ADOPTION OF BRRI DHAN 40 BY THE FARMERS OF NOAKHALI DISTRICT

By

NADIA AFREEN CHOWDHURY

Reg. No. 06-02052

A Thesis

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**

SEMESTER: JANUARY-JUNE, 2013

Approved By
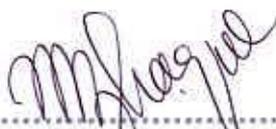
....
(Prof. M. Zahidul Haque)
Supervisor

....
(Mohammad Zamshed Alam)
**Co-Supervisor**
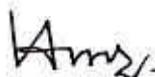
....
(Prof. Dr. Md. Sekendar Ali)
Chairman
Examination Committee

CERTIFICATE

This is to certify that thesis entitled, **"ADOPTION OF BRRI DHAN 40 BY THE FARMERS OF NOAKHALI DISTRICT"** submitted to the Faculty of Agriculture, Sher-e-Bangla Agricultural University, Dhaka, in partial fulfillment of the requirements for the degree of **MASTER OF SCIENCE** in **AGRICULTURAL EXTENSION AND INFORMATION SYSTEM,** embodies the result of a piece of *bona fide* research work carried out by **NADIA AFREEN CHOWDHURY**, Registration No. **06-02052** under my supervision and guidance. No part of the thesis has been submitted for any other degree or diploma.

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

Dated:
Dhaka, Bangladesh
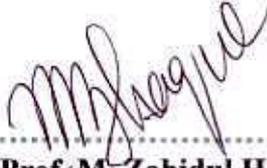
(Prof. M. Zahidul Haque)
Supervisor
Department of Agricultural Extension
and Information System
Sher-e-Bangla Agricultural University,
Dhaka

**DEDICATED
TO
MY BELOVED PARENTS**

ACKNOWLEDGEMENTS

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDIXES

ADOPTION OF BRRI DHAN 40 BY THE FARMERS OF NOAKHALI DISTRICT

By

Nadia Afreen Chowdhury

ABSTRACT

The main purpose of the study was to determine the extent of adoption of BRRI dhan 40 by the farmers of Noakhali district and to explore the relationship between the selected characteristics of the farmers and their adoption of BRRI dhan 40. The study was conducted in three villages of Dharmapur Union under Sadar Upazila of Noakhali District. A list of 279 BRRI dhan 40 growers was prepared with the help of respective SAAO and Agricultural Extension Officer of the Upazila and out of a list of 279 farmers 84 farmers were selected at random. Data were collected during 1st June to 30th June, 2013. Pearson's correlation co-efficient was used to explore the relationship between the selected characteristics of the farmers and their adoption of BRRI dhan 40. Findings showed that highest proportion (58.33 percent) of the farmers categorized into medium adoption category while 20.24 percent into low adoption category and 21.43 percent in high adoption category. Out of nine independent variables, farmer's education, rice cultivation knowledge and innovativeness had significant positive relationship with their adoption of BRRI dhan 40. On the other hand age, farm size, annual income, extension contact, organizational participation and training exposure of the farmers had no relationship with their adoption of BRRI dhan 40.
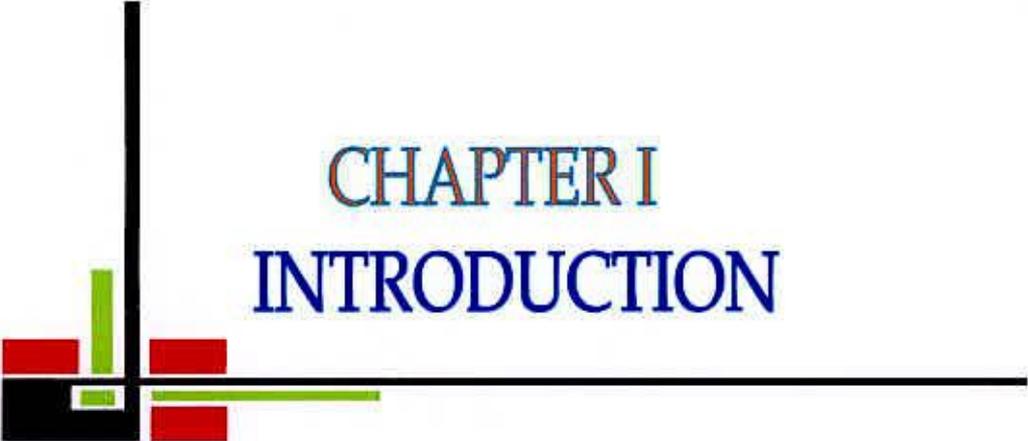
CHAPTER I
INTRODUCTION

CHAPTER I

INTRODUCTION

1.1 General Background

Bangladesh is a developing country with an area of 1,47,570 sq. km. The population of Bangladesh is 150 millions. About 76.70 percent of its populations live in rural areas and 48.10 percent are engaged in agriculture (BBS, 2011). The economy of the country is predominantly agrarian accounting 20.24 percent of GDP in the year 2011-2012 (BBS, 2011). So, agriculture plays a vital role in employment, poverty alleviation, food security, standard of living and increase of earnings.

Rice is the staple food and important source of nutrition occupying 72 percent of the total cultivable land (BBS, 2011) and constitutes 82 percent of the food grains production in Bangladesh. Currently the average yield of rice in Bangladesh is around 2.91 ton/ha (BBS, 2011) which is much below than those of Korea, Japan and China. Aman rice area shows a slow increasing trend and shares about 30.75 percent of total rice production (BBS, 2011).

Bangladesh is the fourth largest rice producing country in the world, following China, India and Indonesia (FAO, 2010). Rice plays an important role in the economy of Bangladesh. The country is approaching near to the self-sufficiency in rice production still there is some shortage of food. The country imports 34.54 lac M. tons of food (0.91 lac M. tons rice and 33.62 lac M. tons wheat) in the year 2009-10 (Bangladesh Economic Review, 2011). At least for food security purpose the rice production should be increased continuously.

Bangladesh has three main rice growing seasons which are Aus, Aman and Boro. In Aman season many varieties are cultivated in Bangladesh such as BR 3 (Biplob), BR 4 (Brrishail), BR 5 (Dulavog), BR 10 (Progoti), BR 11 (Mukta), BR 22 (Kiron), BR 23 (Dishari), BR 25 (Naya Paijam), BRRI dhan 30, 31, 32, 33, 34, 37, 38, 39, 40, 41, 44, 46, 49, 51, 52, 53, 54, 56 and BRRI dhan 57. Some varieties were developed for saline area and some for coastal area. Among these, BRRI dhan 40 is being cultivated in southern region of Bangladesh including Noakhali District in Aman season as T. Aman.

BRRI dhan 40 was developed in 2003 for saline area of Bangladesh. This is a photosensitive variety. The life duration of the variety is 145 days. The plant attains a height of about 115 cm. Stem is strong and sometimes it bears own at the tip of the grain. Seedling age for transplant is 30-40 days. At seedling stage it can tolerate 8 ds/m i.e., medium level of salinity. Supplementary irrigation is required until the grain become hard. It yields about 4.5 ton/ha (Anonymous, 2012).

History evidence that the scientific innovation have a large decisive impact on rice production in countries like Japan, Philippines, Indonesia and Vietnam. It is very likely that the farmers of Bangladesh will produce similar results if they adopt modern technologies and use adequate and productive input on their land.

An individual usually doesn't adopt a new variety unless he finds its higher yield compared to the existing varieties cultivating in their land. Farmers of Noakhali district for the last couple of years are cultivating BRRI dhan 40 with expectation of high yield and other benefits. There are no much advertisements for promoting the variety, but farmers are practicing it. A number of selected characteristics of the

farmers are involved in adoption of this variety. But there is no study to know how much those characteristics influence the farmers to adopt BRRI dhan 40. Therefore, the researcher felt necessity to conduct a research entitled, "Adoption of BRRI dhan 40 by the farmers of Noakhali district".

1.2 Statement of the Problem

Increase in production of rice for the growing population of Bangladesh can be ensured to a greater extent by the cultivation of high yielding varieties (HYV). The adoption of different practice depends on its dissemination among the potential users that is measured by the level of adoption of those practices. Bangladesh Rice Research Institute (BRRI) and Bangladesh Institute of Nuclear Agriculture (BINA) develop about 60 rice varieties. Among these BRRI dhan 40 is suitable for saline area. For wider adoption of this variety, it is necessary to have an understanding of the present status of adoption of the same.

Considering the needs for understanding the adoption status of the farmers, the researcher undertook a piece of study entitled, "Adoption of BRRI dhan 40 by the farmers of Noakhali district", with the following research questions:

1. What are the characteristics of the BRRI dhan 40 growers?

2. To what extent BRRI dhan 40 was adopted by the farmers?

3. Is there any relationship between the characteristics of the farmers and their adoption of BRRI dhan 40?

1.3 Objectives of the Study

The following specific objectives were formulated for giving proper direction of the study.

1. To determine and describe the following characteristics of the BRRI dhan 40 growers:

   a) Age
   b) Education
   c) Farm size
   d) Annual income
   e) Rice cultivation knowledge
   f) Extension contact
   g) Organizational participation
   h) Training exposure and
   i) Innovativeness

2. To determine the extent of adoption of BRRI dhan 40 by the farmers of Noakhali district.

3. To explore the relationship between the selected characteristics of the farmers and their adoption of BRRI dhan 40.

1.4 Justification of the Study

In Bangladesh, there are three growing seasons as Aus, Aman and Boro. Among them maximum production was obtained from Aman season. At present, there is a significant gap between the target and achievement of Aman production. It is obviously true that farmers are the key elements of adoption of BRRI dhan 40. At present there is a lack of adequate information to influence the farmers of Noakhali district to adopt this variety. This fact indicates that the need for an investigation to

ascertain the relationship of the selected characteristics of the farmers with their adoption of BRRI dhan 40.

Findings of this study will be helpful for BRRI scientists, extension officers of DAE and the government as well. From the study, scientists can understand how useful their cultivar, extension officer can understand the extent of adoption of the variety government can prepare a future food policy.

1.5 Assumptions of the Study

An assumption is the supposition that an apparent fact or principle is true in the light of the available evidence (Goode and Hatt, 1952). That means the assumption is taken as a fact or belief to be true. While undertaking this research the researcher possessed the following assumptions in mind:

1. The respondents included in the sample are competent to furnish proper responses to the items included in the interview schedule.

2. The researcher was well adapted with the study area, its culture and capable of collect data with utmost care which can be treated as reliable.

3. The responses furnished by the respondents were accurate, valid and they expressed their opinion on adoption of BRRI dhan 40.

4. The adoption of BRRI dhan 40 was linearly related with selected characteristics of the farmers.

5. Views and opinions furnished by the farmers were confined as representative opinions of the population of the study area.

6. The findings of the study would be useful for planning and execution of the programs in connection with diffusion of BRRI dhan 40.

1.6 Limitations of the Study

In order to keep the study under manageable limit, the following limitations were recognized:

1. The research was cramped to three villages of Dharmapur union under Sadar upazila of Noakhali district.

2. The major area of investigation was mostly confined to farmer's adoption of BRRI dhan 40.

3. Only the rice growers who cultivated BRRI dhan 40 were selected for this study.

4. Population of the present study was kept confined within the heads of farm families in the study area as they are the decision maker in their families in respect of adoption of BRRI dhan 40.

5. The investigator depended on the data furnished by the selected farmers during their interview.

6. Facts and information collected by the researcher were applicable to the present situation in the selected area.

1.7 Definition of Related Terms

A number of terms were used throughout the study. In order to avoid confusion and misunderstanding the terms were defined as stated below:

Adoption

Adoption is a psychological process by which individuals make decision to practice an innovation passing through some sequential events viz. knowledge, persuasion, decision, implementation, confirmation. According to Ray (1991), "When an

individual takes up a new idea as the best course of action and practice it, the phenomenon is known as adoption".

BRRI dhan 40

BRRI dhan 40 was developed in 2003 for saline area of Bangladesh. This is a photosensitive variety. The life duration of the variety is 145 days. The plant attains a height of about 115 cm. Stem is strong and sometimes it bears own at the tip of the grain. Seedling age for transplant is 30-40 days. At seedling stage it can tolerate 8 ds/m i.e., medium level of salinity. Supplementary irrigation is required until the grain become hard. It yields about 4.5 ton/ha (Anonymous, 2012).

Age

Age of a farmer referred to the period of time in complete years from his/her birth to the time of interview. Generally age of the potential adopter influences upon her/his innovation decision. It is measured in terms of years.

Education

Level of education of an individual farmer was defined as the formal education received up to certain level from an educational institute (e.g. School, College and University) at the time of interview. Education directly influences upon the potential adopters for innovation decision.

Farm Size

Farm size refers to the total area of land possessed by a respondent farmer through different land tenure system such as own land under cultivation, land given to

others as borga, land taken from others as borga, land taken as lease etc. The area being estimated in terms of full benefit to his/her family.

Annual income

Annual income referred to the total annual earnings of all the family members of a respondent from agriculture, livestock, fisheries and other accessible sources (business, service, daily working etc) during a year.

Rice Cultivation Knowledge

Knowledge is a body of conceptual understanding about a subject possessed by an individual. Rice cultivation knowledge is the extent of basic understanding of the farmers about rice cultivation.

Extension Contact

Extension contact refers to the respondent farmer's exposure to the communication channels by the extension services (Bhuiyan, 2012).

Organizational participation

Organizational participation of an individual refers to his direct contact with various organizations within a specific period of time. An individual could take part in various activities of organization as ordinary member, executive committee member or officer (president, secretary etc.). All these forms of participation were considered to operationalized the variable.

Training exposure

It refers to the total number of days attended by the respondent in his/her life to the training on various subject matter.

Innovativeness

Innovativeness is the degree to which an individual is relatively earlier in adopting agricultural innovations, new ideas, practices and things than the other member of a social system (Rogers, 1995). This was comprehended by the quickness of accepting innovations by an individual in relation to others and was measured on the basis of time dimension.

CHAPTER II
REVIEW OF LITERATURE

CHAPTER II
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 the above purpose. The research or attempted to search the literatures on a number of studies have been conducted on the adoption of innovations by the farmers. There was no literature directly related to the present research. Therefore, the researcher searched relevant researches conducted by different scientists and authors on the adoption of BRRI dhan 40. This chapter is divided into three major sections, the first section deals with the review of literature on general context of adoption, the second section deals with the relationship between farmer's characteristics and their adoption of BRRI dhan 40 or related innovations and the third section deals with the conceptual framework of the study.

2.1 Review of Literature on General Context of Adoption

Rahman (1974) studied on the adoption of IR-20 variety of paddy by the farmers in Bhabakhali union of Mymensingh district. He found that 69 percent of the growers had medium and low adoption of IR-20 while 31 percent of the growers did not adopt the innovation. Compared to previous literature it can be concluded that adoption rate had been increased with the passage of time.

Sobhan (1975) carried out a study on extent of adoption of ten winter vegetables namely tomato, radish, lettuce, potato etc. in Boilor union of Mymensingh district. Overall adoption scores indicated that 27 percent of the farmers did not adopt

winter vegetables cultivation while 48 percent had low adoption and 25 percent high adoption.

Razzaque (1977) said that he studied on the extent of adoption of HYV rice in three villages of Bangladesh Agricultural University Extension Project Area. He observed that among the respondent growers, majority of the respondents (40 percent) had low adoption followed by 33.3 percent medium and only 6.6 percent high adoption.

Hossain (1981) studied on the relationships of the farmers (Jute growers) with their adoption of improved practices of Jute cultivation. He found that more than half (54 percent) of the respondents had medium adoption of the improved practices compared to 31 percent having high adoption and 15 percent low adoption.

Hossain (1983) studied on the extent of adoption of HYV rice as transplanted Aman and other related aspect in Bhabalhali union of Mymensingh district. He observed that among the respondent farmers, 54 percent had high adoption of HYV rice and 46 percent had medium adoption.

Karim and Mahboob (1986) studied on the adoption of HYV wheat in Kushtia union of Mymensingh district. They found that among the respondent wheat farmers 74 percent adopted HYV wheat cultivation and 26 percent farmers were non-adopters.

Rahman (1986) conducted a research on the extent of adoption of four improved practices which were, use of fertilizers, line sowing, irrigation and use of insecticides in transplanted Aman rice cultivation in two villages of Mymensingh

District. It was revealed from the findings that 22 percent of the farmers adopted all the four practices compared to 49 percent adopted three practices, 22 percent adopted two practices and 5 percent adopted only one practice. It was observed from the findings that majority of the people yet to be adopted improved Aman cultivation practices.

Singh *et al.* (1992) undertook a research 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 were partial adopters of scientific recommendations of sugarcane production technology.

Haque (1993) studied the adoption of BR14 during boro season. He found that 70.2 percent of the farmer had medium adoption of BR14, 9.6 percent had no adoption, 3.4 percent had low adoption and 16 percent of farmer had high adoption category.

Hasan (1996) in his study said that the highest proportion (44 percent) of the respondents had medium adoption compared to 26 percent low adoption and 30 percent high adoption of selected agricultural technologies.

Alam (1998) said that he carried out an investigation on the adoption of HYV rice cultivation in Gazipur district. His study revealed that 40 percent had medium adoption, 32 percent had low and 28 percent had high adoption.

Rahman (1999) studied the adoption of balanced fertilizer by the Boro rice farmers of Ishwarganj thana. He found that the extent of use of balanced nitrogenous fertilizer, 48.57 percent of the farmers had optimum adoption and above optimum respectively. In respect of extent of use of balanced phosphoric fertilizer, 79.05

percent of the farmers had below optimum adoption compared to 20.95 percent having optimum adoption. Regarding the extent of use of balanced Potassic fertilizer, 80.95 percent of the farmers had below optimum adoption compare to 18.10 and 0.95 percent having optimum and above optimum adoption, respectively.

Podder and Kashem (2000) studied on, Use of Extension Contact Media by the farmers in the Adoption of Mehersagar banana. They concluded that about half (47 percent) of the growers had medium adoption compare to 14 percent low adoption and 39 percent high adoption of Mehersagar banana.

Hossain (2003) in his study found that majority (67 percent) of the Boro rice farmers had medium adoption, 17 percent had low adoption and 16 percent had high adoption of modern Boro rice cultivation practices.

Hossain (2004) found that majority (77 percent) of the Boro rice farmer had medium adoption, 5 percent had low adoption and 18 percent high adoption of modern Boro rice cultivation practices.

Hoque (2005) said that he carried out a research study on the adoption of selected modern rice varieties by the farmers in three selected villages of Sadar upazila of Mymensingh district. He observed that majority (63 percent) of the rice growers had medium adoption while 20 percent and 17 percent rice growers had low and higher adoption respectively of selected modern rice varieties.

Kabir (2006) conducted a study on adoption of selected T. Aman production technologies by the farmers and he found that 80 percent of the farmers had medium to high adoption while 20 percent of the farmers had low adoption. That is,

all the farmers of the study had appreciable adoption behavior of T. Aman production technologies.

Hossain (2006) revealed the highest proportion (49 percent) of farmers fell under medium adoption category, while 26 percent had high adoption and 25 percent had low adoption of selected high yielding varieties of rice.

Mausd (2006) studied on adoption of high yielding varieties of rice by the farmers in Sonaimuri (Begumganj) Upazila under Noakhali district. In his study he revealed that the highest proportion (52 percent) of farmers fell under the high adoption category, while (40 percent) had medium adoption and (8 percent) had low adoption.

Islam (2007) made a study on adoption of BRRI dhan 29 production technologies by the farmers and found that about three-fourths of the respondent farmers fell under high adoption category while about one fifth of the respondents had (26 percent) medium adoption. Thus, the cent percent of the farmers had medium to high adoption.

Moni (2008) carried out a study on the attributes influencing the adoption of Haridhan by the farmers of Jhinaidah district. In his study he found that almost one half (49.5 percent) of the respondents had medium adoption compared to 17.2 percent had low adoption and 33.3 percent high adoption.

Nipa (2012) studied on factors affecting adoption of BRRI dhan 44 by the farmers of Barisal district. In her study she found that, the majority portion of the farmers belonged to medium adoption (45.45 percent) category. Only a small portion (12.73

percent) was in high adoption category. Almost equal proportion (41.82 percent) was found to be in low adoption category.

2.2 Selected Characteristics of the Farmers and their Adoption of BRRI dhan 40
2.2.1 Age and Adoption

Hossain (1991) conducted a study to determine the relationship of farmers' characteristics with their adoption behavior of improved farm practices in Sadar thana of Jamalpur district. He reported that age of the wheat growers significantly influenced the adoption of improved farm practices.

Pathak and Sasmal (1992) observed that there was positive relationship between the age of the farmers and their adoption of jute technologies.

Islam (1993) observed that there was no relationship between the age of potato growers and their adoption of improved practices in potato cultivation.

Rahman (2001) conducted a study on knowledge, attitude and adoption of the farmers regarding Aalok 6201 hybrid rice in Sadar upazila of Mymensingh district. He found that family size of the farmers had no significant relationship with their adoption regarding Aalok 6201 hybrid rice.

Sardar (2002) found that the age of the farmers had positive significant negative correlation with their adoption of IPM practices.

Khan (2002) found no significant relationship between farmers' age and adoption of Binashail rice in his study. Hossain (2003), Mamun (2006), Masud (2006) and Islam (2007) also found similar results.

2.2.2 Education and Adoption

Gangadharappa (1981) in his research on trained and untrained farmers found positive relationship between farmers' education and their adoption behavior.

Hossian (1983) in his study that education of the T-Aman growers of Bhabakhali Union of Mymensingh district had no significant relationship with the adoption of HYV paddy.

Ali *et al*. (1986) in their study found that education had highly significant and positive relation with the adoption of improved sugarcane production technologies.

Kaur (1988) found that education influenced the opinion of the women about adoption of vegetable gardening, animal husbandry etc.

Hasan (1996) concluded a study on adoption of some selected agricultural technologies among the farmers as perceived by the frontline GO and NGO workers. He observed that education have no significant relationship with the perceived adoption of selected agricultural technologies.

Paul (2000) conducted his study to determine farmers' attitude towards Urea Super Granule and found the positive relationship between farmers' education and their attitude towards USG.

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

Khan (2002) found in his study that farmers' education had significant relationship with their adoption of Binashail rice variety.

Haque (2005) revealed that education of the farmers had a significant and positive relationship with their adoption of modern rice varieties. Similar results were found by Hossain (2006), Kabir (2006), Masud (2006) and Islam (2007).

2.2.3 Farm Size and Adoption

Hosssain (1983) fond that size of the farm of Transplanted Aman farmers in Bhabakhali union of Mymensingh district had a negative relationship with their adoption of HYV T-Aman rice.

Karim *et al.* (1987) carried out a study on the attitude of farmers towards the use of urea in jute cultivation and found that farm size of the farmers had significant and positive relationship with their attitude towards the use of urea.

Bavaltti and Sundarswamy (1990) found no significant relationship between land holding of the contact growers and their adoption of improved farm practices.

Pal (1995) conducted a research study on adoption of sugarcane cultivation practices by the farmers. He observed the significant and positive relationship between the farm size of the respondent farmers and their adoption of sugarcane cultivation practices.

Alam (1997) studied the use of improved farm practices in rice cultivation by the farmers. The findings of the study showed that the farm size had a significant relationship with their use of improved farm practices in rice cultivation.

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

Hossain (2003) made an investigation in Mymensingh district and found that annual income of the farmers had a negative relationship with their adoption of HYV rice as transplanted Aman.

Hossain (2004) concluded that farm size of the farmers had a significant and positive relationship with their adoption and modern Boro rice cultivation practices.

Haque (2005) conducted a study to determine the relationship of farmers' characteristics with their adoption of modern rice varieties in Sadar thana of Mymensingh district. He reported that family size of the rice growers were not related with the adoption of farming technologies.

Masud (2006) found no significant relationship between farm size of the farmers and their adoption of selected HYV rice

Talukder (2006) conducted a study to determine a relationship of farmers' characteristics with their adoption of selected rice cultivation practices in Char-land of Gomoti River. He reported that farm size of the rice growers had significant and positive relationship with the adoption of selected rice cultivation practices. Islam (2007) also found similar result.

2.2.4 Annual Income and Adoption

Hossain (1983) made an investigation in Mymensingh district and found that annual income of farmers had a negative relationship with their adoption of HYV rice as transplanted Aman. The finding reveals that with the increase of annual income adoption of HYV rice as transplanted Aman decreased.

Pal (1995) said that in his study he found a positive and 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 respondent had a positively significant relationship with their adoption of BINA technologies. Similar findings were reported by Sarkar (1997) and Alam (1997) about relationship between annual income and adoption of improved technologies.

Paul (2000) observed that respondents' annual income had no relationship with the attitude to the use of Urea Super Granule.

Hoque (2005) conducted a study to determine the relationship of farmers' characteristics with their adoption of modern rice varieties in Sadar thana of Mymensing district. He reported that annual income of the rice growers had significant and positive relation with the adoption of modern rice varieties.

Hossain (2006) revealed that annual income of the farmers had a significant relationship with their adoption at selected HYV rice cultivation practices. Hussen (2001), Rahman (2001), Aurangozeb (2002), Hossain (2003), Kabir (2006), Masud

(2006), Talukder (2006), Mamun (2006) and Islam (2007) also found similar result in their studies.

Nipa (2012) found that annual income of the farmers of Barisal district had no significant relationship with their adoption of BRRI dhan 44.

2.2.5 Rice Cultivation Knowledge and Adoption

Koch (1985) conducted a study in the North Western organize free state, South Africa concerning perception of agricultural innovations aspiration, knowledge and innovation adoption. He observed that there was a strong positive relationship between knowledge and practice adoption.

Reddy *et al.* (1987) found that the significant association between knowledge and use of improved package of practices in paddy production by participant and non participant farmers.

Rahman (1995) in his study he observed no significant relationship between farmers' adoption of improved practices and their knowledge on improved practices of potato cultivation.

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

Sarker (1997) found a positive and significant relationship with potato production knowledge of potato growers and their adoption of improved potato cultivation practices.

Haque (2003) concluded in his study that knowledge in maize cultivation of the farmers had a significant positive relationship with their adoption of modern maize cultivation technologies.

Hossain (2006) in his study said that knowledge on HYV rice is very much positive and significant relationship with adoption of selected HYV rice. Talukder (2006), Mamun (2006) and Nipa (2012) also found similar results.

2.2.6 Extension Contact and Adoption

Bezbora (1980) studied on adoption of improved agricultural technology by the farmers of Assam. The study indicated that there was a positive relationship between extension contact and adoption of improved cultivation practices.

Osunloogun *et al.* (1986) studied adoption of improved agricultural practices by cooperative farmers in Nigeria. The findings of the study indicated a positive relationship between extension contact and adoption of improved practices.

Rahman (1986) conducted a study on correlates of adoption of improved practices in transplanted Aman rice by the farmers. He observed a significant and positive relationship between the farmers' extension contact and their adoption of improved practices in transplanted Aman rice.

Heong (1990) observed that the lack of adoption of IPM technologies in rice was frequently attributed to lack of sufficient extension.

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 between extension contact and farmers with their use of improved rice cultivation practices.

Paul (2000) observed that respondents' extent of media contact had significant relationship with the attitude to the use of Urea Super Granule.

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

Hoque (2005) conducted a study to determine the relationship of farmers' characteristics with their adoption of modern rice varieties in Sadar thana of Mymensingh district. He reported that extension contact of the rice growers had significant and positive relation with the adoption of modern rice varieties.

Talukdar (2006) concluded that the extension contact of the farmers had positive significant relationship with their adoption of selected rice production practices by the farmers of Char-land of Gomoti River. Kabir (2006), Masud (2006) and Islam (2007) also found similar result.

2.2.7 Organizational Participation and Adoption

Ahmed (1974) concluded that there is a relationship between organizational participation of the farmers and their agricultural knowledge.

Sobhan (1975) stated on the basis of his study that the organizational participation of the farmers had no significant effect on the adoption of winter vegetable cultivation.

Hossain (1983) said that in his study he found organizational participation of transplanted aman growers had no relationship with their adoption of HYV rice.

Karim *et al.* (1987) revealed in his study that the social participation of the farmers had no significant relationship with their attitude to the use of urea in jute cultivation.

Kher (1992) said that he carried out a research study on the adoption of improved wheat cultivation practices by the farmers of selected village of Rajouri block, India. He observed that there was no significant relationship between the farmers' social participation and their adoption of improved wheat cultivation practices.

Rahman (1995) in his study found that organizational participation of potato growers had no relationship with their knowledge regarding improved practices of potato cultivation.

Hossain (2003) concluded that organizational participation of the farmers had no significant relationship with their adoption of modern Boro rice cultivation. Hossain (2006), Talukdar (2006), Islam (2007) and Nipa (2012) also found similar result.

Masud (2006) found a positively significant relationship between organizational participation of the farmers and their adoption of HYV rice varieties by the farmers of Sonaimuri (Begumganj) Upazila under Noakhali district.

2.2.8 Training Exposure and Adoption

Hussen (2001) conducted a research study on farmers' knowledge and adoption of modern sugarcane cultivation practices. He observed that the agricultural training

experience of the growers had a positive significant relationship with their adoption of modern sugarcane cultivation practices.

Rahman (2001) observed in study that training received of the farmers had a significant and positive relationship with their adoption regarding Aalok 6201 hybrid rice.

Haque (2003) found that training received of the respondent had a positive significant relationship with their adoption of modern maize cultivation technologies.

2.2.9 Innovativeness and Adoption

Kashem and Halim (1991) repotted that innovativeness of the farmers had significant positive correlation with their adoption of modern rice technology use of communication media in live stock production.

Hossain (1999) found positive significant relationship between innovativeness of the farmer and their adoption of fertilizer and also observed no relationship with adoption pesticide.

Rahman (2003) revealed that the highest proportion (63 percent) at the farmers had low innovativeness as compared to 22 percent medium innovativeness and 15 percent very low innovativeness.

Kabir (2006) studied on adoption of selected T. Aman production technologies by the farmers and found a positive and highly significant relationship between innovativeness of the farmers and adoption of T. Aman production technologies.

2.3. The Conceptual Framework of the study

In scientific research, selection and measurement of variables constitute an important task. The hypothesis of a research while constructed properly contains at least two important elements i.e. "a dependent variable" and "an independent variable". Independent variables which included age, education, farm size, annual income, rice cultivation knowledge, extension contact, organizational participation, training exposure and innovativeness and the dependent variable was adoption of BRRI dhan 40. Based on this discussion and the review of literature the conceptual framework of the study has been formulated and shown in the Figure 2.1.
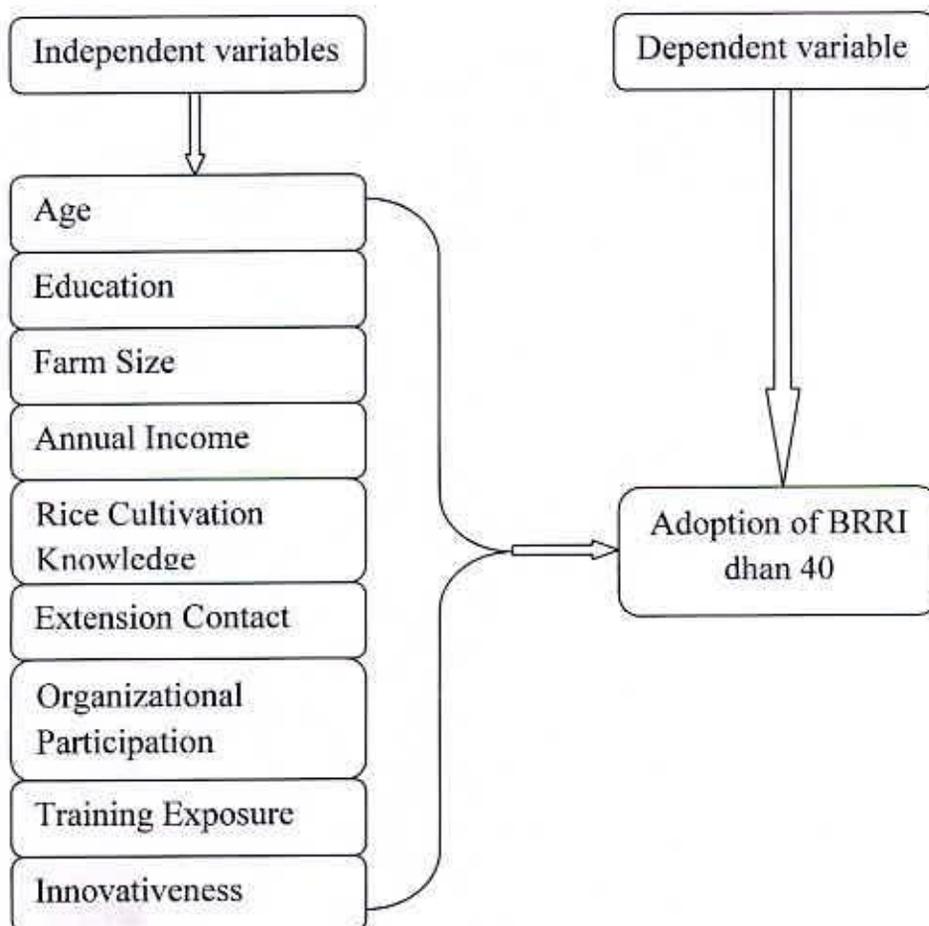
Figure 2.1 The Conceptual Framework of the Study

CHAPTER III
METHODOLOGY

CHAPTER III
METHODOLOGY

Methodology refers to the methods and procedures in the research work. In any research work methodology should be appropriate so that the researcher will be able to collect necessary data and analyze them in an apposite way. Methods and procedures followed in conducting the study have been discussed in this chapter. Further, the chapter includes the operational format and comparative reflection of some variables used in the study. Also statistical methods and their use have been mentioned in the section of this chapter.

3.1. Locale of the study

Sadar upazila of Noakhali district was purposefully selected as locale of the study. This Upazila has thirteen Unions; out of them Dharmapur Union was purposively selected. Dharmapur Union consists of five villages. Out of these, three villages namely Dharmapur, Vatirtake and Char Darbesh were randomly selected. A map of Noakhali Sadar upazila is presented in Figure 3.1.

3.2 Design of the Study

The design of the study was a descriptive survey research. It was designed to describe the relationship between selected characteristics of the farmers and their extent of adoption of BRRI dhan 40.
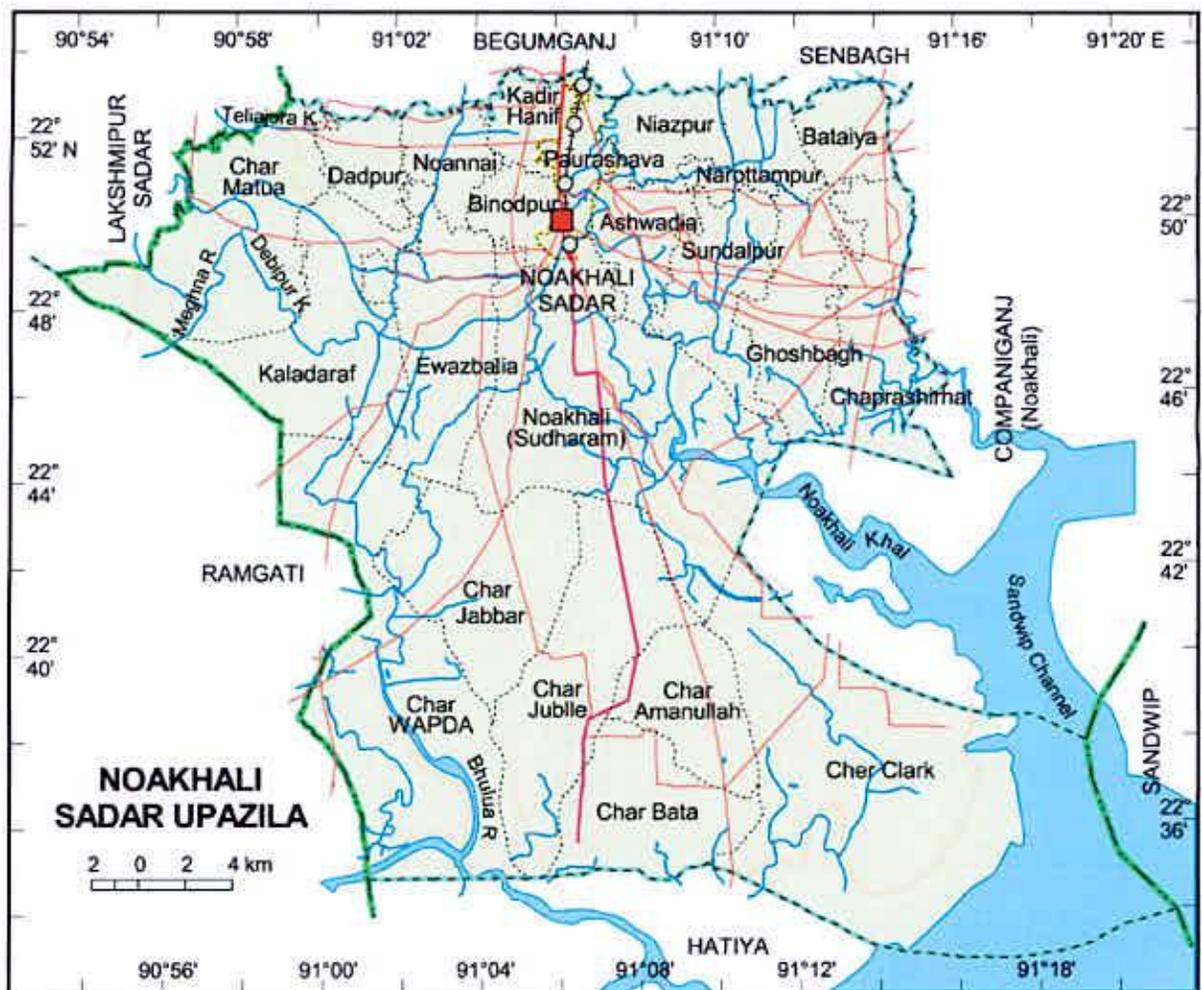
Figure 3.1 Map Showing the Noakhali Sadar Upazila

3.3 Population and Sampling

An up to date list of all farm family heads cultivating BRRI dhan 40 of the selected villages were prepared with the help of pilot survey and Sub-Assistant Agriculture Officer (SAAO). The list comprised a total of 279 farmers in the study area. These farmers constituted the population of this study. There were 103 farmers in Dharmapur, 97 farmers in Vatirtake and 79 farmers in Char Darbesh. 30 (Thirty) percent of the population of each village was randomly selected as representative sample by using random number. Thus, the sample size for Dharmapur was 31, Vatirtake 29 and that of Char Darbesh was 24 making the total sample size of 84

farmers. In addition to that, 3 percent of the population was selected randomly and proportionately from each of selected villages. Thus, the additional sample, so drawn stood 8 farmers, which were included in the reserve list. In case, the individuals included in the original samples were not available or not found suitable at the time of data collection, the farmers of the reserve list were used for the purpose. The distribution of the farmers included in the population, sample and those in the reserve list appears in Table 3.1.

Table 3.1. Distribution of population, sample and reserve list of respondents in three selected villages of Dharmapur union under Sadar Upazila of Noakhali District

Sl. No.	Name of the Villages	Population	Sample Size	Number of Farmers in the Reserve List
01	Dharmapur	103	31	3
02	Vatirtake	97	29	3
03	Char Darbesh	79	24	2
	Total	279	84	8

3.4 Data Collection Procedure

In order to collect relevant information from respondents, an interview schedule was carefully designed focusing the objectives of the study with the assistance of the supervisor. The interview schedule was pre-tested before final data collection. Based on the pre-test experience, necessary correction, addition, alternation and rearrangements were made. Thus the interview schedule was prepared for final use. The interview schedule was multiplied as per requirement. The English version of the interview schedule was enclosed in Appendix A.

Data were collected personally by the researcher herself by interviewing the sample of BRRI dhan 40 growers with the help of an interview schedule. The researcher made all possible efforts to explain the purpose of the study to the farmers. Data were collected during the period from 1st June to 30th June, 2013. The collected raw data were examined thoroughly to detect errors and omission. Having consulted with the research supervisor, a detailed coding plan was made. Data were coded into a coding sheet. Local units were converted to the standard units. Qualitative data were converted into quantitative from by means of suitable scoring techniques for the purpose of analysis.

3.5 Measurement of Variables

In order to conduct a study in accordance with the objectives it is necessary to measure the variables. The procedure of measuring the variables has been discussed below:

3.5.1 Measurement of Independent Variables

The independent variables of the study include 9 selected characteristics of the respondent farmers. These characteristics were: age, education, farm size, annual income, rice cultivation knowledge, extension contact, organizational participation, training exposure and innovativeness. Procedure for measuring independent variables has been discussed below:

Age: The 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. For example, if any respondent's age was 35 years then he has given a score of 35.

Education: Education score of a respondent was measured in terms of the year of schooling completed by the respondent farmer. A score of 0.5 was assigned for the respondent who can sign only, one was assigned for each year of schooling and zero (0) for the respondents who can't read and write.

Farm Size: Farm size was measured as the size of his farm (including BRRI dhan 40 and other crops) on which he continued his farming operations during the period of study. It included the area of farm owned by him as well as those obtained from others as borga, lease etc. The area was being estimated in terms of full benefit to the growers in term of hectare. Actual size of the farm was considered as the score of the farm size. For example if a respondent had 1.00 ha of land then his score was one (1). The farm size of a respondent was measured by using the following formula:

$$FS = A_1 + A_2 + 1/2(A_3 + A_4) + A_5$$

Where

        FS = Farm size
        A_1 = Land under own cultivation
        A_2 = Homestead area including pond
        A_3 = Land given to others on share cropping
        A_4 = Land taken from others on share cropping
        A_5 = Land taken from others on lease

Annual Income: Annual income of a respondent was measured in Taka on the basis of his yearly earning. All of his crops yields of previous year were converted into Taka according to prevailing market price. The price of other enterprise (livestock, poultry and fisheries) was also added to the annual income. Earnings from non agricultural sectors (business, service, labor etc.) of a respondent were also included in the income computation. For calculation of income score, one

score was assigned for each one thousand ('000') taka. For example if a respondent mentioned that his annual family income is 50,000 then his annual family income score would be 50.

Rice Cultivation Knowledge: Rice cultivation knowledge of the respondents was measured by asking 10 (ten) selected questions and two (2) marks were assigned for each of the question. Full marks was given for fully correct answer and partial score was given for partially correct answer, whereas wrong answer was given 0 (zero). Rice cultivation knowledge score of the respondents could range from 0-20 while '0' indicate very low knowledge and '20' indicate very high knowledge on rice cultivation.

Extension Contact: The extension contact of the farmers was measured by the frequency of contact with 14 extension communication media. Each of the respondents was asked to mention their frequency of contact with different media. To compute the extension contact a scale was developed with 6 options. Here the score was measured as 0 for not at all, 1 for yearly, 2 for quarterly, 3 for monthly, 4 for weekly and 5 for daily of the contact respectively. Extension contact score of the respondents could range from 0-70 while '0' indicate very low extension contact and '20' indicate very high extension contact.

Organizational Participation: Organizational participation score was measured on the basis of participation by the respondent in different organizations. Scores were assigned for participation of a respondent in an organization in the following manner.

31

Nature of Participation	Score
No participation	0
Participation as an ordinary member	1
Participation as an executive member	2
Participation as President / Secretary	3

Organization participation (OP) score of respondent for each organization was computed by using following formula:

$$OP = P_{OM}Y + 2P_{EM}Y + 3P_{EO}Y$$

Where,

OP = Organizational participation

P_{OM} = Participation as ordinary member

P_{EM} = Participation as executive member

P_{PS} = Participation as executive officer

Y = Duration of participation in year

Organization participation score of a respondent was determined by summing the participation score of all the organizations.

Training Exposure:

Training exposure score was measured on the basis of participation by the respondent farmers in different agriculture related training program. A score of one (1) was assigned for each day of training and zero (0) for no training.

Innovativeness: Innovativeness is the degree to which an individual adopts an innovation relatively earlier than the other member in a social system (Rogers, 1995). Score were assigned on the basis of time required by the individual to adopt each of the technology in the following manner.

Period of Adoption	Score
Within 2 years after hearing	3
Within 2-4 years after hearing	2
After 4 years of hearing	1
Do not use	0

Possible innovativeness score would be 0 to 30, where '0' indicate no innovativeness and '30' indicate very high innovativeness.

3.5.2 Measurement of Dependent Variable

Adoption of BRRI dhan 40 is the dependent variable of the study. It was measured on the basis of adoption of three years' average. For the measurement of each year adoption, the following formula was used-

$$\text{Adoption} = \frac{\text{Used Area}}{\text{Potential Area}} \times 100$$

The result was obtained as percentage. The adoption score could range from 0 to 100, where '0' indicate no adoption and '100' indicate highest adoption.

3.6 Statement of the Hypothesis

As defined by Goode and Hatt (1952) "A hypothesis, which can be put to a test to determine its validity. It may see contrary to, or in accord with common sense. It may prove to be correct or incorrect. In any event, however, it leads to an empirical test." In studying the relationship between variables, research hypotheses are formulated which state the anticipated relationship between the variables. However, for statistical test it becomes necessary to formulate null hypothesis. In studying relationship between variables a hypothesis was formulated which stated the anticipated relationship between the variables. In this study the null hypotheses

33

were framed as "There is no relationship between the selected characteristics of the farmers and their adoption of BRRI dhan 40". The selected characteristics were: age, education, farm size, annual income, rice cultivation knowledge, extension contact, organizational participation, training exposure and innovativeness.

3.7 Statistical Analysis

The collected data were compiled, tabulated, coded and analyzed in accordance with the objectives of the study. The statistical measures such as number and percentage distribution were used for describing the variables of the study. In order to explore the relationships between the selected characteristics of the farmers and their adoption of BRRI dhan 40, Karl Pearson Correlation Co-efficient (r) was computed. Correlation matrix was also computed to determine the interrelationships among the variables. Five percent (0.05) and one percent (0.01) level of significance were used as the basis of rejecting any null hypothesis.

If the computed value of co-efficient of correlation 'r' was equal to or greater than table value at designated level of significance for the relevant degrees 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 significant for 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.
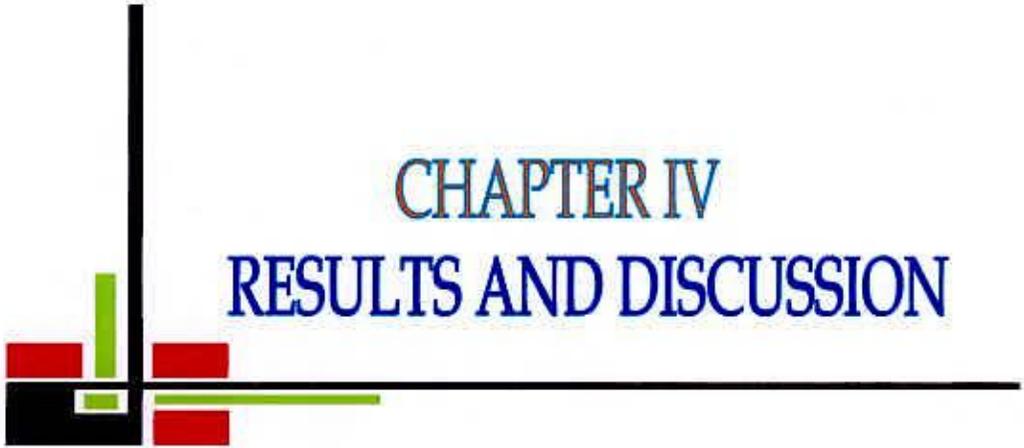
CHAPTER IV
RESULTS AND DISCUSSION

CHAPTER IV
RESULTS AND DISCUSSION

Result and discussion is the focal point of whole research work. The findings of the study and interpretations of the results have been presented in this chapter. There are three sections in this chapter. The first section deals with the selected characteristics of the farmers, while the second section deals with the adoption of BRRI dhan 40. In the third section, the relationships between the extent of adoption of BRRI dhan 40 and the selected characteristics of farmers have been discussed.

4.1. Selected Characteristics of the Farmers

In this section the findings of the BRRI dhan 40 grower's 9 (nine) selected characteristics have been discussed. The selected characteristics were: age, education, farm size, annual income, rice cultivation knowledge, extension contact, organizational participation, training exposure and innovativeness. The distribution of respondents according to their selected characteristics has been shown in Table 4.1.

Table 4.1. Distribution of farmers according to their selected characteristics

Characteristics	Measuring Unit	Range		Categories	Farmers		Mean	SD
		Possible	Observe		Number	Percent		
Age	Actual Years	Unknown	30-63	Young Aged (Up to 35)	11	13.10	46.77	8.16
				Middle Aged (36-50)	44	52.38		
				Old Aged (Above 50)	29	34.52		
Education	Year of schooling	Unknown	0-16	No Education (0-0.5)	37	44.05	3.50	3.89
				Primary Education (1-5)	30	35.71		
				Secondary Education (6-10)	13	15.48		
				Above Secondary Education (Above 10)	4	4.76		
Farm Size	Actual (in ha)	Unknown	0.10-3.08	Marginal (0.02 to 0.2 ha)	6	7.14	1.15	0.73
				Small (0.21-1.00 ha)	32	38.10		
				Medium (1.01-2.00 ha)	33	39.29		
				Large (more than 2.00 ha)	13	15.48		
Annual Income	Computed Scores	Unknown	50-265	Low (Up to 75)	23	27.38	105.45	44.01
				Medium (76-150)	49	58.33		
				High (Above 150)	12	14.29		
Rice Cultivation Knowledge	Computed Scores	0-20	10-20	Low Knowledge (10-12)	11	13.10	15.25	2.31
				Medium Knowledge (13-16)	52	61.90		
				High Knowledge (16-20)	21	25.00		
Extension Contact	Computed Scores	0-70	10-42	Low Contact (Up to 20)	26	30.95	25.07	7.59
				Medium Contact (21-30)	41	48.81		
				High Contact (Above 30)	17	20.24		
Organizational Participation	Computed Scores	Unknown	0-27	No Participation (0)	24	28.57	6.48	6.65
				Low Participation (1-9)	36	42.86		
				Medium Participation (10-18)	18	21.43		
				High Participation (19-27)	6	7.14		

Training Exposure	Computed Scores	Unknown	0-21	Untrained	62	73.81	3.71	7.16
				Trained	22	26.19		
Innovativeness	Computed Scores	0-30	5-25	Low Innovative (5-11)	46	54.76	12.60	5.45
				Medium Innovative (12-18)	23	27.38		
				High Innovative (13-25)	15	17.86		

4.1.1 Age

Age of the respondents ranged from 30 to 63 years with an average of 46.77 and standard deviation 8.16. On the basis of age, the farmers were categorized into three categories: Young aged (up to 35), Middle aged (35-50) and Old aged (above 50). Data presented in Table 4.1 indicates that the highest proportion (52.38 percent) of the respondent farmers felt into middle aged category compared to 13.10 percent young and 34.52 percent old aged category. It may also be revealed from the table that majority (86.90 percent) of the respondents under study area comprised of the middle to old aged categories. Aged farmers had more farming experience and it is very important in adoption of an innovation.

4.1.2 Education

The education score of the respondents ranged from 0 to 16 with an average being 3.35 and the standard deviation was 3.95. Based on their level of education, the respondents were categorized into four categories: no education (0-0.5), primary education (1-5), secondary education (6-10) and above secondary education (Above 10). Table 4.1 shows the distribution of the respondents according to their education scores. From the table, it was revealed that majority of the respondents (44.05 percent) had no institutional education compared to 35.71 percent having

primary education and 15.48 percent having secondary education. Only 4.76 percent of the respondent farmers have above secondary education. The table also shows that more than half (51.19 percent) of the respondent farmers felt under the category of primary and secondary education. An educated individual is likely to be more receptive to the modern facts and ideas; they have much mental strength in deciding on a matter related to problem solving or adoption of technologies. In the study area literacy percentage must be increased for the sake of adoption of BRRI dhan 40.

4.1.3 Farm Size

The farm size of the respondents in the study area varied from 0.10 to 3.08 hectares. The average farm size was 1.15 hectares with a standard deviation of 0.73. Based on their farm size score the respondents were categorized into four categories: marginal (0.02 to 0.20 ha), small (0.21 to 1.00 ha), medium (1.01 to 2.00 ha) and large (more than 2.00 ha) farmers. The distribution of the respondents according to their farm size is shown in Table 4.1.

Data presented in the Table 4.1 shows that the highest proportion (39.29 percent) of the farmers had medium farm compared to 38.10 percent had small farm and 15.48 percent having large farm. Only a small portion (7.14 percent) of the respondent belongs to marginal farm size category. Table 4.1 also shows that majority (77.39 percent) of the farmers in the study area belongs to small to medium farm size category.

4.1.4 Annual Income

Annual income of the respondents ranged from 50 to 265 with an average of 105.45 and standard deviation of 44.01. Based on their annual income, the respondents were classified into three categories: low income (up to 75), medium income (76-150), high income (above 150). Table 4.1 shows the distribution of the respondents according to their annual family income.

The table shows that more than half (58.33 percent) of the respondents in the study area belongs to medium income category compared to 27.38 percent in the low income category and 14.29 percent in the high income category. In fact the majority of the respondent farmers of the study area constituted low to medium income categories. It is evident from the study that income of the respondents influences the adoption of an innovation. The average income of the respondent farmers in the study area (105.45 thousand taka) is much higher than the average per capita income (57.65 thousand taka) of the country (Bangladesh Economic Review, 2011).

4.1.5 Rice Cultivation Knowledge

Rice cultivation knowledge score of the farmers ranged from 10 to 20 against the possible range from 0 to 20 with an average of 15.25 and standard deviation 2.31. According to the rice cultivation knowledge scores the farmers were categorized into three categories such as low knowledge (10-12), medium knowledge (13-16) and high knowledge (17-20). Table 4.1 shows the distribution of the farmers according to their rice cultivation knowledge score.

Data presented in the Table 4.1 reveals that 61.90 percent of the farmers had medium rice cultivation knowledge while 25.00 percent had high rice cultivation knowledge and 13.10 percent had low rice cultivation knowledge. It reveals that the majority 86.90 percent of the farmers in the study area were under medium to high rice cultivation knowledge categories. Knowledge about any particular technology is an important tool for the adoption of that particular technology.

4.1.6 Extension Contact

One's contact with information source is perhaps the most important indicator of one's adoption behavior. The computed extension contact score of the respondents ranged from 10 to 42 against the possible range was 0 to 70, with an average of 25.07 and standard deviation 7.59. Based on the extension contact scores the respondents were categorized into three categories as low contact (up to 20), medium contact (21-30) and high contact (above 30). Table 4.1 shows the distribution of respondents according to their extension contact scores.

Information presented in the Table 4.1 reveals that 48.81 percent of the respondents had medium contact with different extension media, while 30.95 percent had low and 20.24 percent had high extension contact. The table also shows that more than half (69.05 percent) of the respondents had medium to high extension contact. The extension contact of the farmers helped them to be aware of BRRI dhan 40 and adoption of BRRI dhan 40. The person having more extension contact had more knowledge and adopt any innovation more quickly.

4.1.7 Organizational Participation

The observed organizational participation scores of the farmers ranged from 0 to 27 with an average 6.48 and standard deviation 6.65. Depending on the organizational participation scores, the farmers were classified into four categories namely; No participation (0), Low participation (1-9), Medium participation (10-18) and High participation (19-27). Table 4.1 represents the distribution of the respondent farmers according to their organizational participation.

The data of the Table 4.1 shows that highest proportion (42.86 percent) of the respondents had low organizational participation, while 28.57 percent had no organizational participation, 21.43 percent had medium and 7.14 percent had high organizational participation. Data also reveals that about three fourth (71.43 percent) of the respondents had no to low organizational participation. It can be concluded that there were no favorable condition for organizational participation in the study area. If there, it will be more helpful to adopt an innovation.

4.1.8 Training Exposure

The computed training exposure scores of the respondents were 0 to 21 with an average of 3.71 and standard deviation of 7.16. According to the training exposure score the respondents were categorized into two categories as untrained and trained. Table 4.1 represents the distribution of the farmers according to their training exposure. Data in the Table 4.1 shows that majority (73.81 percent) of the respondents were untrained while 26.19 percent obtained training from different organization. From the data it was also reveals that in the study area training is needed to adopted new innovations.

4.1.9 Innovativeness

The maximum innovativeness score of the respondent was 25 and the minimum was 5 against the possible range 0-30. However, the average was 12.60 and the standard deviation 5.45. Based on their innovativeness score, the respondent were classified in to three categories: low innovative (5-11), medium innovative (12-18) and high innovative (19-25). The distribution of the respondents according to their innovativeness was shown in Table 4.1.

Data contained in Table 4.1 indicate that more than half (54.76 present) of the farmers in the study area were low innovative as compared to 27.38 percent medium innovative and 17.86 percent high innovative. Data also revealed that majority (82.14 percent) of the respondent farmers of the study area had low to medium level of innovativeness.

4.2 Adoption of BRRI dhan 40

The adoption of BRRI dhan 40 by the farmers ranged from 19 to 50 against the possible range 0 to 100. The average adoption was 35.42 with a standard deviation of 7.08. Based on the adoption scores the respondents were categorized into three categories low adoption (Up to 30), medium adoption (31-40) and high adoption (Above 40). The distribution of farmers according to their adoption of BRRI dhan 40 has been shown in Table 4.2.

Table 4.2. Distribution of farmers according to their adoption of BRRI dhan 40

Adoption	Measuring Unit	Range		Categories	Farmers		Mean	SD
		Possible	Observe		Number	Percent		
Adoption of BRRI dhan 40	Computed Scores	0-100	19-50	Low adoption (Up to 30)	17	20.24	35.42	7.08
				Medium adoption (31-40)	49	58.33		
				High adoption (Above 40)	18	21.43		

Data contained in Table 4.2 reveals that the highest proportion (58.33 percent) of farmers felt under medium adoption category, while 20.24 percent had low adoption and 21.43 percent had high adoption. Thus an overwhelming majority (79.76 percent) of the farmers had medium to high adoption. The average adoption of BRRI dhan 40 was felt into medium adoption category. It is a good signal for BRRI dhan 40 as the variety was introduced in the study area a few years ago and farmers are adopting it.

4.3 Relationship between the Selected Characteristics of the Farmers and their Adoption of BRRI dhan 40

The purpose of this section is to explore the relationship between the selected characteristics of the farmers and their adoption of BRRI dhan 40. The selected characteristics constituted independent variable and adoption of BRRI dhan 40 by the farmers constituted the dependent variable.

The relationship between the selected characteristics of the farmers and their adoption of BRRI dhan 40 was examined by testing the following null hypothesis: "There is no relationship between the selected characteristics of the farmers and their adoption of BRRI dhan 40." Pearson's correlation co-efficient 'r' has been

used to test the hypothesis concerning the relationships between two variables. 5 (five) percent and 1 (one) percent level of significance was used as the basis of acceptance or rejection of a hypothesis. The summary of the results of the correlation co-efficient between the selected characteristics of the respondent farmers and their adoption of BRRI dhan 40 by the farmers is shown in Table 4.3. The correlation matrix is presented in Appendix B.

Table 4.3 Correlation Co-efficient between the selected characteristics of the farmers and their adoption of BRRI dhan 40

Dependent Variable	Independent Variables	Correlation Co-efficient	Tabulated Value of 'r' at 82 degree of freedom	
			0.05	0.01
Adoption of BRRI dhan 40	Age	-0.150^{NS}		
	Education	0.253^{*}		
	Farm size	0.015^{NS}		
	Annual income	0.062^{NS}		
	Rice cultivation knowledge	0.288^{**}	0.214	0.279
	Extension contact	0.086^{NS}		
	Organizational participation	-0.075^{NS}		
	Training exposure	-0.176^{NS}		
	Innovativeness	0.238^{*}		

^{NS} = Non significant
* = Significant at 5 percent (0.05) level
** = Significant at 1 percent (0.01) level

4.3.1 Relationship between Age of the Farmers and their Adoption of BRRI dhan 40

The calculated value of 'r'= -0.150 (Table 4.3) was found to be smaller than the tabulated value of 'r' (0.214) at 5 percent level of significance with 82 degrees of freedom. So, the concerned null hypothesis in this aspect was accepted. It was therefore suggested that the age of the farmers had no significant relationship with their adoption of BRRI dhan 40.

4.3.2 Relationship between Education of the Farmers and their Adoption of BRRI dhan 40

The co-efficient of correlation between the concerned variables was found to be 'r'= 0.253 as shown in Table 4.3. The computed value of 'r' (0.253) was greater than the table value (r= 0.214) with 82 degrees of freedom at 0.05 level of probability. The relationship showed a positive direction between the concern variables. In this aspect the concerned null hypothesis was rejected.

The findings indicate that the education of the farmers had a significant and positive relationship with their adoption of BRRI dhan 40. Education enables individuals to gain knowledge and thus increases their power of understandings. Thus adoption of BRRI dhan 40 may be higher among those farmers who had higher education.

4.3.3 Relationship between Farm Size of the Farmers and their Adoption of BRRI dhan 40

The calculated value of 'r'= 0.015 (Table 4.3) was found to be smaller than the tabulated value of 'r' (0.214) at 5 percent level of significance with 82 degrees of freedom. So, the concerned null hypothesis in this aspect could not be rejected. The

findings imply that the farm size of the farmers had no relationship with their adoption of BRRI dhan 40.

4.3.4 Relationship between Annual Income of the Farmers and their Adoption of BRRI dhan 40

The calculated value of 'r'= 0.062 (Table 4.3) was found to be smaller than the tabulated value of 'r' (0.214) at 5 percent level of significance with 82 degrees of freedom. So, no significant relationship was found between the annual income of the farmers and the adoption of BRRI dhan 40. Therefore, the concerned null hypothesis in this aspect was accepted. That means annual income of the farmers had no influence on the adoption of BRRI dhan 40.

4.3.5 Relationship between Rice Cultivation Knowledge of the Farmers and their Adoption of BRRI dhan 40

The calculated value of 'r'= 0.288 (Table 4.3) was found to be greater than the tabulated value of 'r' (0.279) at 1 percent level of significance with 82 degrees of freedom. So, the concerned null hypothesis in this aspect has been rejected. It was therefore suggested that the rice cultivation knowledge of the farmers had a positive and significant relationship with their adoption of BRRI dhan 40.

4.3.6 Relationship between Extension Contact of the Farmers and their Adoption of BRRI dhan 40

The co-efficient of correlation between the concerned variables was found to be 'r'= 0.086 as shown in Table 4.3 which is smaller than the tabulated value of 'r' (0.214) at 5 percent level of significance with 82 degrees of freedom. So, the null hypothesis could not be rejected in this aspect. Thus, the researcher concluded that the extension contact of the farmers had no significant relationship with their adoption of BRRI dhan 40.

4.3.7 Relationship between Organizational Participation of the Farmers and their Adoption of BRRI dhan 40

Co-efficient of correlation between the conceded variables was found to be 'r'= -0.075 as shown in Table 4.3. The computed value of 'r' (-0.075) was smaller than the tabulated value (r= 0.214) with 82 degrees of freedom at 0.05 level of probability. So, the concerned null hypothesis was accepted and the researcher found no significant relationship between organizational participation of the farmers and their adoption of BRRI dhan 40.

4.3.8 Relationship between Training Exposure of the Farmers and their Adoption of BRRI dhan 40

Computed value of the co-efficient of correlation between training exposure of the farmers and their adoption of BRRI dhan 40 was found to be 'r'= -0.176 (Table 4.3) which is smaller than the tabulated value of 'r' (0.214) at 5 percent level of significance with 82 degrees of freedom. So, the null hypothesis was accepted in this aspect and it was concluded that there is no relationship between training exposure of the farmers and their adoption of BRRI dhan 40.

4.3.9 Relationship between Innovativeness of Farmers and their Adoption of BRRI dhan 40

Computed value of the co-efficient of correlation between innovativeness of the farmers and their adoption of BRRI dhan 40 was found to be 'r'= (0.238) as shown in Table 4.3. The relationship showed a positive trend. The computed value of 'r' (0.238) was found to be greater than the table value (r = 0.214) with 82 degrees of freedom at 0.05 level of probability. Hence, the concerned null hypothesis was rejected. The researcher thus concluded that the innovativeness of the farmers had a significant relationship with their adoption of BRRI dhan 40. It could influence

directly to adopt new technologies. Hence, extension workers who are strongly contributed to be created need awareness, consciousness and activeness of them to adopt BRRI dhan 40.
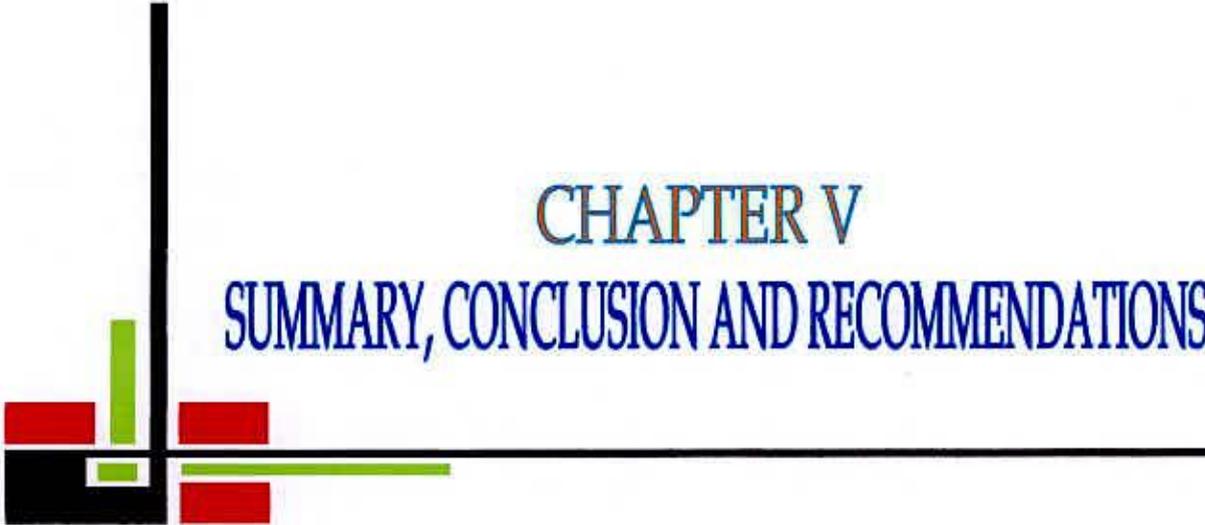
CHAPTER V
SUMMARY, CONCLUSION AND RECOMMENDATIONS

CHAPTER V
SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

Introduction

Bangladesh has a great potential to increasing the agricultural productivity to a great extent by transferring the new technologies among the farmers. The rate of adoption of agricultural innovation has to be increased which will enhance the agricultural production. Currently the average yield of rice in Bangladesh is around 2.91 ton/ha. Aman rice area shows a slow an increasing trend and shares about 30.75 percent of total rice production. As the population of the country is ever increasing, the farm holding size of a family is ever decreasing. So it is necessary to take initiative to increase the production of Aman rice.

BRRI dhan 40 is a photosensitive variety which was developed in 2003 for saline area of Bangladesh including Noakhali district. The life duration of the variety is 145 days. The plant attains a height of about 115 cm. At seedling stage it can tolerate 8 ds/m i.e., medium level of salinity. Supplementary irrigation is required until the grain become hard. The variety can yields about 4.5 ton/ha.

Farmers of Noakhali district for the last couple of years are cultivating BRRI dhan 40 with the expectation of high yield and other benefits. There are no much advertisements for promoting the variety, but farmers are practicing it. A number of selected characteristics of the farmers are involved in adoption of this variety.

Objectives of the Study

4. To determine and describe the selected characteristics of the BRRI dhan 40 growers. The selected characteristics are:

    j) Age
    k) Education
    l) Farm size
    m) Annual income
    n) Rice cultivation knowledge
    o) Extension contact
    p) Organizational participation
    q) Training exposure and
    r) Innovativeness

5. To determine the extent of adoption of BRRI dhan 40 by the farmers of Noakhali district.

6. To explore the relationship between the selected characteristics of the farmers and their adoption of BRRI dhan 40.

Methodology

Sadar Upazila of Noakhali District was the locale of the study. A union of Sadar Upazila name Dharmapur was selected purposively from 13 unions. Three villages of Dharmapur union namely Dharmapur, Vatirtake and Char Darbesh were selected randomly. An update list of all BRRI dhan 40 growers was prepared with the help of Sub-Assistant Agriculture Officer. The list comprised of 279 farmers of which 30 (thirty) percent of the population from each selected village was randomly selected as representative sample by using random number table. Thus, the sample size of the study was 84 farmers. A reserve list of 8 farmers at the rate of 3 percent of the population was also prepared. For data collection an interview schedule was

prepared keeping the objectives and variables of the research in mind. Data obtained from the respondents were tabulated, coded, compiled and analyzed to accomplish the objectives of the study.

Independent variables of the study were: age, education, farm size, annual income, rice cultivation knowledge, extension contact, organizational participation, training exposure and innovativeness and the dependent variable was the adoption of BRRI dhan 40 by the farmers of Noakhali district. To explore the relationship between the independent and dependent variables Correlation Co-efficient was measured.

Findings

The major findings of the study are summarized below:

Selected Characteristics of the Farmers

Age: The highest proportion (52.38 percent) of the respondent farmers fell into middle aged category compared to 13.10 percent young and 34.52 percent old age category.

Education: Majority of the respondents (44.05 percent) in the study area have no institutional education compared to 35.71 percent having primary education and 15.48 percent having secondary education. Only 4.76 percent of the respondent farmers have above secondary education.

Farm size: The highest proportion (39.29 percent) of the farmers had medium farm compared to about equal proportion (38.10 percent) had small farm and 15.48 percent having large farm. Only a small portion (7.14 percent) of the respondent belongs to marginal farm size category.

Annual income: More than half (58.33 percent) of the respondents in the study area belongs to medium income category compared to 27.38 percent in the low income category and 14.29 percent in the high income category.

Rice cultivation knowledge: In the study area about 61.90 percent of the farmers had medium rice cultivation knowledge while 25.00 percent had high rice cultivation knowledge and 13.10 percent had low rice cultivation knowledge.

Extension contact: About half (48.81 percent) of the respondents had medium contact with different extension media, while 30.95 percent had low and 20.24 percent had high extension contact.

Organizational participation: Highest proportion (42.86 percent) of the respondents had low organizational participation, while 28.57 percent had no organizational participation, 21.43 percent had medium and 7.14 percent had high organizational participation.

Training exposure: Majority (73.81 percent) of the respondents had no training while 26.19 percent obtained training from different organization.

Innovativeness: More than half (54.76 present) of the farmers in the study area were low innovative as compared to 27.38 percent medium innovative and 17.86 percent high innovative.

Adoption of BRRI dhan 40: The highest proportion (58.33 percent) of farmers felt under medium adoption category, while (20.24 percent) had low adoption and (21.43 percent) had high adoption of BRRI dhan 40.

Relationship between the selected characteristics of the farmers and their adoption of BRRI dhan 40

To explore the relationship of the 9 (nine) selected characteristics of the farmers with their adoption of BRRI dhan 40, Pearson's product moment co-efficient of correlation (r) was computed. Correlation analysis indicates that education, rice cultivation knowledge and innovativeness of the farmer were found to have positive significant relationship with their adoption of BRRI dhan 40. Age, farm size, annual income, extension contact, organizational participation and training exposure were found to have no significant relationship with their adoption of BRRI dhan 40.

5.2 Conclusion

Conclusion is the final decision or judgment, which is established through argument at the end or termination of a research work. Findings of the study and the logical interpretation of their meanings in the light of other relevant facts prompted the researcher to draw the following conclusions:

I.   The adoption of BRRI dhan 40 by the farmers in the study area was quite satisfactory, an overwhelming majority (79.76 percent) of the farmers had medium to high adoption. The average adoption of BRRI dhan 40 was fall into medium adoption category. However, to meet the ever increase demand of food for the growing population, there is a need for further enhance the rate and extent of adoption of BRRI dhan 40 among the farmers. The Government Organization (GO) particularly the DAE and BRRI and Non-Government Organizations (NGOs) should give proper attention in popularizing the variety through extensive extension activities.

II.   In the study area more than half (52.38 percent) of the farmers were middle aged. No significant relationship was found between age of the farmers and their adoption of BRRI dhan 40. So, age is not a factor in the adoption of BRRI dhan 40.

III.   Findings of the study showed a significant relationship between educational levels of the farmers with their adoption of BRRI dhan 40. Education is a contributory factor of gaining knowledge and skill and has creating positive attitude in an individual. There is a need to enhance the educational level of the farmers in the study area as well as the overall country to increase adoption of BRRI dhan 40.

IV.   Farm size of the farmers had no significant relationship with their adoption of BRRI dhan 40. The average farm size of the farmers in the study area belonged to medium farm size category. Most of the farmers had small to medium farm size. Large farmers can take risk than small and medium farmers. So, extension agent should take special care of marginal to medium farmers.

V.   The average income of the respondent farmers in the study area is much higher than the average per capita income of the country. In fact the majority of the respondent farmers of the study area constituted low to medium income categories. Annual income of the farmers had no significant relationship with the adoption of BRRI dhan 40, which means the farmers had other source of income rather rice cultivation.

VI. Rice cultivation knowledge of the farmers showed a positive and highly significant relationship with their adoption of BRRI dhan 40. Through rice cultivation knowledge an individual farmers become aware of various aspect of selected rice production technologies. Consequently, they become motivated in adoption of selected rice production technologies. The above facts lead to the conclusion that necessary steps to be taken to increase the knowledge on rice cultivation which would ultimately increase the adoption of BRRI dhan 40 and to keep the adoption sustain.

VII. Extension contact, organizational participation and training exposure of the farmers had no relationship with the adoption of BRRI dhan 40. But these factors cannot be ignored because these are important personal factors in adoption of any technology. Hence, appropriate extension program may be taken to raise extension contact, organizational participation etc. of the farmers.

VIII. Innovativeness had significant and positive correlation to the adoption of BRRI dhan 40. Innovativeness is very important to adopt any technology. Innovative persons can take immediate decision to adopt innovation. So, it is necessary to keep monitoring the innovativeness of the farmers so that innovativeness increase and adoption rate of BRRI dhan 40 enhance.

5.3 Recommendations

The adoption of innovation largely depends on its attributes and time. Not all individual of a social system adopt an innovation at a time. People take their time to assess the innovation and then they decide to adopt it. In Bangladesh the farmers adopt new varieties in a steady way and thus the rate of adoption is slow and low.

5.3.1 Recommendations for policy implications

Recommendations based on the findings and conclusions of the study are presented below:

I. BRRI, DAE and other agriculture related organizations should take necessary steps to enhance their extension contact with the farmers. So, that the farmers will come to know about the new varieties. Posters, leaflets, group discussions are recommended to be prepared, distributed and organized by the DAE authority.

II. Education of the farmers had positive and significant relationship with their adoption of BRRI dhan 40. It indicates the importance of education for rapid adoption of modern technologies. Under the above situation, it may be recommended that arrangements should be made for increasing the literacy level of BRRI dhan 40 rice growers by the concerned authorities through the establishment of night school, adult education program and other extension methods.

III. Farmers having more rice cultivation knowledge were more likely to have more adoption. It is recommended that the farmers' rice cultivation knowledge should be increased through farmers' training.

IV. In view of the importance of the increase of the production of rice, the adoption of BRRI dhan 40 should be more. Therefore, it may be recommended that the innovativeness of the farmers should be increased by encouraging them through farmers' training, result demonstrations, farm and home visit, motivation tour etc.

5.3.2 Recommendations for further study

A small piece of study cannot provide all information for the proper understanding of the farmers towards BRRI dhan 40. Therefore, the following recommendations were made for further study:

I. The present study was conducted in three villages of Dharmapur union of Sadar upazila under Noakhali district. It is recommended that similar studies should be conducted in other areas of Bangladesh.

II. This study investigated the relationship between nine selected characteristics of the farmer with their adoption of BRRI dhan 40. Therefore, it is recommended that further study should be conducted with other characteristics of the farmers.

III. In this study age, farm size, annual income, extension contact, organizational participation and training exposure of the farmers had no relationship with their adoption of BRRI dhan 40. Generally a significant relationship is

expected to be observed between the above characteristics of the farmers and their adoption of BRRI dhan 40. Hence, further studies are necessary to find out the relationship between the concerned variables.

IV.   Studies need to be undertaken to ascertain the principles and procedures for establishment and maintenance of nursing organization in the rural areas of Bangladesh.

CHAPTER VI
REFERENCES

CHAPTER VI
REFERENCES

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.

Alam, M.M. 1998. Farm Level Status of HYV Rice in a Selected Union of Gazipur District. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education, BSMRAU, Salna, Gazipur.

Ali, M.K.; Chowdhury, S.A.; Kader, M.A. and Gani, M.O. 1986. Factors Influencing Adoption of Improved Sugarcane Production Technologies among the Growers of Sugar Mills Zone. *Bangladesh J. Ext. Edu.* 1(2):25-31.

Anonymous. 2012. Fact Sheet 46, Rice Production Training Module. Bangladesh Rice Research Institute (BRRI), Joydebpur, Gazipur.

Aurangozeb, M.K. 2002. Adoption of Integrated Homestead Farming Technologies by the Rural Women in RDRS. M.S. Thesis. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.

Bangladesh Economic Review. 2011. Bangladesh Economic Review, Directorate of Economic Advisor, Finance Division, Ministry of Finance, Government of the People's Republic of Bangladesh.

Bavaltti, V.G. and Sundarswamy, B. 1990. Adoption of Dry Land Farming Practices by the Farmers of Bijapur District. *Indian J. Ext. Edu.* 26(3&4):67-69.

BBS. 2011. Statistical Year Book of Bangladesh. Bangladesh Bureau of Statistics. Statistics Division, Ministry of Planning, Government of the People's Republic of Bangladesh.

Bezbora, S.N. 1980. Factors Affecting Adoption of Improved Agricultural Technologies for Paddy Cultivation by the Farmers of Assam. Summary of Extension Research. 6:24-27. Department of Extension Education, Punjab Agricultural University, Ludhiana, India.

Bhuiyan, M.H. 2012. Generation and Diffusion of Agricultural Innovation. 1st Ed., Gurpukur Research Institute, 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, Bangladesh Agricultural University, Mymensingh.

FAO. 2010. Data taken from FAO Website. http: 1/1/www.FAO.org.

Gangadharappa, N.R. 1981. A Critical Analysis of Knowledge Level of Adoption Behavior of Trained and Untrained Farmers in Malapralha Command Area of Karnatak State. *Thesis Abstract.* Hariana Agricultural University, Hissar. 7(2):102.

Goode, W.J. and Hatt, P.K. 1952. Methods of Social Research. New York: McGraw-Hill Book Company, Inc.

Haque, M.E. 1993. Adoption of BR14 during Boro Season. M.S. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education. Bangabandhu Sheikh Mujibor Rahman Agricultural University, Salna, Gazipur.

Haque, M.M. 2003. Farmers Adoption of Modern Maize Cultivar Technologies. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.

Haque, M.N. 2005. Attributes Influencing Adoption of BRRI dhan 28: A Study in Three Selected Villages of Mymensing District. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.

Hasan, M.Z. 1996. Adoption of Some Selected 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 Proceedings on the International Conference on Plant Protection in the Tropics Kuala Lumpur, Malaysia, Malaysian Plant Protection Society. 5:80-84.

Hoque, M.F. 2005. Adoption of Selected Modern Boro Rice Varieties by the Farmers in Three Selected Villages of Sadar Upazila of Mymensingh

District. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.

Hossain, M.D. 1981. 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 and Teachers' Training, Bangladesh Agricultural University, Mymensingh.

Hossain, M.A. 1983. Relationship of Farmers Characteristics with their Adoption of Transplanted Aman and other Related Aspects in Bhabakhali Union of Mymensingh District. M.S.(Ag. Ext. Ed.)Thesis. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.

Hossain, M.A. 1991. Adoption Behavior of Contract Growers in Sadar Upazila of Jamalpur District. 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.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.A. 2004. Adoption of Selected Modern Boro Rice Cultivation Technology by the Farmer of Homna Upazila in Comilla District. M.S. (Ag.

Ext. Ed.) Thesis. Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.

Hossain, K. 2006. Adoption of Selected High Yielding Varieties of Rice by the Farmers of Rajpat Union under Gopalgonj District. M.S. Thesis. Department of Agricultural Extension and Information System. Sher-e-Bangla Agricultural University, Dhaka.

Hussen, M.A. 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.M. 1993. Adoption of Improved Practices on Potato Cultivation by the Potato Farmers of Sonatola Union of Bogra District. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.

Islam, M.Z. 2007. Adoption of BRRI dhan 29 Production Technologies by the Farmers. M.S. Thesis. Department of Agricultural Extension and Information System. Sher-e-Bangla Agricultural University, Dhaka.

Kabir, M.H. 2006. Adoption of Selected T. Aman Production Technologies by the Farmers. M.S. Thesis. Department of Agricultural Extension and Information System. Sher-e-Bangla Agricultural University, Dhaka.

Karim, A.S.M.Z. and Mahaboob, S.F. 1986. Farmers Characteristics and other Factors Associated with Adoption of HYV Wheat in Kushtia Union of Mymensingh District. *Bangladesh J. Ext. Edu.* 1(1): 17-24.

Karim, A.S.M.; Hossain, H.A. and Samsuzzoha, A.N.M. 1987. Farmers Economic Characteristics Affecting their Attitude towards the Use of the Urea in Jute Cultivation. *Bangladesh J. Ext. Edu.* 2(2):69-74.

Kashem, M.A. and Halim, A. 1991. Use of Communication Media in the Transfer of Technologies of Farmers: A Farm Level Study. Research Monograph No. 2. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.

Kaur, M.R. 1988. An Evaluation Study of Women Development Programme Under Indo-German-Dhauhadhar Project Palampur District Kumgra, H. P. Harayana Agricultural University. *Thesis Abstract.* 16(4): 258.

Khan, M.A. 2002. Adopter Categories in Respect of Binasail Rice Variety in Two Selected Villages of Ghagra Union of Mymensingh District. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.

Kher, S.K. 1992. Adoption of Wheat Cultivation Practices. *Indian J. Ext. Edu.* 113:1-4.

Koch, B.H. 1985. The Role of Knowledge in the Adoption of Agricultural Development Practices. *South Africa J. Agric. Ext.* XXVI (374):86-91.

Mamun, N.M. 2006. Adoption of Urea Super Granule by the Boro-Rice Growers. M.S. Thesis. Department of Agricultural Extension and Information System. Sher-e-Bangla Agricultural University, Dhaka.

Masud, M.A. 2006. Adoption of High Yielding Varieties of Rice by the Farmers. M.S. Thesis. Department of Agricultural Extension and Information System, Sher-e-Bangla Agricultural University, Dhaka.

Moni, S.F.H. 2008. Attributes Influencing the Adoption of Haridhan by the Farmers of Jhinaidah District. M.S. Thesis. Department of Agricultural Extension and Information System. Sher-e-Bangla Agricultural University, Dhaka.

Moullik, T.K.; Hrabovxzky, J.P. and Rao, C.S.S. 1996. Predictive Values of Some Factors of Adoption of Nitrogenous Fertilizers by the North Indian Farmers. *Rural Sociology*. 31(4):467-477.

Nipa, S.K. 2012. Adotpion of BRRI dhan 44 by the farmer of Barisal District. M.S. Thesis. Department of Agricultural Extension and Information System, Sher-e-Bangla Agricultural University, Dhaka.

Osunloogun, A.; Ademoyo, R. and Anyanwu, E. 1986. The Adoption of Innovations by Co-operative Farmers in Nigeria. *Tropical Agriculture*. 63(2): 158-160.

Pal, S.K. 1995. Adoption of Recommended Sugarcane Cultivation Practices by the Farmers of Two Selected Centers of North Bengal Sugar Mills. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.

Pathak, S. and Sasmal, B.C. 1992. Adoption of Jute Technologies. *Indian J. Ext. Edu.* 27(1&2):77-80.

Paul, S.K. 2000. Attitude of the Farmers towards the Use of Urea Super Granule on Rice Cultivation in Abhaynagar Upazilla under Jessore District. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.

Podder, S.K. and Kashem, M.A. 2000. Use of Extension Contract Media by the Farmers in the Adoption of Mehersagar banana. *Bangladesh J. Ext. Edu.* 11 & 12(1 & 2): 89-94.

Rahman, M.S. 1974. Analysis of Factors in Relation to the Adoption of IR-20. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension and Teachers' Training, Bangladesh Agricultural University, Mymensingh.

Rahman, M.M. 1986. Correlation of Adoption of Improved Practices in Transplanted Aman Rice. *Bangladesh J. Ext. Edu.* 1(2):71-77.

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. 1999. Adoption of Balanced Fertilizer by the HYV Farmers of Ishwarganj Thana. M.S. (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 Upazilla of Mymensingh District. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.

Rahman, M.H. 2003. Adoption of Year round Homestead Fruit Cultivation Practices in Selected Area of Meherpur District. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.

Ray, G.L. 1991. Extension Communication and Management. Calcutta: Naya Prokash.

Razzaque, M.A. 1977. Relationship of Selected Characteristics of the Farmers with Adoption of High Yielding Varieties of Rice Three Villages of Agricultural University Project Area. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.

Reddy, P.R.; Reddy, M.M. and Reddy, D.R. 1987. Impact of National Demonstration on Knowledge level Attitude and Adoption Behaviour of Farmers in Ranaga Reddy District of Andhra Pradesh state. *J. Res. APAU.* 15(1): 35-38.

Rogers, E.M. 1995. Diffusion of Innovation. 4[TM]ed, New York; The Free Press.

Sardar, M.H.U. 2002. Adoption of IPM Practices by the Farmers under PETRA Project of RDRS. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.

Sarkar, D.C. 1997. Correlates of Selected Characteristics of Potato Growers with their Adoption of Improved Potato Cultivation Practices in Five Villages of

Comilla District. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.

Singh, S.P., Hoda, R.S. and Laharia, S N. 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.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.

Talukder, M.M.R. 2006. Adoption of Selected Rice Production Practices by the Farmers of Char Land of Gomoti River. M.S. Thesis. Department of Agricultural Extension and Information System. Sher-e-Bangla Agricultural University, Dhaka.
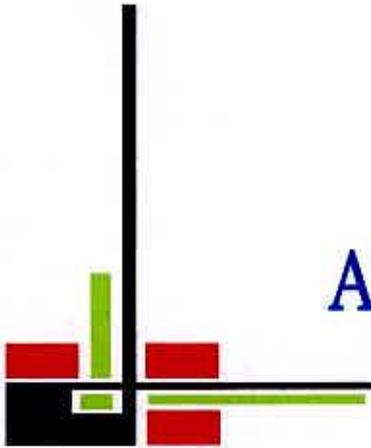
APPENDIXES

ENGLISH VERSION OF THE INTERVIEW SCHEDULE

DEPARTMENT OF AGRICULTURAL EXTENSION AND INFORMATION SYSTEM

SHER-E-BANGLA AGRICULTURAL UNIVERSITY, DHAKA-1207

AN INTERVIEW SCHEDULE FOR COLLECTION OF DATA

ON

ADOPTION OF BRRI DHAN 40 BY THE FARMERS OF NOAKHALI DISTRICT

SL. NO.............

Name of the respondent   : ....

Village   : ....

Upazilla   : ....

District   : ....

Please answer the following questions (put tick mark on the appropriate one and where applicable):

1. **Age**
   How old are you? .... Years.

2. **Education**
   Please mention your educational level

   a) Cannot read and write   [ ]   b) Can sign only   [ ]

   c) I read up-to class ....

3. **Farm Size**
   Please mention your land holdings according to nature of tenure:

Sl. No.	Types of land	Land area	
		Local unit	Hectare(ha)
A_1	Land under own cultivation		
A_2	Homestead area including pond		
A_3	Land given to others on Borga		
A_4	Land taken from others on Borga		
A_5	Land taken from others on lease		
	Total = $A_1 + A_2 + 1/2(A_3 + A_4) + A_5$		

4. Annual Income

Please mention your family income from the following sources:

Source of income		Total Production (Kg)	Price per Kg	Total Price (Taka)
Agriculture	a) Aus Rice			
	b) Aman Rice			
	c) Boro Rice			
	d) Wheat			
	e) Maize			
	f) Jute			
	g) Sugarcane			
	h) Pulse			
	i) Oil seed			
	j) Fruits			
	k) Others			
	l) Livestock production			
	m) Poultry production (No.)			
	n) Fisheries production (Kg)			
Non-agriculture	a) Business			
	b) Service			
	c) Labor			
	d) Others (please specify)			
Total (Tk.)				

5. Rice Cultivation Knowledge

Please answer the following questions:

Sl. No.	Questions	Assign score	Obtained marks
1	Name three high yielding varieties of rice for Aus, Aman and Boro season.	2	
2	Mention two HYV varieties of T. Aman recommended for saline prone area.	2	
3	What are the qualities of good rice seed?	2	
4	What type of soil is suitable for rice cultivation?	2	
5	Mention the name of two chemical fertilizers.	2	
6	Mention two major insects of rice.	2	
7	Name two diseases of rice.	2	
8	Mention two harmful weeds of rice field.	2	
9	Mention at least one insecticide, fungicide and one herbicide used in rice cultivation.	2	
10	Mention two major problems of rice cultivation.	2	
	Total	20	

6. Extension Contact

Please indicate the extent of contact with the following extension media in receiving information about adoption BRRI dhan 40.

Sl. No.	Name of Extension Media	Extent of contact					
		Daily	Weekly	Monthly	Quarterly	Yearly	Not at all
1	Local leaders						
2	Neighbors						
3	Agricultural input dealer (Seed, Fertilizer, Insecticide etc.)						
4	Sub-Assistant Agriculture Officer						
5	Upazila Agriculture Officer						
6	Agricultural Extension Officer						
7	Participation in group discussion						
8	Farm and home visit by extension worker						
9	NGO workers						
10	Participation in agricultural training course						
11	Listening agricultural program in radio (Sonali fashol, krishi kotha etc.)						
12	Watching agricultural program in television (Hridoye Mati O Manush, Sobuj Bangla etc.)						
13	Reading agricultural magazine (Krishi kotha) /leaflet/booklet)						
14	Agricultural fair						

7. Organizational participation

Please give a detailed information about your organizational participation according to the following table:

Sl. No.	Name of the organization	Nature of participation				Duration
		No participation	Ordinary member	Executive member	Executive Officer	
1	Youth club					
2	Mass literacy committee					
3	School committee					
4	Mosque/Mondir committee					
5	Bazaar committee					
6	Union parishad					
7	Farmers co-operative association					
8	Village development committee					
9	Landless group					

8. Training Exposure

Did you participate in any training program?

Yes ☐   No ☐

If yes, then please give the following information:

Sl. No.	Name of the Training Courses	Training Organizer	Duration of Training (Days)
1			
2			
3			
4			
5			

9. Innovativeness

Please give your information about the use of following technologies:

Sl. No.	Name of technologies	Time taken for adoption			Do not use (0)
		Within 2 years after hearing (3)	Within 2 to 4 years after hearing (2)	After 4 years of hearing (1)	
1	Cultivation of modern rice variety				
2	Use of power tiller				
3	Use of green manure				
4	Use of compost				
5	Use of bio-fertilizer				
6	Use of guti urea				
7	Use of mixed fertilizer				
8	Use of IPM				
9	Use of pesticides				
10	Use of herbicide				

10. Adoption of BRRI dhan 40

Year	Potential area (p)	Used area (u)
2010		
2011		
2012		

Thanks for your cooperation

Dated ------------------

Signature of the Interviewer

APPENDIX-B

Correlation Matrix of the Variables

	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}
X_1	-									
X_2	-.184	-								
X_3	.036	.060	-							
X_4	.218*	.274*	.611**	-						
X_5	.008	.246*	.121	.117	-					
X_6	-.101	.018	.012	-.017	.429**	-				
X_7	-.004	-.083	-.120	.017	-.056	-.073	-			
X_8	-.052	.010	-.032	-.230*	.036	.125	.248*	-		
X_9	.021	.062	-.051	.128	.180	-.033	-.006	.021	-	
X_{10}	-.150	.253*	.015	.062	.288**	.086	-.075	-.176	.238*	-

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

X_1 = Age X_2 = Education
X_3 = Farm Size X_4 = Annual Income
X_5 = Rice Cultivation Knowledge X_6 = Extension Contact
X_7 = Organizational Participation X_8 = Training Exposure
X_9 = Innovativeness X_{10} = Adoption of BRRI dhan 40

74