sup>		

\* = Correlation is significant at the 0.05 level.

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

NS- Non significant

Hence, the researcher concluded that age of the growers had no significant relationship with their adoption of soybean cultivation. Similar findings were also observed by Chowdhury (1997). Rahman (2001), Islam (2002) and Hasan (2003).

#### **4.4.2 Education and adoption of Soybean cultivation**

The relationship between education of the growers and their adoption of soybean cultivation was examined by the concerned null hypothesis. Based on the computed r values, the following conclusions were drawn:

- The relationship showed a positive trend.
- The computed value of  $r = .168$  was smaller than the tabulated value  $r = 0.184$  with 108 degree of freedom at 0.05 level probability.
- The concerned null hypothesis could not be rejected.

On the basis of above findings, the null hypothesis could not be rejected. Hence, the researcher concluded that education of the growers had no significant relationship with their adoption of soybean cultivation. Similar findings were also observed by Chowdhury (1997), Islam (2002) and Sarder (2002).

#### **4.4.3 Farm size and adoption of soybean cultivation**

The relationship between farm size of growers and their adoption of soybean cultivation was examined by testing the concerned null hypothesis.

Co-efficient of correlation between the concerned variables was found to be  $r = .154$  as shown in Table 4.6. This led to the following observation regarding the relationship between tow variables under consideration.

- The relationship showed a positive trend.
- The computed value of  $r = .154$  was smaller than the tabulated value  $r = 0.184$  with 108 degree of freedom at 0.05 level of probability.
- The concerned null hypothesis could not be rejected.

Hence the researcher concluded that firm size of the growers had no significant relationship with their adoption of soybean cultivation. Similar findings were also observed by Chowdhury (1997), Islam (2002) and Sardar (2002).

#### **4.4.4 Annual family income and adoption of soybean cultivation**

The relationship between annual family income of growers and their adoption of soybean cultivation was examined by the concerned null hypothesis. Co-efficient of correlation testing the concerned variables was found to be “r” .346 as shown in Table 4.6. 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’ =.346 was larger than the tabulated value ‘r’= 0.240 with 108 degree of freedom at 0.01 level of probability.
- The concerned null hypothesis was rejected.

Hence, the researcher concluded that annual income of the growers had highly significant relationship with their adoption of Soybean cultivation. This means that raise in annual income of the farmers enable them to invest for the adoption of high cost technology related to Soybean and like crops. Such findings were also observed by Sarker (1997), Hasan (2003) and Aurangazeb (2002).

#### **4.4.5 Extension contact and adoption of soybean cultivation**

The relationship between extension contact of the growers and their adoption of soybean cultivation was examined by testing the concerned null hypothesis. Co-efficient of correlation between the concerned variables was

found to be  $r = .082$  as shown in Table 4.6. 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  $r = .082$  was smaller than tabulated value  $r = 0.184$  with 108 degrees of freedom at 0.05 level probability.
- The concerned null hypothesis could not be rejected.

Hence, the researcher concluded that extension contact of the growers had no significant relationship with their adoption of soybean cultivation. Similar findings were also observed by chowdhury (1997), Podder (1999), Hussen (2001) and Aurangazeb (2002).

#### **4.4.6 Cosmopolitanism and adoption of soybean cultivation**

The relationship between cosmopolitanism of the growers and their adoption of soybean cultivation was examined by testing the concerned null hypothesis. Co-efficient of correlation between the concerned variable was found to be  $r = .046$  as shown in Table 4.6. 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  $r = .046$  was smaller than tabulated value  $r = 0.184$  with 108 degrees of freedom at 0.05 level of probability.
- The concerned null hypothesis could not be rejected.



Hence, the researcher concluded that cosmopolitanism of the growers had no significant relationship with their adoption of soybean cultivation. Similar findings were observed by Chowdhury (1997).

#### **4.4.7 Innovativeness and adoption of soybean cultivation**

The relationship between innovativeness of the growers and their adoption of soybean cultivation was examined by testing the concerned null hypothesis. Co-efficient of correlation between the concerned variable was found to be ' $r$ ' = .130 as shown in Table 4.6. 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 ' $r$ ' = .130 was smaller than tabulated value ' $r$ ' = 0.184 with 108 degrees of freedom at 0.05 level of probability.
- The concerned null hypothesis could not be rejected.

Hence, the researcher concluded that innovativeness of the growers had no significant relationship with their adoption of soybean cultivation. Similar findings were also observed by Chowdhury (1997), Podder (1999), Aurangozeb (2002) and Islam (2002).

#### **4.4.8 Agricultural knowledge and adoption of soybean cultivation practices**

The relationship between agricultural knowledge of the growers and their adoption of soybean cultivation was examined by testing the concerned null hypothesis. Co-efficient of correlation between the concerned variable was found to be ' $r$ ' = .195 as shown in Table 4.6. 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' = .195 was larger than tabulated value 'r' = 0.184 with 108 degrees of freedom at 0.05 level of probability.
- The concerned null hypothesis was rejected.

Hence, the researcher concluded that innovativeness of the growers had significant relationship with their adoption of soybean cultivation. This findings indicates that soybean growers who had more knowledge on soybean production, were the farmers who were trained up from MCC, NGO etc. The knowledge of the farmers also developed on various key issues like the fertility status, intercropping and beneficial aspects of using soybean. Being field demonstration effective to develop pertinent knowledge on soybean cultivation, these farmers had also higher adoption.

#### **4.4.9 Attitude towards Soybean cultivation and adoption of soybean cultivation practices**

The relationship between attitude towards soybean cultivation of the growers and their adoption of soybean cultivation was examined by testing the concerned null hypothesis. Co-efficient of correlation between the concerned variable was found to be 'r' = .095 as shown in Table 4.6. 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' = .095 was smaller than tabulated value 'r' = 0.184 with 108 degrees of freedom at 0.05 level of probability.
- The concerned null hypothesis could not be rejected.

Hence, the researcher concluded that attitude towards of the growers had no significant relationship with their adoption of soybean cultivation.

## CHAPTER-5

### SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This Chapter presents the summary of findings, conclusion and recommendations 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 soybean growers

###### Age

Age of the growers ranged from 18 to 70 years. The average being 39.85 years with a standard deviation 12.89. The highest proportions 43.64 of the growers were young aged, while 33.64 percent was middle and 22.73 percent old.

###### Education

Education of the growers ranged from 0 to 15. The average score being 5.03 and the standard deviation 4.35. Large proportion (37.27 percent) of the growers are primary education, compared to 10.91 percent having illiterate (score 0), 13.64 percent can sign only, 23.64 percent are secondary education and 14.55 percent had above secondary education.

###### Farm size

Farm size of the growers ranged from 0.4 to 9.5 hectares with and average 2.26 hectares and the standard deviation 1.47. 17.27 percent of the growers were found to have small farm, 62.73 percent medium farm and 20.00 percent had large size farm.



**Annual income**

Annual income scores of the growers ranged 50.00 to 310.00 with an average of 92.80 and the standard deviation 44.88. The highest proportion (47.27 percent) of the growers had low income compared to (40.91 percent) of the growers had medium annual income and 11.82 percent having high annual income.

**Extension contact**

Extension contact scores of the growers ranged from 2 to 24, with an average score 10.23 and the standard deviation 4.82. The highest proportion (46.36 percent) of the growers had medium extension Contact Compared to 40.00 percent of the growers low extension contact and 13.64 percent had high extension contact.

**Cosmopolitaness**

Cosmopolitaness score of the growers ranged from 5 to 17 with an average 11.02 and the standard deviation 3.53. The highest proportion (48.18 percent) of the growers had medium cosmopolitaness compared to 40.00 percent low cosmopolitaness and 11.82 percent having high cosmopolitaness.

**Innovativeness**

Innovativeness scores of the growers ranged from 6 to 22 with an average 12.14 and the standard deviation 4.29. The highest proportion (53.64 percent) of the growers had medium innovativeness compared to 29.09 percent having high innovativeness and 17.27 percent low innovativeness.

**Agricultural knowledge**

Agricultural knowledge of the growers ranged from 10 to 32. The average agricultural knowledge score being 18.18 and standard deviation was 7.04. The highest proportion (51.82 percent) of the growers had low agricultural knowledge compared to 33.64 had medium agricultural knowledge and 14.55 percent had good agricultural knowledge.

### **Attitude towards soybean cultivation**

Attitude towards soybean of the growers ranged from 7 to 28. The average attitude towards soybean cultivation score being 16.35 and standard deviation was 5.67. The highest proportion (45.45 percent) of the growers had moderately favorable attitude compared to 32.73 had Slightly attitude towards soybean cultivation and 21.82 percent had good attitude towards soybean cultivation practices.

### **5.1.2 Adoption of soybean cultivation**

Adoption scores of the growers ranged from 6 to 16 the average being 13.43 and the standard deviation 5.55. The highest proportion (52.7 percent) of the growers had medium adoption compared to 30.9 percent low adoption and 16.4 percent had high adoption.

### **5.1.3 Relationship between the selected characteristics of the growers with their adoption of Soybean cultivation.**

#### **Age and adoption**

The null hypothesis could not be rejected on the basis of estimated 'r' value at 0.05 level of probability with 108 degrees of freedom. Hence, age of the growers had no significant relationship with their adoption of Soybean cultivation.

#### **Education and adoption**

The null hypothesis could not be rejected on the basis of estimated 'r' value at 0.05 level of probability with 108 degrees of freedom. Hence, education of the growers had no significant relationship with their adoption of Soybean cultivation.

### **Farm size and adoption**

The null hypothesis was rejected on the basis of estimated 'r' value at 0.05 level of probability with 108 degrees of freedom. Hence, farm size of the growers had no significant relationship with their adoption of soybean cultivation.

### **Annual family income and adoption**

The null hypothesis was rejected on the basis of estimated 'r' value at 0.01 level of probability with 108 degrees of freedom. Hence, annual family income of the growers had highly significant positive relationship with their adoption of soybean cultivation.

### **Extension contact and adoption**

The null hypothesis could not be rejected on the basis of estimated 'r' value at 0.05 level of probability with 108 degrees of freedom. Hence, extension contact of the growers had no significant relationship with their adoption of Soybean cultivation.

### **Cosmpoliteness and adoption**

The null hypothesis could not be rejected on the basis of estimated 'r' value at 0.05 level of probability with 108 degrees of freedom. Hence, cosmpoliteness of the growers had no significant relationship with their adoption of Soybean cultivation.

### **Innovativeness and adoption**

The null hypothesis could not be rejected on the basis of estimated 'r' value at 0.05 level of probability with 108 degrees of freedom. Hence, innovativeness of the growers had no significant relationship with their adoption of Soybean cultivation.

### **Agricultural knowledge and adoption**

The null hypothesis was rejected on the basis of estimated 'r' value at 0.05 level of probability with 108 degrees of freedom. Hence, agricultural knowledge of the growers had significant positive relationship with their adoption of soybean cultivation.

### **Attitude toward soybean cultivation practices**

The null hypothesis could not be rejected on the basis of estimated 'r' value at 0.05 level of probability with 108 degrees of freedom. Hence, attitude towards soybean cultivation of the growers had no significant relationship with their attitude towards soybean cultivation.

## **5.2 Conclusions**

Findings of the study and the logical interpretations of their meaning in the light of other relevant facts prompted the researcher to draw the following conclusions:

1. Findings indicate that about 53 percent of the growers had medium adoption of soybean cultivation, while 30.9 percent had low adoption, and 16.4 percent had high adoption. Therefore, it may be concluded that the adoption behavior of the growers in respect of cultivation of soybean is a promising picture, but there is a further scope for increasing the extent of adoption of soybean cultivation.
2. Introduction of soybean in the farming system of Bangladesh in a planned way has been a recent phenomenon. The positive significant relationship between age and adoption leads to a conclusion that relatively younger farmers are more innovative than older farmers. Most of the soybean growers were either middle or young aged, while age of the soybean growers had no significant relationship with their adoption. Therefore, it

may be concluded that special attention need not be given to any particular age group. But as larger proportion of the soybean growers were young aged and medium, hence it is necessary to give some importance to these categories.

3. Findings of the study showed a significant relationship of education with the adoption of soybean cultivation. It may, therefore, be concluded that enhancement of formal education among the growers may contribute positively towards the formation of favorable mental make up for the adoption of soybean cultivation.
4. Farm size of the soybean growers showed positive and significant relationship with their adoption of soybean cultivation. The growers having medium farm are generally economically solvent and they are able to adoption of soybean cultivation. Considering the facts it may be concluded that growers with small and large farm size should be encouraged to produce soybean through supplying seed of HYV and credit supports.
5. Extension contact of the soybean growers had a significant and positive relationship with their adoption of soybean cultivation. This means that the growers with more extension contact with different extension methods are expected to have more adoption of soybean cultivation. It may, therefore, be concluded that adoption of soybean cultivation practices will be increased, if the growers are highly exposed to different information sources and extension teaching methods.
6. Innovativeness of the growers had a significant and positive relationship with their adoption of soybean cultivation. This means that with increase of innovativeness, the rate of adoption also increased. Frequent contact

with extension media can make growers more innovative which would ultimately lead to adoption of soybean cultivation. This situation is quite favorable for the implementation of agricultural development programmes in the study area.

7. Agricultural knowledge in soybean cultivation of the growers had a significant and positive relationship with their adoption of soybean cultivation. Through agricultural knowledge, an individual grower becomes aware of the recent information of various aspects of soybean cultivation technologies. Unless arrangements are made for increasing the agricultural knowledge of the soybean growers, their adoption of soybean cultivation would be hampered. For successful adoption of soybean cultivation technologies, the growers to be aware and then to know the methods about their cultivation.
8. Attitude towards soybean cultivation of the growers had a significant and positive relationship with their adoption of soybean cultivation. This means that with the increase of a positive attitude towards soybean cultivation, the rate of adoption will also be increased. Frequent soybean cultivation of an individual will refer to his feeling, beliefs and action tendencies towards the various aspects of soybean cultivation.

### **5.3 Recommendation**

Recommendation has been divided into two sub sections, viz. recommendations for policy implication and recommendation for further study.

#### **5.3.1 Recommendation for policy implication**

Based on the findings and conclusions of the study, the following recommendations were made:

1. The level of adoption of soybean cultivation practices was encouraging. However, there is a need of further efforts for wide adoption of soybean cultivation by the growers.
2. In view of the absence of any relationship between ages of the growers and their adoption of soybean cultivation, it is recommended that the extension workers should work with the growers of all age groups to promote the adoption of soybean cultivation.
3. Education of the soybean growers had no significant and positive relationship with their adoption of soybean cultivation. It indicates the importance of education of the soybean growers for rapid adoption of soybean cultivation. The findings also indicate that 10.91 percent of the growers were almost illiterate. Under above situation, it may be recommended that arrangements should be made for increasing the literacy level of the soybean growers by the concerned authorities through the establishment of night school or adult education centre.
4. The annual family income of the growers had highly significant and positive relationship with their soybean cultivation. It leads to the recommendation that extension services should provide adequate farm management advice to the growers for increasing their farm income. It is a fact that if income were increased, grower's receptive capacity to adoption of soybean cultivation will also be increased thereby contributing to increased production.
5. Extension contact of the soybean growers showed no significant influence on adoption of soybean cultivation. Hence, the concerned authorities should take cognizance of these facts and should take necessary steps to increase the frequency of extension contact with the farmers.

6. Innovativeness of the soybean growers had positive and no significant relationship with their adoption of soybean cultivation practices. So, extension providers should take necessary steps for motivational activities to increase innovativeness of the growers for better adoption of soybean cultivation.
7. Agricultural knowledge for soybean cultivation of the growers had a significant and positive relationship with their adoption of soybean cultivation practices. Hence, it may be recommended that extension providers should provide training and other motivation campaign to increase the agricultural knowledge of the growers in soybean cultivation.
8. Attitude towards soybean cultivation of the growers had no significant and positive relationship with their adoption of soybean cultivation. This means that with increase of a positive attitude towards soybean cultivation, its rate of adoption will also be increased. Frequent soybean cultivation of an individual might refer to his feeling, beliefs and action tendencies towards the various aspects of soybean cultivation.

### **5.3.2 Recommendation for further study**

A short term and sporadic study being conducted in some specific location cannot provide all information for proper understanding about adoption of soybean cultivation technologies and other related matters. Further studies should be undertaken covering more dimensions of soybean cultivation. In this connections, the following recommendations were made:

1. The present study was conduct in Noakhali Sadar, Subarna Char and Hatiya Upazila under Noakhali district. It is recommendation that similar



studies should be conducted in other soybean growing areas of Bangladesh.

2. This study investigated the relationship of nine characteristics of the growers with their adoption of soybean cultivation as independent variable. Therefore, it is recommendation that further studies be conducted with other independent and dependent variables.
3. In the present study, age had no significant relationship with their adoption of soybean cultivation practices. Moreover, cosmopolitaness had significant relationship with their adoption of soybean cultivation practices. In this connection, further verification is necessary.
4. More research should also be undertaken to identify the factors causing hindrance towards the adoption of soybean cultivation practices. It would provide a more valid platform to make generalizations for problem confrontation in the adoption of soybean cultivation.



## BIBLIOGRAPHY

- Ahmed, H (1977). Use of Information Scores by the Farmers in Adoption of Improved Practices in Soybean Cultivation. M.S. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education and Teachers Training Bangladesh Agricultural University, Mymensingh.
- Akanda, M.R.K. (1995). Correlates of Information Sources used by the Potato Farmers in Garidaha Union of Sherpur Thana. M.S. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education and Teachers Training Bangladesh Agricultural University, Mymensingh.
- Alam, M.F. (1996). Farmers Awareness Regarding the Subsequences of Homestead Deforestation in Two selected Areas Under Madhupur Thana of Tangail District. M.S. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.
- Alam, M.S. (1997). Use of Improved Farm Practices in Rice Cultivation by the Farmers. M.S. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.
- Ali, M.A. (2004). Adoption Aquaculture Technologies by the Fish Farmers of Mymensingh and Netrokona Districts. M.S. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.
- Ali, M.K. and Chowdhury, S.A. (1983). Influence of few Selected Factors on Adoption Behavior of Sugarcane growers of a Mills None. Bangladesh Journal of Sugarcane, 5:77-83.

- Ali, M.K., S.A. Chowdhury, M.A. Kader and M.O. Gani, (1968). Factors Influencing Adoption of Improved Sugarcane Production Technologies Among the Growers of Sugar Mills Zone. *Bangladesh Journal of Extension Education* 1(2):25-31.
- Aurangozeb, M.K. (2002). Adoption of Integrated Homestead Farming Technologies by the Rural Women in RDRS. M.S. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education and Teachers Training Bangladesh Agricultural University, Mymensingh.
- BBS, (2003). Monthly Statistical Bulletin, July, 2005. Bangladesh Bureau of Statistics, Statistical Division. Ministry of Planning, Government of the People's Republic of Bangladesh, Dhaka.
- Chowdhury, M.S.A. (1997). Adoption of Selected BINA Technologies by the Farmers of Boira Union in Mymensingh District. M.S. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education and Teachers Training, Bangladesh Agricultural University, Mymensingh.
- Deobold, B.V.D. (1973). *Understandings Education Research: An Introduction*. 3<sup>rd</sup> edn, New York: Mc Graw Hill Book Company Inc.
- Ezekiel, M. And K.A. Fox (1995). *Method of Correlation and Regression Analysis* 3<sup>rd</sup> Ed. New York: John Wiley and Sons, Inc.
- Halim, A. (1985). A Historical Review of Approaches for the Communication of Agricultural Research. National Symposium on Agricultural Research.
- Hasan, M.M. (2003). Adoption of Recommended Potato Cultivation Practices by the Farmers in Some Selected Areas of Rajshahi District. M.S. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education and Teachers Training, Bangladesh Agricultural University, Mymensingh.

- Hasan, M.Z. (1996). Adoption of Some Agricultural Technologies Among the Farmers as Perceived by the Frontline GO and NGO workers. M.S. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.
- Heong, K.L. (1990). Technology Development in Rice Integrated Pest Management Proceeding on the International Conference on Plant Protection in the Tropics Kuala Lumpur Malaysia, Malaysian Plant Protection Society, 5:80-84.
- Hoque, M.M. (1993). Adoption of Improved Practices in Sugarcane Cultivation by the Sugarcane Growers in Sreepur Thana under Gazipur District. M.S. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education and Teachers Training, Bangladesh Agricultural University, Mymensingh.
- Hossain, M.A. (1983). Relationship of the Farmers Characteristics with their Adoption of HYV and Transplanted Aman and Other Related Aspects in Bhabakhali Union of Mymensingh District. M.S. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education and Teachers Training, Bangladesh Agricultural University, Mymensingh.
- Hossain, M.D. (1991). Relationship of Selected Characteristics of the Jute Growers with their Adoption of Improved Practices of Jute Cultivation. M.S. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education and Teachers Training, Bangladesh Agricultural University, Mymensingh.

- Hossain, M.M. (2003). Farmers Knowledge and Adoption of Modern Boro Rice Cultivation Practices. M.S. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.
- Hossain, M.N. (1999). "Farmers Perception of the Effects of Agro-Chemicals on Environment". M.S. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.
- Hossain, M.N. (1999). Adoption Behavior of Contact Wheat Growers in Sadar Upazila of Jamalpur District. M.S. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education and Teachers Training, Bangladesh Agricultural University, Mymensingh.
- Hussen, M.A.M. (2001). Farmers Knowledge and adoption of Modern Sugarcane Cultivation Practices. M.S. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.
- Islam, M.A. (2003). Farmers Adoption of Organic Manures for Maximizing Rice Production. M.S. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.
- Islam, M.M. (1993). Adoption of Improved Practices in Potato Cultivation by the Potato Farmers of Sonatala Union Borga Distirict. M.S. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.

- Islam, M.M. (1996). Farmers Use of Indigenous Technical Knowledge (ITK) in the Context of Sustainable Agricultural Development. M.S. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.
- Islam, M.S. (2002). Adoption of Modern Agricultural Technologies by the Farmers of Sandip. M.S. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education and Teachers Training, Bangladesh Agricultural University, Mymensingh.
- Islam, M.S. (2002). Farmers Knowledge and Adoption of Ecological Agricultural Practices Under Supervision of Proshika. M.S. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.
- Kashem, M.A. and Hossain, M.A. (1992). Adoption Behavior of Sugarcane Farmers. *Indian Journal of Extension Education*, 28(1&4):92-96.
- Khan, M.A.H. (1993). Adoption of Insecticides and Related Issues in the Village of Pachon Union, Madaripur District. M.S. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.
- Moullick, T.A. Hraboszky, J.P. and C.S.S. Rao. (1996). Predictive Values of Some Factors of Adoption of Nitrogenous Fertilizers by North Indian Farmers. *Rural Sociology*, 31 (4): 467-477.

- Muhammad, A. (1974). A Study on the Farmers Adoption of Insect Control Measures and Related Aspects. M.Sc. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education and Teachers Training, Bangladesh Agricultural University, Mymensingh.
- Mustafi, B.A.A, N.M. Islam and M.M. Rahman (1987). Factors Adoption of Modern Varieties of Rice in Bangladesh. Bangladesh Journal of Extension Education, 2(1): 97-100.
- Muttalab, M.A. (1995). Relationships of Selected Characteristics of Potato Growers with their Adoption of Improved Potato Technologies. M.Sc. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.
- Nikhade, M.D., S.R. Bhole and S.V. Sharkar (1993). Adoption of Improved Practices of Soybean Cultivation. Indian Journal of Extension Education, 29:(3&4).
- Okro, F.U. and Obiduaka, L.U. (1992). Factors Influencing the Adoption of Improved Oil Palm Management Practices among Small Holders in IMO states, Nigeria. Bangladesh Journal of Extension Education, 7 (1&2): 45-52.
- Pal, S.K. (1995). Adoption of Recommended Sugarcane Cultivation Practices by the Farmers of Two Selected Centres of North Bengal Sugar Mills. M.S. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.

- Pathak, S. and B.C. Sasmal. (1992). Adoption of Jute Technologies. *Indian Journal of Extension Education*, 27(1&2):77-80.
- Podder, S.K. (1999). Adoption of Mehersagar Banana by the Farmers of Gazipur Union under Sahkipur Thana of Tangail District. M.S. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.
- Rahman, M.L. (1995). Farmers Knowledge on Improved Practices of Potato Cultivation. M.S. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.
- Rahman, M.M. (1973). An Investigation into the Factors Related to Adoption of Improved Farm Practices in Transplanted Aman Cultivation in two villages of Mymensingh District. M.Sc. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.
- Rahman, M.S. (2001). Knowledge, Attitude and Adoption of the Farmers Regarding Aalok-6201 Hybrid Rice in Sadar Upazila of Mymensingh District. M.Sc. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.
- Ray, G.L. (1991). *Extension Communication and Management*. Calcutta: Naya Prokash.



- Rogers, E.M. (1995). Diffusion of Innovations. 4<sup>th</sup>ed. New York. The Free Press.
- Sardar, M.H.U. (2002). Adoption of IPM Practices by the Farmers under PETRRA Project of RDRS. M.S. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.
- Sarker, D.C. (1997). Correlates of Selected Characteristics of Potato Growers with their Adoption of Improved Potato Cultivation Practices of Five Villages of Comilla District. M.S. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.
- Sharma, D.K. and Sanoria, Y.C. (1983). Comparative Analysis of Knowledge and Adoption of Contact and Non-contact Farmers of T&V System. Background Papers. Workshop on Management of Transfer of farm Technologies under the Training and Visit System. Rajandarnagar, National Institute of Rural Development, India.
- Singh, S.P., R.S. Hoda and S.N. Laharia. (1992). Factors Affecting the Adoption of Improved Sugarcane Production Technology. A Regression Analysis, Indian Sugar, 42:687-690.
- Sobhan, M.A. (1975). Adoption of Winter Vegetable Cultivation by the Farmers in Boilor Union of Mymensingh District. M.Sc. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.
- Townsend, J.C. (1953). Introduction to Experimental Methods. International Students Edition, New york: McGraw Hill Book Company. Inc.
- Veeranna, K.C. (2000). Adoption of Scientific Goat Rearing Practices by Lambani Tribe. Indian Veterinary Journal, 77:12, 1063-1065.

## APPENDICES

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

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

An interview schedule on “Adoption of Soybean Cultivations by the farmers of Noakhali District of Bangladesh”

Serial No. ....

Name of the respondent.....

Village .....

Union .....

Same Upazila & District .....

Please answer the following questions:

#### 1. Age

How old are you ? .....(years)

#### 2. Educational Qualification

What is the extent of your education ?

a) Don't know reading and writing (.....)

b) Don't know reading and writing but can sign only

(.....)

c) Passed .....class.

### 3. Farm Size

Please furnish area of your land according to use:

Sl. No.	Nature of land	Area	
1.	Homestead (including pond)		
2.	Own land under own cultivation		
3.	Land taken from others on barga		
4.	Land given to others on barga		
5.	Land taken from others on lease		
6.	Others		
Total			

### 4. Annual Income

Please state the income of your family from different sources during the last one year.

#### a) Income from agricultural crops

Sl. No.	Source of income	Total production (kg/unit)	Price per kg/unit (Tk.)	Total price
1.	Soybean			
2.	Rice			
3.	Coconut			
4.	Betelnut			
5.	Vegetables, Pulse crops			
6.	Others			
Sub total (a)				

#### b) Income from livestock and fisheries

Sl. No.	Source of income	Total production (kg/unit)	Price per kg/unit (Tk.)	Total price
1.	Livestock			
2.	Poultry			
3.	Fisheries			
4.	Others			
Sub total (b)				

**c) Income from non-agricultural sources**

Sl. No.	Source of income	Income	
		Monthly income (Tk.)	Annual income (Tk.)
1.	Service		
2.	Business		
3.	Daily labour		
4.	Others		
Sub total (c)			

Grand total = a+b+c = .....Tk.

**5. Extension Contact**

Please state how frequently you contact the following agricultural extension media:

**A) Personal media**

Sl. No.	Name of the information sources	Extent of contact			
		Regularly	Occasionally	Rarely	No at all
1.	Sub-Assistant Agriculture Officer (SAAO)	4-5 times/month	2-3 times/month	1 time/ month	
2.	NGO workers like MCC	3-4 times/month	1-2 times/month	1 time/month	
3.	Officer of other extension agencies (ULO, UFO)	3-4 times/month	1-2 times/month	1-5 times/ year	
4.	Officer of DAE (UAO, AAO, AEO)	4-5 times/year	2-3 times/ year	At least time/ year	
5.	Retailers (fertilizer & insecticide dealers)	4-5 times/year	2-3 times/year	1 time/year	

**B) Group media**

Sl. No.	Name of the information sources	Extent of contact			
		Regularly	Occasionally	Rarely	No at all
1.	Participation in group meeting/discussion	3 times/year or more	1-2 times/year	At least- 1 time/year	
2.	Participation in result demonstration	3 times/year or more	1-2 times/year	1 time/year	
3.	Field day	3 times/year or more	2 times/year	1time/year	

### C) Mass media

Sl. No.	Name of the information sources	Extent of contact			
		Regularly	Occasionally	Rarely	No at all
1.	Listening to agricultural radio programmes	6-8 days/ month	3-5 days/month	1-2 days/month	
2.	Watching agricultural programmes of television	2-3 days/week	1-2 days/week	1 day/week	
3.	Reading printed materials like leaflet, bulletin, magazines etc.	Read 6-8 pieces/ year	3-5 pieces/year	1-2 pieces/year	
4.	Watching agricultural posters, flip charts, advertisement (in newspaper)	6-8 pieces/year	3-5 pieces/year	1-2 pieces/year	
5.	Agricultural fair	1 time/year	1 time/2years	1 time/3years	

### 6. Cosmopolitaness

Please indicate the extent of your visits to the following places:

Sl. No.	Place of visit	Extent of places			
		Frequently	Occasionally	Rarely	No at all
1.	Other villages	7 times or more/month	4-6 times/month	1-3 times/month	time/month (0)
2.	Upazila Agriculture Office	5 times or more/month	3-4 times/month	1-2 times/month	time/month (0)
3.	Other upazila Office	5 times or more/month	3-4 times/month	1-2 times/month	time/month (0)
4.	Own district town	5 times or more/month	2-3 times/month	1-2 times/month	time/month (0)
5.	Other district town	4 times/ year	2-3 times/year	At least- 1 time/year	time/year (0)
6.	Capital city	3 times/year	2 times/ year	At least-1 time/ year	time/in life (0)
7.	NGO Office	>6 times/year	4-5 times/ year	1-3 times/ year	time/ year (0)

## 7. Innovativeness

Indicate the extent of your adoption of the following innovations:

Sl. No.	Name of Practices	Do not use	Duration			
			Within 1 year after listening	Within 2-3 year after listening	Within 4-5 year after listening	Within 6 year and above after listening
1.	Cultivation of Soybean variety					
2.	Use of IPM in Soybean					
3.	Recommended dose of fertilizer					
4.	Use of Urea, TSP, MP & gypsum in Soybean Cultivation					
5.	Use of good quality seed					
6.	Intercropping in soybean field					
7.	Irrigation in soybean field					

## 8. Agricultural knowledge in soybean cultivation practices

Please reply the following questions :

Sl. No.	Questions	Full mark	Mark obtained
1.	What is the suitable soil for soybean cultivation?	2	
2.	Mention the weather condition for soybean cultivation	2	
3.	Name two modern varieties of soybean	2	
4.	Mention the suitable time of soybean cultivation	2	
5.	Mention the suitable application period of fertilizer	2	
6.	Name two harmful insects of soybean	2	
7.	Name two insecticides for controlling the insect of soybean	2	
8.	Name two diseases of soybean	2	
9.	Name two intercropping pattern of soybean	2	
10.	Harvesting time of soybean	2	
11.	Name two bio-fertilizer for soybean	2	

Sl. No.	Questions	Full mark	Mark obtained
12.	Name two chemicals to control disease	2	
13.	Name two methods of soybean cultivation	2	
14.	Name two suitable time of soybean irrigation	2	
15.	Name two period of soybean harvesting.	2	
16.	Mention two methods for intercultural operation of soybean	2	
17.	Name two methods of seed preservation of soybean	2	
18.	What types of organic matter you usually use in soybean field?	2	
19.	Name two methods of seeds sowing	2	
20.	What is about rest of the part of soybeans after collecting seed and oil?	2	

## 9. Adoption of soybean cultivation

### (a) Duration of Soybean cultivation

(Please mention the extent of adoption of the following soybean varieties)

Sl. No	Name of varieties	No adoption	Time of cultivation			
			Up to 5 years	6-10 years	11-15 years	16-20 years
1.	Bangladesh soybean-4					
2.	Shohag					

### (b) Land allotted for Soybean Cultivation

Please mention the amount of following lands that has been used in your soybean field:

Sl. No.	Name of varieties	Effective area (ha.)	Potential area	Not cultivated	Land allotted for Soybean cultivation			
					Low	Medium	High	Very High
1.	Bangladesh Soybean- 4							
2.	Shohag							

## 10. Attitude towards soybean cultivation

Please indicate your agreement with the following statements:

Sl. No.	Statement	Extent of agreement/disagreement				
		Strongly agreed	Agreed	Undecided	Disagreed	Strongly disagreed
1(+)	Less infestation of diseases occurs in soybean cultivation					
2(-)	High cost is involved in soybean cultivation					
3(+)	Effective from insect attack in soybean cultivation					
4(-)	Much yield in soybean production					
5(+)	I support soybean production because it contains a lot of protein					
6(-)	Soybean cultivation is complex					
7(+)	Less irrigation is required for soybean cultivation					
8(+)	Soybean can be grown under less or zero tillage, so I want to cultivate soybean					
9(-)	Soybean threshing is difficult					
10(+)	Soybean is cultivated to mitigate the food crisis caused by flood					
11(-)	I do not like to cultivate soybean as the attack of rodent is intense here					





### 11. Problem confrontation

Please indicate the extent of hindrance caused by the following problems in soybean cultivation :

Sl. No.	Problems	Extent of hindrance caused in farming			
		Very much	Much	Little	Not at all
1.	Less irrigation facilities				
2.	High input cost (seed, fertilizer, pesticide)				
3.	Non available of credit				
4.	Less scope for consuming as food				
5.	Lack of technical information				
6.	Non availability of land for soybean cultivation				
7.	Less scope of marketing				
8.	Less market price of soybean				
9.	Threshing problem				
10.	Non availability of hybrid seed				
11.	Lack of training regarding on pest control				
12.	Less damage caused by the man and animals etc. in soybean				

Thank you for your kind co-operation in collection of data

Date:.....

Signature of the Respondent

\_\_\_\_\_

**APPENDIX- B. Correlation Matrix of the Dependent and Independent Variables (N=110)**

Variables	X <sub>1</sub>	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>	X <sub>5</sub>	X <sub>6</sub>	X <sub>7</sub>	X <sub>8</sub>	X <sub>9</sub>	X <sub>10</sub>
X <sub>1</sub>	1									
X <sub>2</sub>	.052	1								
X <sub>3</sub>	.029	.390**	1							
X <sub>4</sub>	.045	.370**	.839**	1						
X <sub>5</sub>	-.080	.367**	.169	.240*	1					
X <sub>6</sub>	-.015	.524**	.133	.115	.213*	1				
X <sub>7</sub>	.045	.916**	.438**	.395**	.339**	.451**	1			
X <sub>8</sub>	.037	.945**	.378**	.345**	.364**	.470**	.841**	1		
X <sub>9</sub>	.079	.907**	.340**	.284**	.345**	.519**	.845**	.858**	1	
X <sub>10</sub>	.058	.168	.154	.346**	.082	.046	.130	.195*	.095	1

\* Significant at 0.05 level of probability;

\*\* Significant at 0.01 level of probability

<sup>NS</sup> = Non-significant

X<sub>1</sub> = Age

X<sub>2</sub> = Education

X<sub>3</sub> = Farm Size

X<sub>4</sub> = Annual family income

X<sub>5</sub> = Extension Contact

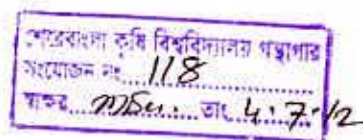
X<sub>6</sub> = Cosmopolitaness

X<sub>7</sub> = Innovativeness

X<sub>8</sub> = Agricultural knowledge

X<sub>9</sub> = Attitude

X<sub>10</sub> = Adoption



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