


**FACTORS AFFECTING ADOPTION OF BRRI DHAN 44
BY THE FARMERS OF BARISAL DISTRICT**

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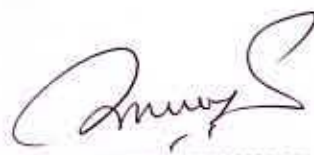
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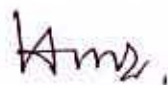
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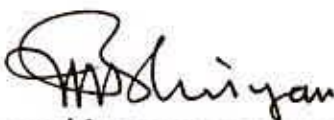
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CERTIFICATE

This is to certify that thesis entitled, **“FACTORS AFFECTING ADOPTION OF BRR1 DHAN 44 BY THE FARMERS OF BARISAL 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 **SHAYLA KHAN NIPA**, Registration No. **06-01910** 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: 02.09.2013
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**DEDICATED
TO
MY BELOVED PARENTS**

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FACTORS AFFECTING ADOPTION OF BRRI DHAN 44 BY THE FARMERS OF BARISAL DISTRICT


By

Shayla Khan Nipa

ABSTRACT

The main purpose of the study was to determine the extent of adoption of BRRI dhan 44 by the farmers of Barisal district and to explore the relationship between the selected factors of the farmers and their adoption of BRRI dhan 44. The study was conducted in six villages of Kashipur union under Sadar Upazila of Barisal District. A list of 322 BRRI dhan 44 growers was prepared with the help of respective SAAO and Agricultural Extension Officer of the Upazila and 110 farmers were selected at random. Pearson's correlation co-efficient was used to explore the relationship between the selected factors of the farmers and their adoption of BRRI dhan 44. In the study area BRRI dhan 44 introduced just two years ago. Findings showed that highest proportion (45.45 percent) of the farmers categorized into medium adoption category while almost same proportion (41.82 percent) into low adoption category in case of adoption of BRRI dhan 44. Only a small portion of the farmers were categorized into high adoption (12.73 percent) category. Among the seven selected factors only three factors namely family influence, attitude towards BRRI dhan 44 and rice cultivation knowledge affected the adoption of BRRI dhan 44.





Chapter I
Introduction

CHAPTER I

INTRODUCTION

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1.1 General Background

Bangladesh is mainly an agro-based country with an area of 1,47,570 sq. km. with an estimated population of about more than 150 millions. About 76.70 percent of its populations live in rural areas and 48.10 percent are engaged in agriculture (BBS, 2011). The predominance of agriculture in the country's economic life becomes all the evident if one looks at the magnitude of its contribution to Gross Domestic Product (GDP). According to BBS (2011) report, agriculture contributes 20.24 percent to GDP in the year 2011-2012. So, agriculture plays a vital role through employment generations, poverty alleviation, food security, enhance standard of living by increasing income level of rural population.

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 has to produce more food from the decreasing land and other natural resources to feed the growing population. As the population of the country is ever increasing, the farm holding size of a family is ever decreasing. Practically now-a-days all cultivable land is in use and the pressure of increasing population reduced the average size of the farm holding from 1.69 acres in 1996 to 1.48 acres in 2008

(BBS, 2011). This situation is steadily declining although there is acute food deficiency in the country.

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 is the fourth largest rice producing country in the world, following China, India and Indonesia (FAO, 2010). Per capita consumption of rice is also higher in Bangladesh. In Bangladesh a person on an average uptake 150 kilo of milled rice annually. People obtain 75 percent calorie from rice alone. This ratio is the highest in the world. Eventually Bangladesh needs more rice production.

Adoption of improved technologies by the farmers may play vital role for increasing rice production in Bangladesh. Among technologies, modern rice varieties play vital role for achieving higher yield. Bangladesh Rice Research Institute (BRRI) and Bangladesh Institute of Nuclear Agriculture (BINA) develop different rice varieties. Among these two institutes BRRI develops 60 rice varieties. 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 44 is being cultivated in southern region of Bangladesh was developed in 2005 for coastal area including Barisal District in Aman season as T. Aman.

The life duration of the variety is 145 days. This variety yields 1 ton/ha more than BR 11 and BRRI dhan 31 and average yield is 6.5 ton/ha. It requires less amount of urea and also tungro resistant. It requires minimum two weeding. With the increase of high tide water the height of the plant increases. Rice is coarse and bright golden color (Anonymous, 2012).

Farmers of Barisal district for the last couple of years are cultivating BRRI dhan 44 with expectation of high yield and other benefits. There are no much advertisements for promoting the variety, but farmers are practicing it. How they have been influenced? In fact there are many influencing factors in a social system through which a farmer can make decision to adopt an innovation. In BRRI dhan 44 some factors such as family size, annual income, neighborhood influence, family influence, attitude toward BRRI dhan 44, rice cultivation knowledge and organizational participation might influence the farmers. But we don't know how much these factors influence the farmers to adopt BRRI dhan 44. So, the researcher is very much interested to conduct research on influencing factors of adoption of BRRI dhan 44 by the farmers of Barisal district.

1.2 Statement of the Problem

The adoption of any practices depends on its dissemination among the potential users that is measured by the level of adoption of those practices. It is to be anticipated that certain sustainable development can take place in the agriculture of Bangladesh, if the technology can be transferred properly. When an innovation is introduced to the farmer, it may be readily accepted, partly accepted, fully accepted and it may also happen that the adoption of innovation is discontinued or totally stopped. These happenings are certainly due to a number of factors.

For wider adoption of BRRI dhan 44, it is necessary to have an understanding of the factors affecting to adopt BRRI dhan 44. An understanding about the same will be useful to the researcher, planners and extension workers in doing research, planning and execution of extension programs for enhancing adoption of BRRI dhan 44.

In view of the foregoing discussion, the researcher undertook a piece of study entitled, "Factors Affecting Adoption of BRRI dhan 44 by the Farmers of Barisal District", with the following questions:

1. What are the factors affecting the farmers of Barisal district to adopt BRRI dhan 44?
2. To what extent BRRI dhan 44 was adopted by the farmers?
3. To what extent the relationship between the factors affecting adoption of BRRI dhan 44 and its adoption by the farmers?



1.3 Objectives of the Study

Keeping in view the research questions the following objectives were framed out in order to give proper direction to the research work:

1. To determine and describe the factors affecting adoption of BRRI dhan 44 by the farmers of Barisal district. The factors are:
 - i) Family size
 - ii) Annual income
 - iii) Neighborhood influence
 - iv) Family influence
 - v) Attitude towards BRRI dhan 44
 - vi) Rice cultivation knowledge
 - vii) Organizational participation
2. To determine the extent of adoption of BRRI dhan 44 by the farmers of Barisal district.
3. To explore the relationship between the selected factors of the farmers and their adoption of BRRI dhan 44.

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.

The country is facing a chronic problem which is deficit of food grains due to rapid increase of population. So, to ensure adequate food supply it is necessary to give thrust to increase food production by using high yielding Aman varieties. Minimize food shortage and maximize self-sufficiency in food production is possible when adoption of selected high yielding Aman variety creates positive impact on the users. The characteristics of BRRI dhan 44 demonstrate that it has potentiality to

yield more than other T. Aman varieties that can make the country self sufficient in food production.

The major focus of the study was to assess the relationship between the selected factors affecting farmers' adoption of BRR1 dhan 44. The findings of the study will be especially applicable to Barisal district (the locale of the study). At present there is a lack of adequate information about the factors affecting adoption of BRR1 dhan 44. This indicates the need for a study to assess the relationship between the factors affecting adoption of BRR1 dhan 44 and its adoption by the farmers of Barisal district. Findings of this study will be helpful for BRR1 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 researcher was well adapted with the study area and its social activities. She collected data with utmost care and can be treated as reliable.
2. The respondents were capable of providing proper responses to the questions included in the interview schedule.
3. The questions included in the interview schedule were reasonably adequate to measure the adoption of BRR1 dhan 44.

4. Views and opinions furnished by the farmers were confined as representative opinions of the population of the study area.
5. The findings of the study would be useful for planning and execution of the programs in connection with diffusion of BRR1 dhan 44.

1.6 Limitations of the Study

The present study was undertaken with a view to having an understanding on the level of adoption of BRR1 dhan 44 by the farmers of Kashipur union of Barisal Sadar upazila under Barisal district. In order to conduct the research in a meaningful and manageable way it became necessary to impose some limitation with regard to certain aspects of the study. Considering this the researcher has been observed the following limitations throughout the study:

1. The study was confined to a union named Kashipur of Sadar upazila of Barisal district.
2. The study was restricted to adoption of BRR1 dhan 44 by the farmers of Barisal district.
3. There are many factors affecting adoption of BRR1 dhan 44 by the farmers but only seven factors were selected for the study which stated in the objectives. This was done due to complete the study within limited resources and time.
4. Only the rice growers who cultivated BRR1 dhan 44 were selected for this study.
5. 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 BRR1 dhan 44.
6. The researcher relied on the data furnished by BRR1 dhan 44 growers from their memory during interview.
7. Reluctance of the farmers to provide information was overcome by establishing rapport.

8. 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". In other way, adoption is a decision to make full use of an innovation as the best course of action available (Rogers, 1995). In this study adoption means extent of use of BRRI dhan 44 by the farmers of Barisal district.

BRRI dhan 44

BRRI dhan 44 is a HYV of T. Aman rice developed by Bangladesh Rice Research Institute (BRRI) in 2005. This variety is cultivated in Aman season in the southern region (non saline) of Bangladesh. The average life duration of this variety is 145 days. This variety yields 6.5 ton/ha. It requires less amount of urea and it is a tungro resistant variety.

Family Size

Family size is defined as the total number of individuals directly dependent upon the respondent farmers for every family demands. They usually live in the same homestead area and eat in the same kitchen. Family members include respondent farmer himself, his wife, children and other dependent members.

Annual Income

Annual income refers to the total earnings of a respondent farmer and family members liable to him/her from agriculture sectors as crop production, livestock production, poultry production, fisheries production etc. and non-agriculture sectors as business, service, day labor etc. during a year.

Neighborhood Influence

Neighborhoods are composed of a few families living within a boundary of social system, personally know to each other and have strong we feelings. The families essentially are closely associated with each other to safe gourd their social interests and mutual welfare (Bhuiyan, 2012). Farmers of Bangladesh are very much influenced by their neighbors in respect of adoption of new technology.

Family Influence

Family is the basic unit of a social system. The head of the family himself/herself does not decide alone to adopt an innovation or any other activity to be started. He/she needs a joint decision to solve any family problem. Family values positively associated with the acceptance of innovations or improvements in farming (Bhuiyan, 2012). Maximum families of Barisal district are joint family. Those

farmers very much depend on the decision of their family members and they are very much influenced with their family members.

Attitude of farmers towards BRRI dhan 44

Attitudes may be thought of as a person's perspective towards a specific target and way of predisposition to act, perceive, think and feel in relation to something (Bhuiyan, 2012). The term attitude towards BRRI dhan 44 of an individual was used to refer to his feelings, beliefs and action tendencies towards the various aspects of BRRI dhan 44.

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. In this study rice cultivation knowledge of farmers was assessed by asking 20 questions consisting of different dimensions of rice cultivation operations.

Organizational Participation

Organization participation of BRRI dhan 44 growers refers to the respondent farmers' involvement in different social or political organizations. An individual could take part in various activities of organization as ordinary member, executive committee member or officer (president, secretary etc.).





Chapter II

Review of Literature

CHAPTER II

REVIEW OF LITERATURE

The researcher made an elaborate search of available literature to find out the factors affecting adoption of BRRI dhan 44 and to determine its extent of adoption by the farmers and also to explore the relationship between the selected adoption factors. Available literatures were extensively reviewed to find out relevancy with the present research. 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 44. This chapter is divided into three major sections, the first section deals with the review of literature on concept of adoption, the second section deals with the relationship between factors affecting adoption of innovations by the farmers and the third section deals with the conceptual framework of the study.

2.1. Review of Literature on Concept of Adoption

Talukder (2006) and Islam (2007) quoting Hossain (1971) said that he carried out a study on the adoption of four improved practices by the farmers in Gouripur of Mymensingh district. The practices were (i) plant protection measure, (ii) recommended variety of paddy, (iii) line transplanting and (iv) recommended doses of fertilizers. It was revealed that among the respondent farmers 57.40 percent adopted plant protection measure, 35.51 percent adopted recommended variety of paddy, 25.36 percent adopted line transplanting and 11.52 percent adopted recommended dose of fertilizers. On an average only 32.34 percent respondents adopted improved rice production practices. It is to be mentioned here that

aforesaid research was conducted about 41 years ago. At that time farmers' attitude toward agricultural innovations was very much conservative.

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.

Islam (2007) quoting 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%) had low adoption followed by 33.3 percent medium and only 6.6 percent high 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. Interestingly, no low adoption was found. Compared to the study of Razzaque (1977) it is said that within 6 years the farmers of Mymensingh district adopted HYV rice with an increasing rate.

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.

Gogoi and Gogoi (1989) conducted a study on adoption of recommended plant protection practices in rice in Zorhat district of Assam state in India. The study revealed that one half of the respondents (50 percent) had low level of adoption, 35.36 percent medium level of adoption and 13.64 percent had high level of adoption of recommended plant protection practices. The study reveals that adoption behavior of farmers of India and Bangladesh is almost same.

Moni (2008) quoting Juliana *et al.* (1991) said that they undertook a study on adoption of integrated pest management practices among the different categories of farmers in five villages of Vasusdevanallar block in Tirunelveli district, Tamilnadu, India. They found that about 50 percent of marginal farmers, 47.50 percent of small farmers and 52.50 percent of big farmers had medium adoption and 42.50 percent of big farmers, 22.50 percent of small farmers and 5 percent of the marginal farmers had high level of adoption. In both adoptions level of big farmers' participation was higher in comparison to other categories of farmers.

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.

Khan (1993) carried out a research study on the adoption of insecticides and related issues in the villages of Pachar union, Madaripur district. He observed that among the respondent farmers, 7 percent had no adoption, 57 percent had low adoption, 32 percent had medium adoption and only 4 percent had high adoption of insecticides. On an average 31 percent of the respondent farmers of Pachar union of Madaripur district adopted insecticides.

Nikhade *et al.* (1993) observed in their study on adoption of improved practices of soybean cultivation that cent percent adopted improved varieties. More than 82 percent had complete adoption of package practices like timely sowing, spacing and inter cultural operations. Partial adoption was observed in majority of the soybean growers (74.6 percent) with regard to recommended seed rate.

Choudhury (1996) conducted a research on the adoption of Boro rice practices among the growers in Nowabgonj thana of Dhaka district. He found that 50 percent farmers had high adoption of improved technologies as compared to 35 percent having medium adoption and 15 percent with low adoption.

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.

Islam (1996) carried out a study on farmers' use of indigenous technical knowledge (ITK) in the context of sustainable agricultural development. He found that almost equal proportion of the respondents were lower user (42.73 percent) and medium

user (41.82 percent) respectively. The remaining (15.45 percent) of the respondents were in the higher user category.

Roy (1997) conducted a study on the adoption of IPM practices by the Boro rice growers in Sadar thana of Magura district. He found 55 percent Boro rice growers had medium adoption of IPM technology, while 25 percent had high and only 20 percent with low adoption. The findings show that majority of the Boro rice growers had medium adoption of IPM technology.

Kabir (2006) quoting 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.

Moni (2008) quoting 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.

Squire (2000) said that he studied on factors influencing traditional farmers to adopt improved food crop production technologies in BO district of Southern Sierra

Leone. He found that the 54 percent of the respondents adopted communication technology, almost equal number (55 percent) adopted artificial fertilizers, about two-thirds adopted mechanical technology, more than one half (53 percent) of the respondents adopted good to excellent eating quality of the improved crop varieties. The standard of adoption for pest and disease control, draught animal technology and planting technologies found to be 61 percent, 53 percent and 59 percent respectively.

Haidar *et al.* (2001) said that they studied on the adoption level of improved package for T-Aman rice cultivation in Gouripur upazila of Mymensingh district. He found that the 5 percent farmers were non-adopters, 62 percent had low adoption, 24.5 percent were medium adopter and 8.5 percent high adopter. A vast majority (95 percent) of the farmer's adopted MV of T. Aman rice.

Aurangojeb (2002) studied on the extent of adoption of integrated farming technology by the rural women in RDRS. He observed that the highest percent of rural women (64 percent) used high level, 28 percent of the women used medium level and only 8 percent used low level integrated homestead farming technologies.

Sardar (2002) studied on "adoption of IPM practices by the farmers under PETRRA Project of RDRS. He observed that majority (45.9 percent) of the farmers had medium, 38.3 percent had low and 15.8 percent had high adoption of IPM practices. The researches related to adoption of IPM shows that majority of the farmers had medium adoption of IPM practices. In adopting IPM practices the farmers of Bangladesh are little away from the optimum level.

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.

Haque (2003) found that the majority (47 percent) of the growers had medium adoption of modern maize cultivation technologies while 28 percent had high adoption and 25 percent low adoption.

Kabir (2006) quoting 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.

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.

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.

Talukder (2006) studied on adoption of selected rice production practices by the farmers of char-land of Gomoti River. He found that nearly 82 percent of the farmers had medium to high adoption.

Islam (2007) made a study on adoption of BRR1 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. However, an overwhelming majority (82.8 percent) had medium to high adoption.

2.2 Factors affecting adoption of innovations by the farmers

2.2.1 Family size and adoption of innovations

Hossain (1983) in his study in Bhabakhali union of Mymensingh district observed that family size of the farmers had no relationship with their adoption of HYV rice as transplanted aman. That is, family size has no influence on adoption of crop varieties.

Talukder (2006) quoting Ali *et al.* (1986) said that in their study they found adoption of improved sugarcane production technologies significantly increased with increased family size. That is, family size had significant positive relationship with adoption of improved sugarcane production technologies.

Hoque (1993) found family size of the growers had negative but significant relationship with their adoption of improved practices in sugarcane cultivation. That is, smaller the family size more the adoption of sugarcane cultivation.



Chowdhury (1997) conducted a research on adoption of selected BINA technologies by the farmers of Boira union in Mymensingh district. He observed that family size of the farmers had positive and significant relationship with the adoption of selected BINA technologies. That is every member of a family has a right to give decision on adoption of technologies. Thus the adopters of rice varieties are influenced in making adoption decision by his/her family members. Similar findings were observed by Barkatullah (1985), Okoro and Obibauka (1992), Pathak and Sasmal (1992), Ali (1993) and Sarkar (1997).

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

Aurangozeb (2002) conducted a study on adoption of integrated homestead farming technologies by the rural women in RDRS. He found that there was no relationship between family size and adoption of integrated homestead farming technologies.

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 family size of the rice growers were not related with the adoption of farming technologies.

Hossain (2006) said that family size of the farmers had significant relationship with their adoption of HYV rice. That is, with the increase of family members the adoption level of HYV rice will increase.

Kabir (2006) in his study found that family size had no significant relationship with the adoption of selected T. aman production technologies by the farmers. Similar finding was revealed by Talukder (2006) and Islam (2007).

Mamun (2006) conducted a study on adoption of urea super granule by the boro-rice growers and he found that there is no relationship between family size and adoption of urea super granule.

2.2.2 Annual income and adoption of innovations

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.

Singh (1989) in a study found that income of the farmers was significantly associated with the level of adoption of plant protection measures. That is, when the annual income of the farmers increase than the farmers can afford costly plant protection measures.

Talukder (2006) quoting 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.

Sarker (1997) found family income of potato growers had significant positive relations with their adoption of improved potato cultivation practices. Similar results were observed by Rahman (1986), Kashem (1991), Alam (1997), Chowduary (1997), Hossain (1999), Rahman (2001), Hussen (2001), Aurangozeb

(2002), Hossain (2003) and Hossain (2006), Kabir (2006), Talukder (2006), Mamun (2006).

Islam (2007) conducted a research on adoption of BRRI dhan 29 production technologies by the farmers. He found that annual income had a positive and significant relationship with the adoption of BRRI dhan 29 production technologies. That is, when the annual income of the farmers increased then the adoption of BRRI dhan 29 increased.

2.2.3 Neighborhood influence and adoption of innovations

BRRI dhan 44 a new variety and it was developed by Bangladesh Rice Research Institute in 2005. Farmers of Southern part of Bangladesh are practicing this variety very recently. Further, no research was found with this variable. However, the wishes to make a research on neighborhood influence in adoption of BRRI dhan 44 by the farmers of Barisal district. This would be the source of information generation in favor of influence of neighborhood in adoption of agricultural technologies.

2.2.4 Family influence and adoption of innovations

Maximum families of Barisal district are joint family. Those farmers very much depend on the decision of family members. For that reason the researcher wants to study the family influence on adoption of BRRI dhan 44 by the farmers of Barisal district.

2.2.5 Attitude towards BRRI dhan 44 and adoption of innovations

Hossain (1981) conducted a study on relationships of selected characteristics of the jute growers with their adoption of improved practices of jute cultivation. Attitude was one of the independent variables. He found that there was no relationship between attitude towards intensive jute cultivations scheme of the jute growers and their adoption of improved practices of jute cultivation.

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

Hossain (2006) and Talukder (2006) quoting Hasan (1996) said that he conducted a study on adoption of some selected agricultural technologies among the farmers as perceived by the frontline GO and NGO workers. He found that there was strong positive relationship between attitude towards development and perceived adoption of selected technologies.

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

Paul (2000) in his study stated that majority of the farmers showed favorable attitude toward urea super granule.

Hossain (2006) made a study on adoption of selected high yielding varieties of rice by the farmers of Rajpat union under Kasiani upazila in Gopalganj district. He found in his study that attitude towards HYV rice had a positive significant

relationship with the adoption of HYV rice. Similar findings were revealed by Mamun (2006) and Talukder (2006).

2.2.6 Rice Cultivation Knowledge and adoption of innovations

In most of the study it is found that farmers' knowledge on particular technology and its adoption has a positive relationships.

Koch (1985) observed that there was a strong positive relationship between knowledge and practice adoption. This finding is agrees with that of Rogers and Shoemaker (1971).

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.

Alam (1997) observed that agricultural knowledge of the rice growers had significant relationship with their use of farm practices in rice cultivation. Sarker (1997) also 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) and Mamun (2006) also found similar results.

2.2.7 Organizational participation and adoption of innovations

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.

Islam (2007) quoting Hossain (1983) said that in his study he found organizational participation of transplanted aman growers had no relationship with their adoption of HYV rice. Ali (1984) found that organizational participation of contact farmers had significant positive contribution to their agricultural knowledge.

Balasubramanian and Kaul (1985) studied on adoption of improved practices by fish trawler owners in Kerala. The study indicated no relationship between organizational participation and adoption of improved practices. Similar finding was also observed by Khan (1993) and Alam (1997).

Hossain (1991) studied on the adoption behavior of the contact wheat growers found organizational participation of the respondents had positive and significant effect on their adoption of improved farm practices.

Talukder (2006) quoting 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.

Chowdhury (1997) observed in his study that there was a significant positive relationship between farmers' organizational participation and their adoption of selected BINA technologies. Karim (1973), Halim (1985), Rahman (1986), Islam (1993), Bashar (1993), Hoque (1993), Khan (1993) and Pal (1995) also observed similar findings.

Paul (2000) observed respondents' organizational participation had significant relationship with the attitude to the use of urea super granule.

Khan (2002) found in his study that the organizational participation had significant and positive relationship with the adoption of Binashail rice variety at 0.05 level of probability.

Hossain (2006) revealed that organizational participation of the farmers had no significant relationship with their adoption of HYV rice.

Kabir (2006) found that organizational participation had a positive significant relationship with the adoption of selected T. aman production technologies. Mamun (2006) also found the similar results.

Talukder (2006) in his study found that organizational participation had no significant relationship with adoption of selected rice production practices by the farmers.

Islam (2007) conducted a research on adoption of BRR I dhan 29 production technologies by the farmers. He found that organizational participation had no relationship with adoption of BRR I dhan 29 by the farmers.

2.3 The Conceptual Framework of the Study

In scientific research, selection and measurement of variables constitute an important task. The conceptual framework of Rosenberg and Hoveland (1960) was kept in mind while framing the structural arrangement for the dependent and independent variables. The present study tried to focus two concepts: first, factors affecting adoption of BRR I dhan 44 and second, adoption of BRR I dhan 44 by the farmers of Barisal district.

Adoption of BRR I dhan 44 may be affected by many factors and also adoption will vary on the basis of technology. So, it is impossible to study with too many technologies and affecting factors in a single research. It was therefore, necessary to limit the independent and dependent variables. Independent variables which included family size, annual income, neighborhood influence, family influence, attitude towards BRR I dhan 44, rice cultivation knowledge and organizational participation and the dependent variable was adoption of BRR I dhan 44. 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.

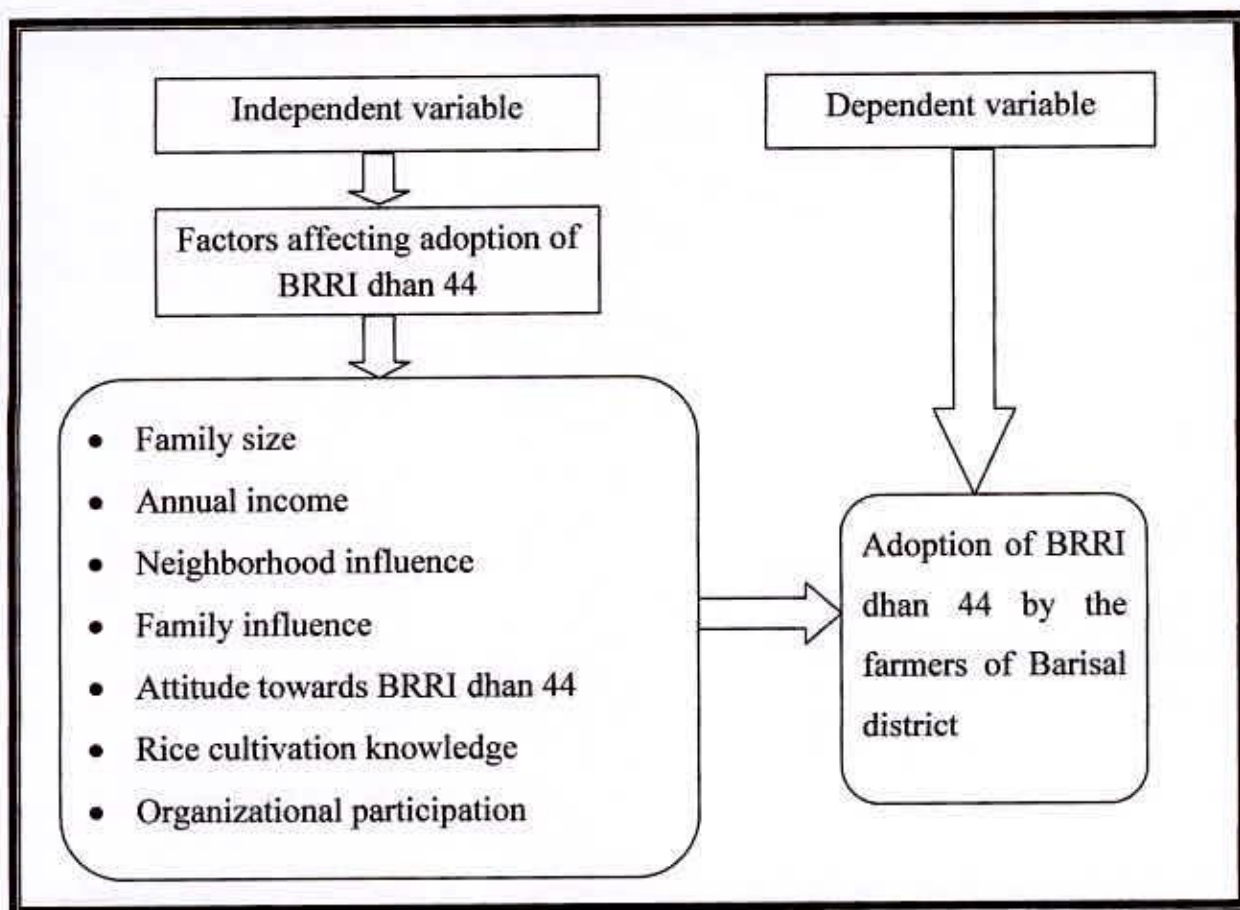


Figure 2.1 The Conceptual framework of the study





Chapter III

Methodology

CHAPTER III

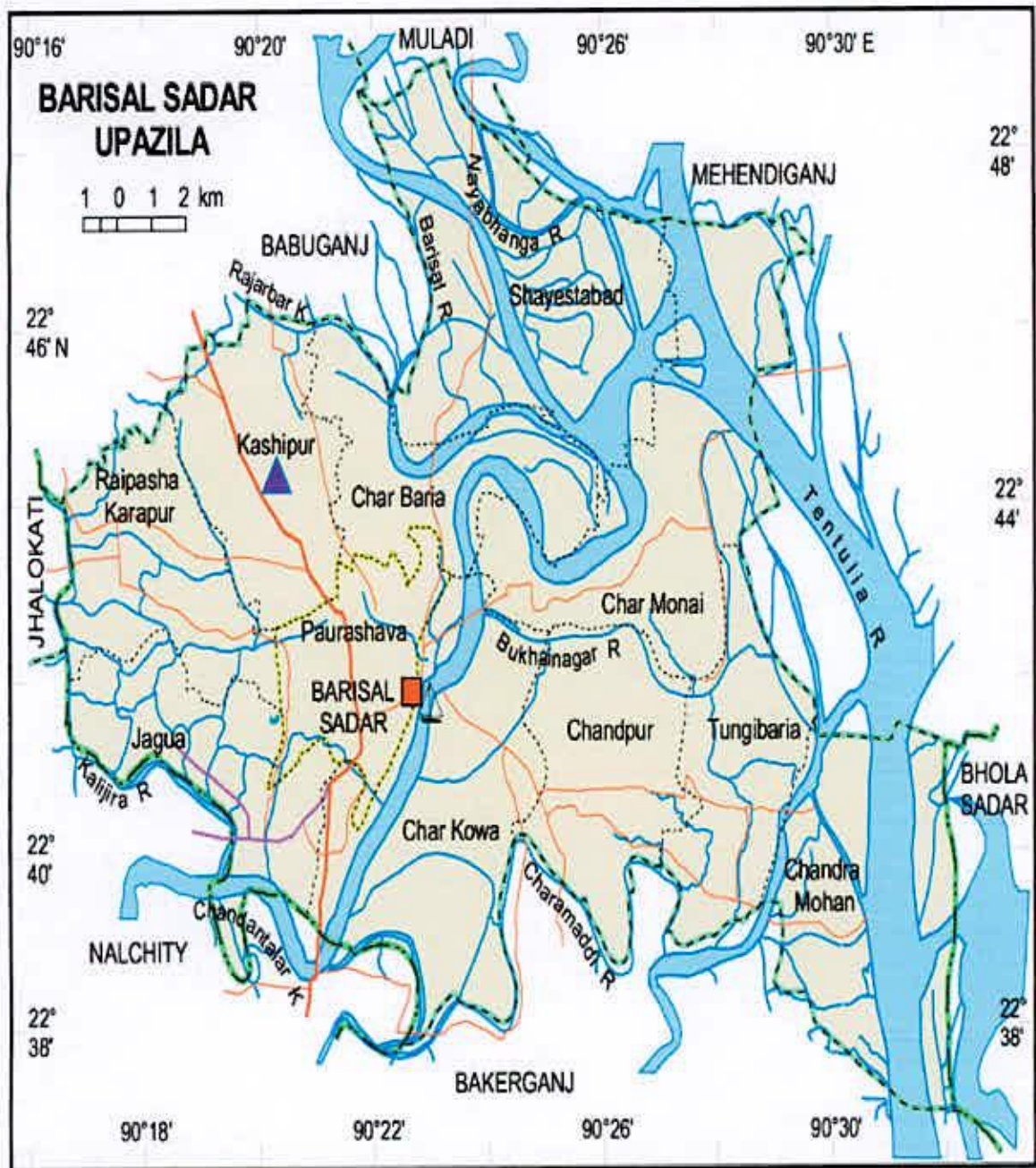
METHODOLOGY

Methods and procedures of collecting and analysis of data are very important in a research. Methodology should be appropriate so that the researcher will be able to collect necessary data and analyze them in an apposite way, which will help him/her to arrive at correct decision. Methods and procedures followed in conducting the study have been discussed in this chapter. The main aspects of methodology considered here are: (i) selection of locale of the study, (ii) population and sampling design, (iii) the research instrument and its preparation, (iv) data collection, (v) variables of the study and their measurement and (vi) data coding and tabulation.

3.1 Locale of the Study

Barisal District consists of 10 (Ten) upazila namely Barisal sadar, Hizla, Muladi, Ujirpur, Agyljhora, Babuganj, Mehendiganj, Bakerganj, Banaripara and Gournadi. Out of which Sadar Upazila was purposively selected as locale of the study. There are 10 unions in the Upazila namely Kashipur, Char Koa, Chanpura, Tungibaria, Charmonai, Jagua, Charbaria, Shayestabad, Chandramohan and Raipasa Korapur. Out of these unions Kashipur was selected randomly. There are 17 villages in Kashipur union namely Kashipur, Magarpara, Tilok, Behangan, Chaitpur, Barajjahat, Diapara, Haripasha, Sarshi, Goriarpar, Ishakathi, Bagia, Dillahbari, Bendtala, Befulia, Koromja and Baisarhat. Out of these villages, 6 villages of Kashipur union namely Lakutia, Magarpara, Chaitpur, Barajjahat, Sarshi and Bagia

were selected randomly. A map of Barisal Sadar Upazila showing the study area is presented in figure 3.1.



Legend:
 ▲ Location of the Study

Figure 3.1 Map of Barisal Sadar Upazila Showing Kashipur Union as the Locale of the Study

3.2 Population and Sampling

The farmers who were cultivating BRR1 dhan 44 of the randomly selected six villages were the population of the study. An update list of all farm family heads of these selected villages was prepared with the help of Sub-Assistant Agriculture Officer. The list comprised a total of 322 farmers who cultivate BRR1 dhan 44 in the study area. The numbers of BRR1 dhan 44 growers in six villages Lakutia, Magarpara, Chaitpur, Barajjahat, Sarshi and Bagia were enlisted as 74, 66, 63, 45, 48 and 26 respectively. Thirty four (34) 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 became 110 farmers. A reserve list of 9 farmers at the rate of 3 percent of the population was prepared by the same method so that in case, the individual included in the original samples were not available or not found at the time of data collection. The distribution of the BRR1 dhan 44 growers included the in the population, sample and reserve list are shown in Table 3.1.

Table 3.1. Distribution of population, sample and reserve list of respondents in six selected villages of Kashipur union under Barisal sadar upazila of Barisal district

| Sl. No. | Name of the Villages | Population | Sample Size | Number of Farmers in the Reserve List |
|---------|----------------------|------------|-------------|---------------------------------------|
| 01 | Lakutia | 74 | 25 | 2 |
| 02 | Magarpara | 66 | 22 | 2 |
| 03 | Chaitpur | 63 | 22 | 2 |
| 04 | Barajjahat | 45 | 16 | 1 |
| 05 | Sarshi | 48 | 16 | 1 |
| 06 | Bagia | 26 | 9 | 1 |
| Total | | 322 | 110 | 9 |

3.3 The Research Instrument and Its Preparation

For data collection an interview schedule was prepared as research instrument. It was prepared keeping the objectives and variables of the research in mind. The interview schedule contained both open and closed form of questions. Direct and simple questions were inserted in the schedule for both dependent and independent variables. The draft schedule was prepared in English with the assistance of the supervisor.

The interview schedule was pre-tested before final data collection. Ten farmers were interviewed for the pre-test where at least one farmer of each of the six villages was interviewed. 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.

3.4 Data Collection

Data were collected personally by the researcher herself through face to face interview with the randomly selected BIRRI dhan 44 growers of the six villages. During data collection the researcher took help from the local leaders and the Sub Assistant Agriculture Officer (SAAO) who was well acquainted with the respondents. The researcher made all possible efforts to collect pertinent and authentic information. Rapport was established prior to the interview and all the questions were rephrased. So no serious problem occurred during the interview. The coordination and cooperation of the respondents were very nice. The data collection was started on 20th February, 2013 and ended 31st March, 2013.

Data were collected from each of the interviewees with great reliance on their memory recall. The respondents were assured about the confidentiality of their information delivered to the researcher.

3.5 Hypothesis

In studying the relationship between variables, research hypotheses were formulated which state the anticipated relationship between the variables. "A hypothesis is a proposition, which can be put to a test to determine its validity. It may seem contrary to or in accord with commonsense. It may prove to be correct or incorrect. In any event, however, it leads to an empirical test" (Goode and Hatt, 1952). In studying relationship between variables a hypothesis was formulated

which stated the anticipated relationship between the variables. The null hypotheses were framed as “There is no relationship between the selected factors affecting adoption of BRRI dhan 44 and its adoption by the farmers”. The selected factors were:

- i) Family size
- ii) Annual income
- iii) Neighborhood influence
- iv) Family influence
- v) Attitude towards BRRI dhan 44
- vi) Rice cultivation knowledge
- vii) Organizational participation

3.6 Measurement of the Variables

Selection and measurement of variables is an important task in any descriptive research. In order to conduct a study in accordance with the objectives it was necessary to measure the variables. Accordingly measurements of variables are described in the following sub-sections:

3.6.1 Measurement of Independent Variables

The independent variables of this study were seven factors that affect the adoption of BRRI dhan 44 by the farmers of Barisal district. These were family size, annual income, neighborhood influence, family influence, attitude toward BRRI dhan 44, rice cultivation knowledge and organizational participation. Procedure for measuring independent variables has been discussed below:

Family Size

The family size of the respondents was measured in terms of actual number of his family members including himself. The scoring was considered by the actual number mentioned by the respondents. For example if a respondent mentioned he had 3 members in his family then his family size score was 3.

Annual Income

Annual income of a respondent was measured in '000' Taka on the basis of his yearly earning. All of his crops yields of previous year were recorded. Then all the yields 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 and his dependents were also included in the income computation. For calculation of income score, one score was assigned for each one thousand taka. For example if a respondent mentioned that his annual family income is 1,75,000 then his annual family income score would be 175.

Neighborhood Influence

Neighborhood influence was measured by computing neighborhood influence score. The respondents were asked five selective questions which were assigned according to the degree of influence high, medium, low and little influence as 4, 3, 2 and 1 respectively. The possible score of neighborhood influence was ranged from 5 to 20, where 5 indicated little neighborhood influence and 20 indicated high neighborhood influence.

Family Influence

The family influence was measured by construction of five statements which were asked to the respondents against which scores were assigned according to the degree of influence high, medium, low and little influence as 4, 3, 2 and 1 respectively. The possible score of neighborhood influence was ranged from 5 to 20, where 5 indicated little family influence and 20 indicated high family influence.

Attitude towards BRR1 dhan 44

Attitude of a respondent was used to refer his feelings and actions toward BRR1 dhan 44. With the help of my supervisor and co-supervisor 10 (Ten) statements were selected from which 5 (Five) were positive and 5(Five) were negative related to the adoption of BRR1 dhan 44. The respondents were asked to indicate their opinion about each of the statements. A 5-point scale was used to measure their attitude. The five options were 'Strongly Agree', 'Agree', 'Undecided', 'Disagree' and 'Strongly Disagree'. Scores assigned against those five responses were 5, 4, 3, 2, and 1 respectively for the positive statements and a reverse score was given for the negative statements. The sum total of the scores obtained by a respondent was his score for this variable. Thus the possible range of the score was 10 to 50, where 10 indicated highly unfavorable attitude and 50 indicated highly favorable attitude toward BRR1 dhan 44.

Rice Cultivation Knowledge

Rice cultivation knowledge of the respondents was measured by asking 20 (twenty) selected questions and each of the questions was assigned 2 (two) marks. Full score was assigned for each correct answer, one (1) for partially correct answer and zero

(0) for the wrong answer. Rice cultivation knowledge score could range from 0 which indicated very low knowledge to 40 indicated very high knowledge.

Organizational Participation

Organizational participation of a respondent was measured by computing an organizational participation score, which was assigned according to the nature of participation and duration of participation. The respondents were asked about their nature and duration of participation in 8 (eight) organizations and the scoring was done in the following way:

$$\text{Organizational participation score} = \sum P \times D$$

Where,

P = Participation score

D = Duration (no. of years) score

Participation score was assigned in the following method

| <u>Nature of Participation</u> | <u>Score</u> |
|--|--------------|
| No participation | 0 |
| Participation as an ordinary member | 1 |
| Participation as an executive member | 2 |
| Participation as President / Secretary | 3 |

If an individual is an executive member for four years his/her score of participation would be $4 \times 2 = 8$. One respondent had opportunity to involve in more than one organization. Thus his/her organizational participation score was obtained by adding the score of his/her participation in all the organizations.

3.6.2 Measurement of Dependent Variables

The dependent variable of this study was adoption of BRR1 dhan 44. Adoption of BRR1 dhan 44 was measured by using the following formula-

$$\text{Adoption of BRR1 dhan 44} = \frac{\text{BRR1 dhan 44 Used Area (l)}}{\text{Total Potential Area (L)}} \times 100$$

For doing this, the area used under BRR1 dhan 44 and the total potential area were determined by asking questions to the respondents. The result was obtained as percentage. The result of the above formula was the adoption score of the respective respondents. For example, if a farmer had total 100 decimal lands and he cultivated BRR1 dhan 44 in 30 decimal lands then his adoption score would be:

$$\begin{aligned}\text{Adoption of BRR1 dhan 44} &= \frac{30}{100} \times 100 \\ &= 30 \text{ percent.}\end{aligned}$$

Some of the farmers gave the information of adoption for two of years 2011 and 2012. In this case, first the adoption score for the two years was made and then the average of the scores was taken. For example, if one's adoption scores for 2011 and 2012 was 15 percent and 25 percent respectively, then his average adoption score would be-

$$\begin{aligned}\text{Average score} &= \frac{\text{Adoption score for 2011} + \text{Adoption score for 2012}}{2} \\ &= \frac{15 + 25}{2} \\ &= 20\end{aligned}$$

The adoption score could range from 0 to 100, where 0 (Zero) indicated no adoption and 100 indicated highest adoption.

3.7 Statistical Analysis

Data collected from the respondents were compiled, tabulated and analyzed in accordance with the objective of the study. Statistical measures such as frequency, percentage, range, mean and standard deviation were used for descriptive data. A statistical software package named Statistical Package for Social Science (SPSS) was used to analyze the data. In order to explore the relationship between the selected factors affecting adoption of BRR1 dhan 44 and its adoption by the farmers, Karl Pearson Correlation Co-efficient (r) was computed. Throughout the study 5 percent (0.05) and 1 percent (0.01) levels of significance were used as the basis of rejection or accepting the null hypothesis. If the computed value of correlation co-efficient was equal to or greater than the tabulated value at designated level of significance for the relevant degrees of freedom the null hypothesis was rejected and it was concluded that there was a significant relationship between the concerned variables. However, when the computed value of correlation co-efficient was found to be smaller than the tabulated value at designated level of significance for the relevant degrees of freedom the null hypothesis was accepted and it was concluded that there was no significant 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 quality of research largely depends on how the findings of the research are discussed and interpreted. To make the results and discussion meaningful data received from 110 BRR I dhan 44 growers were measured, analyzed, tabulated and statistically treated in accordance with the objectives of the study. This chapter deals with the findings of the study which have been discussed under the following sections: factors affecting adoption of BRR I dhan 44 by the farmers, extent of adoption of BRR I dhan 44 by the farmers and relationship between the selected factors affecting adoption of BRR I dhan 44 and its adoption by the farmers of Barisal District.

4.1 Factors Affecting Adoption of BRR I dhan 44

In this section the factors that affect the adoption of BRR I dhan 44 by the farmers of Barisal District have been discussed. The selected factors were: family size, annual income, neighborhood influence, family influence, attitude towards BRR I dhan 44, rice cultivation knowledge and organizational participation.

4.1.1 Family Size

The score of family size of the respondent farmers ranged from 2 to 7 with an average of 4.61 and standard deviation of 1.13. On the basis of family size the respondent farmers have been classified into 3 (three) categories, as “small” (up to 4), “medium” (5-6) and “large” (above 6). Table 4.1.1 shows the distribution of the farmers according to their family size.

Table 4.1.1 Distribution of the farmers according to their family size

| Categories | Farmers | | Mean | Standard deviation |
|-----------------|---------|---------|------|--------------------|
| | Number | Percent | | |
| Small (Up to 4) | 54 | 49.09 | 4.61 | 1.13 |
| Medium (5-6) | 48 | 43.64 | | |
| Large (Above 6) | 8 | 7.27 | | |
| Total | 110 | 100 | | |

Data presented in Table 4.1.1 shows that the highest proportion (49.09 percent) of the farmers belonged to the small family size category compared to 43.64 percent of the farmers belonged to medium category and a small portion (7.27 percent) to large family size category. The data also indicates that the average family size of the study area was 4.61 where the average family size of Bangladesh is 4.4 (BBS, 2011). It is very easy to take any decision in small or medium family. So, small and medium sized families influence the respondent farmers of the study area in adoption of BRRI dhan 44.

4.1.2 Annual Income

Annual income scores of the farmers ranged from 42 to 280 with an average of 108.44 and standard deviation of 50.06. On the basis of annual income the respondent farmers had been classified into 3 categories namely, low income category (up to 80), medium income category (81-160) and high income category (above 160) income category. Table 4.1.2 shows the distribution of the farmers according to their annual income.



Table 4.1.2 Distribution of the farmers according to their annual income

| Categories | Farmers | | Mean | Standard deviation |
|------------------|---------|---------|--------|--------------------|
| | Number | Percent | | |
| Low (Up to 80) | 34 | 30.91 | 108.44 | 50.06 |
| Medium (81-160) | 63 | 57.27 | | |
| High (Above 160) | 13 | 11.82 | | |
| Total | 110 | 100 | | |

Data from Table 4.1.2 reveal that the highest proportion of the farmers (57.27 percent) had medium income while 30.91 percent had low income and only 11.82 percent had high income. In fact the overwhelming 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 Table also shows that the average annual family income of the study area was 108.44 thousand taka where the national per capita income is 57.65 thousand taka (Bangladesh Economic Review, 2011). The average income of the respondent farmers in the study area is much higher than the average per capita income of the country. This might be due to the fact that the farmers in the study area were not only engaged in agriculture. They also earn from other sources, such as service, business etc.

4.1.3 Neighborhood Influence

Neighborhood influence score of the farmers ranged from 5 to 19 with an average of 8.80 and standard deviation of 4.13. Depending on the neighborhood influence

scores, the farmers have been categorized into 3 categories as, low influence (up to 7), medium influence (8-13) and high influence (above 13). Table 4.1.3 shows the distribution of the farmers according to their neighborhood influence.

Table 4.1.3 Distribution of the farmers according to their neighborhood influence

| Categories | Farmers | | Mean | Standard deviation |
|-----------------|---------|---------|------|--------------------|
| | Number | Percent | | |
| Low (Up to 7) | 61 | 55.46 | 8.80 | 4.13 |
| Medium (8-13) | 31 | 28.18 | | |
| High (Above 13) | 18 | 16.36 | | |
| Total | 110 | 100 | | |

Data contained in the Table 4.1.3 reveal that the highest proportion of the farmers had low (55.46 percent) neighborhood influence in adoption of BRR1 dhan 44. Whereas 28.18 percent had medium and 16.36 percent had high neighborhood influence in adoption of BRR1 dhan 44. Neighborhood influence is an important factor in innovation decision process. In this study it was also revealed that more than two-fifths (44.54 percent) of the respondent farmers had medium to high neighborhood influence in adoption of BRR1 dhan 44.

4.1.4 Family Influence

Family influence score of the respondent farmers ranged from 5 to 17 with an average of 7.91 and standard deviation of 3.81. According to the family influence scores the farmers had been categorized into three categories. The categories were low influence (up to 6), medium influence (7-12) and high influence (above 12).

Table 4.1.4 shows the distribution of the farmers according to their family influence.

Table 4.1.4 Distribution of the farmers according to their family influence

| Categories | Farmers | | Mean | Standard deviation |
|-----------------|---------|---------|------|--------------------|
| | Number | Percent | | |
| Low (Up to 6) | 53 | 48.18 | 7.91 | 3.81 |
| Medium (7-12) | 42 | 38.18 | | |
| High (Above 12) | 15 | 13.64 | | |
| Total | 110 | 100 | | |

Information presented in the Table 4.1.4 reveal that 48.18 percent of the farmers had low family influence in adoption of BRR1 dhan 44 while 38.18 percent had medium influence. Above one tenths (13.64 percent) of the respondent farmers had high family influence in adoption of BRR1 dhan 44. The data in the Table also reveal that above one half (51.82 percent) of the respondent farmers had medium to high influence. Conclusion can be drawn that the importance of family influence in adoption of BRR1 dhan 44 can hardly be over emphasized.

4.1.5 Attitude towards BRR1 dhan 44

The attitude towards BRR1 dhan 44 was ranged from 30 to 40 against the possible range of 10 to 50 with mean 35.96 and standard deviation 2.55. According to the attitude scores farmers were classified into three categories such as low (Up to 33), medium (34-36) and high (Above 36) attitude towards BRR1 dhan 44. Table 4.1.5 represents the distribution of farmers according to their attitude towards BRR1 dhan 44.

Table 4.1.5 Distribution of the farmers according to their attitude towards BRR1 dhan 44

| Categories | Farmers | | Mean | Standard deviation |
|-----------------|---------|---------|-------|--------------------|
| | Number | Percent | | |
| Low (Up to 33) | 19 | 17.27 | 35.96 | 2.55 |
| Medium (34-36) | 51 | 46.36 | | |
| High (Above 36) | 40 | 36.36 | | |
| Total | 110 | 100 | | |

Data presented in the Table 4.1.5 shows that highest proportion (46.36 percent) of the farmers had medium attitude towards BRR1 dhan 44 while 36.36 percent had medium and 17.27 percent high attitude towards BRR1 dhan 44. The data also indicates that the average attitude of the farmers in study area was 35.96. The Table also shows that more than four-fifths (83.72 percent) of the respondent farmers had medium to high attitude towards BRR1 dhan 44. It is clear that majority of the respondent farmers had positive attitude toward BRR1 dhan 44, which helped them to adopt it. BRR1 dhan 44 was introduced in the study area only two years ago. In near future all the farmers would have high attitude towards it.

4.1.6 Rice Cultivation Knowledge

Rice cultivation knowledge score of the respond farmers was assessed by asking them 20 questions and then marks were given to their answers. Their marks ranged from 22 to 40 against the possible range from 0 to 40. The average was 33.52 and standard deviation was 3.54. According to the rice cultivation knowledge scores the farmers were categorized into three categories such as low knowledge (22-27), medium knowledge (28-33) and high knowledge (34-40) rice cultivation

knowledge. Table 4.1.6 shows the distribution of the farmers according to their rice cultivation knowledge score.

Table 4.1.6 Distribution of the farmers according to their rice cultivation knowledge

| Categories | Farmers | | Mean | Standard deviation |
|--------------------------|---------|---------|-------|--------------------|
| | Number | Percent | | |
| Low Knowledge (22-27) | 6 | 5.45 | 33.52 | 3.54 |
| Medium Knowledge (28-33) | 44 | 40.00 | | |
| High Knowledge (34-40) | 60 | 54.55 | | |
| Total | 110 | 100 | | |

Data presented in the Table 4.1.6 reveals that 54.55 percent of the farmers had high rice cultivation knowledge while 40.00 percent had medium knowledge. Only a small portion (5.45 percent) of the farmers had low rice cultivation knowledge. The data shows that good rice cultivation knowledge helped the farmers to adopt BRRI dhan 44.

Rice is the staple food of Bangladesh. Farmers grow rice in three seasons. Extension workers constantly educating farmers newly developed rice production technologies. So, it is reasonable that almost all the farmers (94.55 percent) had medium to high rice cultivation knowledge.

4.1.7 Organizational Participation

The computed organizational participation scores of the farmers ranged from 0 to 50 with an average of 6.76 and standard deviation of 9.05. According to the scores of organizational participation the farmers were classified into no participation (0),

low participation (1-17), medium participation (18-34) and high participation (35-50). Table 4.1.7 represents the distribution of farmers according to their organizational participation scores.

Table 4.1.7 Distribution of the farmers according to their organizational participation

| Categories | Farmers | | Mean | Standard deviation |
|------------------------------|---------|---------|------|--------------------|
| | Number | Percent | | |
| No participation (0) | 31 | 28.18 | 6.76 | 9.05 |
| Low participation (1-17) | 71 | 64.54 | | |
| Medium participation (18-34) | 4 | 3.64 | | |
| High participation (35-50) | 4 | 3.64 | | |
| Total | 110 | 100 | | |

The data contained in the Table 4.1.8 show the most of the farmers of the study area had low organizational participation (64.54 percent). A mentionable number (28.18 percent) having no organizational participation while equal number (3.64 percent) of the farmers had medium and high organizational participation. The findings indicate that more than nine-tenths of the farmers (92.72 percent) had almost no or low participation. Most of the respondent farmers of Bangladesh are marginal and small. They work hard in their crop lands to insure two square meals. They cannot make time to be involved in any organization. However, extension workers should involve there in agriculture related organizations.

4.2 Adoption of BRRI dhan 44

The adoption score of BRRI dhan 44 ranged from 5 to 37 with an average of 17.54 and standard deviation 7.06. According to the adoption scores farmers' adoption of

BRRJ dhan 44 of the study area had been classified into three categories, which are low adoption (up to 15), medium adoption (16-26) and high adoption (above 26). Table 4.2 represents the distribution of farmers according to their adoption score of BRRJ dhan 44.

Table 4.2 Distribution of the farmers according to their adoption score of BRRJ dhan 44

| Categories | Farmers | | Mean | Standard deviation |
|--------------------------|---------|---------|-------|--------------------|
| | Number | Percent | | |
| Low adoption (Up to 15) | 46 | 41.82 | 17.54 | 7.06 |
| Medium adoption (16-26) | 50 | 45.45 | | |
| High adoption (Above 26) | 14 | 12.73 | | |
| Total | 110 | 100 | | |

Data presented in the Table 4.2 indicate that the highest proportion (45.45 percent) of the farmers categorized into medium adoption category while almost same proportion (41.82 percent) into low adoption category. Only a small portion of the farmers were categorized into high adoption (12.73 percent) category. BRRJ dhan 44 was introduced in the study area for two years ago. If the extension workers work properly to popularize this variety it may be possible to reduce the gap between the high and medium adoption and also the number of low adoption would be minimized.

4.3 Relationship between the Selected Factors Affecting Adoption of BRRJ dhan 44 and Its Adoption by the Farmers

The purpose of this section is to explore the relationship between the selected factors affecting adoption of BRRJ dhan 44 and its adoption by the farmers. The

selected factors constituted the independent variables and the adoption of BRR I dhan 44 is the dependent variable.

Karl Pearson correlation co-efficient 'r' was used to test the null hypothesis between the two concerned variables. 5 (five) percent and 1 (one) percent level of significance was used as the basis for rejection of any null hypothesis. The summary of the results of the correlation co-efficient between the selected factors affecting adoption of BRR I dhan 44 and its adoption by the farmers have been presented in Table 4.3. The correlation matrix is presented in Appendix B.

Table 4.3 Correlation Co-efficient between the Selected Factors Affecting Adoption of BRR I dhan 44 and Its Adoption by the Farmers

| Independent variables | Correlation Co-efficient | Dependent Variable | Tabulated Value of 'r' at 108 degree of freedom | |
|--------------------------------|--------------------------|---------------------------|---|-------|
| | | | 0.05 | 0.01 |
| Family Size | -0.224* | Adoption of BRR I dhan 44 | 0.183 | 0.238 |
| Annual Income | -0.125 ^{NS} | | | |
| Neighborhood Influence | 0.015 ^{NS} | | | |
| Family Influence | -0.092 ^{NS} | | | |
| Attitude towards BRR I dhan 44 | 0.978** | | | |
| Rice Cultivation Knowledge | 0.931** | | | |
| Organizational Participation | -0.130 ^{NS} | | | |

NS = Non significant

* = Significant at 5 percent (0.05) level

** = Significant at 1 percent (0.01) level



4.3.1 Family Size and Adoption of BRRRI dhan 44

The relationship between the family size of the farmers and their adoption of BRRRI dhan 44 was examined by testing the null hypothesis “There is no relationship between family size and adoption of BRRRI dhan 44”.

The calculated value of $r = -0.224$ (Table 4.2) was found to be greater than the tabulated value of r (0.183) at 5 percent level of significance with 108 degrees of freedom. So, the concerned null hypothesis in this aspect was rejected. It was therefore suggested that the family size of the farmers had a negative and significant relationship with their adoption of BRRRI dhan 44. The smallest is the beautiful. In a small family it is easy to take any decision and adoption is high in small family. So, small family size influences high adoption of BRRRI dhan 44.

4.3.2 Annual Income and Adoption of BRRRI dhan 44

The relationship between annual income of the farmers and their adoption of BRRRI dhan 44 was examined by testing the null hypothesis “There is no relationship between annual income and adoption of BRRRI dhan 44”.

The calculated value of $r = -0.125$ (Table 4.2) was found to be smaller than the tabulated value of r (0.183) at 5 percent level of significance with 108 degrees of freedom. So, no significant relationship was found between the annual income of the farmers and the adoption of BRRRI dhan 44.

Therefore, the concerned null hypothesis in this aspect could not be rejected. That means annual income of the farmers had no influence on the adoption of BRRRI dhan 44.

4.3.3 Neighborhood Influence and Adoption of BRR I dhan 44

The relationship between neighborhood influence of the farmers and their adoption of BRR I dhan 44 was examined by testing the null hypothesis “There is no relationship between neighborhood influence and adoption of BRR I dhan 44”.

The calculated value of ‘r’ = 0.015 (Table 4.2) was found to be smaller than the tabulated value of ‘r’ (0.183) at 5 percent level of significance with 108 degrees of freedom. So, no significant relationship was found between the neighborhood influence of the farmers and the adoption of BRR I dhan 44.

Therefore, the concerned null hypothesis in this aspect could not be rejected. That means neighborhood influence of the farmers had no influence on the adoption of BRR I dhan 44.

4.3.4 Family Influence and Adoption of BRR I dhan 44

The relationship between family influence of the farmers and their adoption of BRR I dhan 44 was examined by testing the null hypothesis “There is no relationship between family influence and adoption of BRR I dhan 44”.

The calculated value of ‘r’ = -0.092 (Table 4.2) was found to be smaller than the tabulated value of ‘r’ (0.183) at 5 percent level of significance with 108 degrees of freedom. So, no significant relationship was found between the family influence of the farmers and the adoption of BRR I dhan 44.

Therefore, the concerned null hypothesis in this aspect could not be rejected. That means family influence of the farmers had no influence on the adoption of BRR I dhan 44.

4.3.5 Attitude towards BRRRI dhan 44 and Adoption of BRRRI dhan 44

The relationship between the attitude of the farmers towards BRRRI dhan 44 and their adoption of BRRRI dhan 44 was examined by testing the null hypothesis “There is no relationship between attitude of the farmers towards BRRRI dhan 44 and adoption of BRRRI dhan 44”.

The calculated value of $r = 0.978$ (Table 4.2) was found to be greater than the tabulated value of r (0.238) at 1 percent level of significance with 108 degrees of freedom. It was therefore concluded that the attitude of the farmers towards BRRRI dhan 44 had a positive and significant relationship with their adoption of BRRRI dhan 44. So, the concerned null hypothesis in this aspect has been rejected.

In the study area attitude of the respondent farmers towards BRRRI dhan 44 was positive. It means that when attitude towards a specific innovation increases then its adoption increases.

4.3.6 Rice Cultivation Knowledge and Adoption of BRRRI dhan 44

The relationship between the rice cultivation knowledge of the farmers and their adoption of BRRRI dhan 44 has been examined by testing the null hypothesis “there is no relationship between rice cultivation knowledge of the farmers and adoption of BRRRI dhan 44”.

The calculated value of $r = 0.931$ (Table 4.2) was found to be greater than the tabulated value of r (0.238) at 1 percent level of significance with 108 degrees of freedom. It was therefore concluded that the rice cultivation knowledge of the

farmers had a positive and significant relationship with their adoption of BRR I dhan 44. So, the concerned null hypothesis in this aspect has been rejected.

So, it can be concluded that rice cultivation knowledge of the respondent farmers highly influenced in adoption of BRR I dhan 44. It means that if rice cultivation knowledge of farmers will high then adoption of BRR I dhan 44 will be high.

4.3.7 Organizational Participation and Adoption of BRR I dhan 44

The relationship between organizational participation of the farmers and their adoption of BRR I dhan 44 was examined by testing the null hypothesis “There is no relationship between organizational participation and adoption of BRR I dhan 44”.

The calculated value of ‘r’ = -0.130 (Table 4.2) was found to be smaller than the tabulated value of ‘r’ (0.183) at 5 percent level of significance with 108 degrees of freedom. So, no significant relationship was found between the organizational participation of the farmers and the adoption of BRR I dhan 44. Therefore, the concerned null hypothesis in this aspect could not be rejected. That means organizational participation of the farmers had no influence on the adoption of BRR I dhan 44.



Chapter V

Summary, Conclusion and Recommendations

CHAPTER V

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

5.1.1 Introduction

Agriculture is a great potential sector of Bangladesh economy. Agricultural productivity of this country can be increased unprecedentedly by transferring the new technologies among the farmers. The value of agricultural technologies can be understood if the ultimate users – the farmers use them.

As, rice is the staple food of the country and important source of nutrition so, the increase of rice production has to be increased. Bangladesh has to produce more food from the decreasing land and other natural resources to feed the growing population. As the population of the country is ever increasing, the farm holding size of a family is ever decreasing. Aman rice area shows a slow increasing trend and shares about 30.75 percent of total rice production. So it is necessary to take initiative to increase the production of Aman rice.

Adoption of improved technologies by the farmers may play vital role for increasing rice production in Bangladesh. Among technologies, modern rice varieties play vital role for achieving higher yield. BRRI dhan 44 is being cultivated in southern region of Bangladesh was developed by Bangladesh Rice Research Institute (BRRI) in 2005 for coastal area including Barisal District in Aman season as T. Aman.

The life duration of the variety is 145 days. This variety yields 1 ton/ha more than BR 11 and BRRI dhan 31 and average yield is 6.5 ton/ha. It requires less amount of

urea and also tungro resistant. It requires minimum two weeding. With the increase of high tide water the height of the plant increases. Rice is coarse and bright golden color.

Farmers of Barisal district for the last couple of years are cultivating BRRI dhan 44 with expectation of high yield and other benefits. There are no much advertisements for promoting the variety, but farmers are practicing it. In fact there are many influencing factors in a social system through which a farmer can make decision to adopt an innovation.

5.1.2 Objectives of the Study

1. To determine and describe the factors affecting adoption of BRRI dhan 44 by the farmers of Barisal district. The factors are:
 - i) Family size
 - ii) Annual income
 - iii) Neighborhood influence
 - iv) Family influence
 - v) Attitude towards BRRI dhan 44
 - vi) Rice cultivation knowledge
 - vii) Organizational participation
2. To determine the extent of adoption of BRRI dhan 44 by the farmers of Barisal district.
3. To explore the relationship between the selected factors of the farmers and their adoption of BRRI dhan 44.

5.1.3 Methodology

Sadar Upazila of Barisal District was the locale of the study. A union of Sadar Upazila name Kashipur was selected randomly from 10 unions. Six villages of Kashipur union namely Lakutia, Magarpara, Chaitpur, Barajjihat, Sarshi and Bagia were selected randomly. An update list of all farm family heads of these selected villages was prepared with the help of Sub-Assistant Agriculture Officer. The list comprised of 322 farmers who cultivate BRRI dhan 44 in the study area. Thirty four (34) 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 110 farmers. A reserve list of 9 farmers at the rate of 3 percent of the population was prepared by the same method so that in case, the individual included in the original samples were not available or not found at the time of data collection. For data collection an interview schedule was prepared as research instrument. It 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 are: family size, annual income, neighborhood influence, family influence, attitude towards BRRI dhan 44, rice cultivation knowledge and organizational participation and the dependent variable is the adoption of BRRI dhan 44 by the farmers of Barisal district. All these variables of the study were measured by computing appropriate scores. Various statistical measures such as mean, standard deviation, percentage and range were used in describing both the independent and dependent variables. To explore the

relationship between the independent and dependent variables Correlation Coefficient was measured.

5.1.4 Findings

The major findings of the study are summarized below:

Farmers' adoption of BRR I dhan 44

The highest proportion (45.45 percent) of the farmers felt into medium adoption category while almost same proportion (41.82 percent) felt into low adoption category. Only a small portion of the farmers felt into high adoption (12.73 percent) category.

Factors Affecting Adoption of BRR I dhan 44

Family size

The highest proportion (49.09 percent) of the farmers belongs to the small family size category compared to 43.64 percent of the farmers belonged to medium category and only a small portion (7.27 percent) to large family size category.

Annual Income

The highest proportion of the farmers (57.27 percent) had medium income while 30.91 percent had low income and only 11.82 percent had high income.

Neighborhood Influence

The highest proportion of the farmers had low (55.46 percent) neighborhood influence in adoption of BRR I dhan 44. On the other hand 28.18 percent had medium while 16.36 percent had high neighborhood influence in adoption of BRR I dhan 44.

Family Influence

About 48.18 percent of the farmers had low family influence in adoption of BRR I dhan 44 while 38.18 percent had medium influence. Only a small portion (13.64 percent) of the farmers had high family influence in adoption of BRR I dhan 44.

Attitude towards BRR I dhan 44

Highest proportion (46.36 percent) of the farmers had medium attitude towards BRR I dhan 44 while 36.36 percent had medium and 17.27 percent high attitude towards BRR I dhan 44.

Rice Cultivation Knowledge

About 54.55 percent of the farmers had high rice cultivation knowledge while 40.00 percent had medium influence. Only a small portion (5.45 percent) of the farmers had low rice cultivation knowledge.

Organizational Participation

Most of the farmers of the study area had low organizational participation (64.54 percent). A mentionable number (28.18 percent) having no organizational participation while equal number (3.64 percent) of the farmers had medium and high organizational participation.

Relationship between the Selected Factors Affecting Adoption of BRR I dhan 44 and Its Adoption by the Farmers

Attitude towards BRR I dhan 44 and rice cultivation knowledge of the farmers had positive significant relationship with their adoption of BRR I dhan 44. Family size of the farmers had significant negative relationship with their adoption of BRR I

dhan 44. Other variables had no significant relationship with adoption of BRRI dhan 44.

5.2 Conclusion

Conclusions have been drawn on the basis of the findings of the study, the logical interpretation of their meanings and other relevant facts are presented below:

- I. 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. The history of BRRI dhan 44 is very short. If the DAE gives proper attention the gap between high and medium adoption is likely to be decreased.
- II. There was highly significant and positive relationship between attitude of the farmers towards BRRI dhan 44 with its adoption. Therefore, it may be concluded that as the farmers hold favorable attitude towards BRRI dhan 44 its adoption rate is also likely to be increased.
- III. Rice cultivation knowledge of the farmers showed a positive and significant relationship with their adoption of BRRI dhan 44. High rice cultivation knowledge was possessed by the farmers who have high social status and they were generally respected in the society.
- IV. Annual income, neighborhood influence and family influence of the farmers had no relationship with the adoption of BRRI dhan 44. But neighborhood influence and family influence cannot be ignored.

V. According to the findings, organizational participation of BRRI dhan 44 farmers showed no significant relationship with their adoption. Unfortunately, the level of participation of the farmers was found to be quite low. This is evident from the fact that 64.54 percent of the farmers had low participation. Hence, it may be concluded that there is need for higher participation of the farmers. There are many GO and NGO organization in the grass root level. Change agents of those organizations can inspire farmers to participate with their programs.

5.3 Recommendations

The adoption of innovation largely depends on its affecting factors 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. In view of the importance of the increase of the production of rice, the adoption of BRRI dhan 44 should be more. Therefore, it may be recommended that the farmers should be encouraged by the BRRI, DAE, agricultural input dealers and other concerned organizations personnel to form favorable attitude towards BRRI dhan 44. In this context frequent farmers' training, result demonstrations, motivation tour should be arranged.

- II. 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.
- 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.

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 44. Therefore, the following recommendations were made for further study:

- I. The present study was conducted in Khshipur union of Barisal sadar upazila under Barisal district. It is recommended that similar studies should be conducted in other areas of Bangladesh.
- II. This study investigates the relationship of seven selected factors that affects the adoption of BRRI dhan 44 by the farmers with their adoption as dependent variables. Therefore, it is recommended that further study be conducted with other independent variables.
- III. 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

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CHAPTER VI

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Appendixes

APPENDIX-A

ENGLISH VERSION OF THE INTERVIEW SCHEDULE
 DEPARTMENT OF AGRICULTURAL EXTENSION AND INFORMATION SYSTEM
 SHER-E-BANGLA AGRICULTURAL UNIVERSITY, DHAKA-1207
 AN INTERVIEW SCHEDULE FOR COLLECTION OF DATA
 ON
 FACTORS AFFECTING ADOPTION OF BRRI DHAN 44 BY THE FARMERS OF
 BARISAL DISTRICT

SL. NO.....

Name of the respondent :

Father's name :

Village :

Union :

Upazilla :

District :



Please answer the following questions:

1. Family Size

How many members are there in your family including you? persons

2. Annual Income

Please mention your family income from the following sources:

| Sl. No. | Source of income | Total Production (Kg) | Price per Kg | Amount of Taka |
|---------|---|-----------------------|--------------|----------------|
| A. | Agricultural sources a) Vegetable production b) Crop production Rice Wheat Maize Sugarcane Pulse Oil seed Fruits (Mango, Jackfruit, Banana etc.) Others | | | |

| | | | | | |
|-------------|--------------------------|---|--|--|--|
| | | c) Livestock production Cow (No.) Milk (Kg) Meat (Kg) d) Poultry production (No.) e) Fisheries production (Kg) | | | |
| B. | Non-agricultural sectors | a) Business b) Service c) Labor d) Others (please specify) | | | |
| Total (Tk.) | | | | | |

3. Neighborhood Influence

Please mention how much your neighbors influence you in adoption of BRR I dhan 44.

| Sl. No. | Statements | Extent of Influence | | | |
|---------|--|---------------------|------------------|---------------|------------------|
| | | High influence | Medium influence | Low influence | Little influence |
| 1 | My neighbors are very much innovative and their activities are imitable. | | | | |
| 2 | My neighbors frequently visit my house and advice me to adopt BRR I dhan 44. | | | | |
| 3 | My neighbors have more knowledge about modern agricultural practices. | | | | |
| 4 | My neighbors help me managing seeds of BRR I dhan 44 for me. | | | | |
| 5 | My neighbors visit my farm, observe and provide necessary suggestion in cultivating BRR I dhan 44. | | | | |

4. Family Influence

Please mention how your family members influence you in adoption of BRR1 dhan 44.

| Sl. No. | Statements | Extent of Influence | | | |
|---------|---|---------------------|------------------|---------------|------------------|
| | | High influence | Medium influence | Low influence | Little influence |
| 1 | My son is cosmopolite and has enough innovational knowledge. | | | | |
| 2 | My brother is a literate person. He influences me in adoption of BRR1 dhan 44 | | | | |
| 3 | Every member of my family is literate. So, my family influences me in adoption of BRR1 dhan 44. | | | | |
| 4 | My family is a modern one. An agricultural innovation is always attracted to us. | | | | |
| 5 | My family has a reputation of adoption of new rice varieties and any other technologies. | | | | |

5. Attitude Towards BRR1 dhan 44

Indicate the degree of agreement against the following statements

| Sl. No. | Statement | Nature of Opinion | | | | |
|---------|--|-------------------|-------|-----------|----------|-------------------|
| | | Strongly agree | Agree | Undecided | Disagree | Strongly disagree |
| 1 | BRR1 dhan 44 yields 20% higher compared to other HYV Aman varieties. | | | | | |
| 2 | It possesses average life duration. | | | | | |
| 3 | It requires less amount of urea. | | | | | |
| 4 | It is a tungro resistant variety. | | | | | |
| 5 | Adoption of this variety is risky. | | | | | |
| 6 | Color of both paddy and rice is attractive. | | | | | |
| 7 | The grain is course but tasty. | | | | | |
| 8 | The variety is susceptible to fungal disease. | | | | | |
| 9 | Its intercultural operation is more labor intensive. | | | | | |
| 10 | No serious insect infestation was found in BRR1 dhan 44. | | | | | |

6. Rice Cultivation Knowledge

Please answer the following question

| Sl. No. | Questions | Assign score | Obtained marks |
|---------|---|--------------|----------------|
| 1 | Name three high yielding varieties of rice that you cultivate in Aus, Aman and Boro season. | 2 | |
| 2 | Mention two major insects of rice. | 2 | |
| 3 | What are the qualities of good rice seed? | 2 | |
| 4 | What type of soil is suitable for rice cultivation? | 2 | |
| 5 | Name two diseases of rice. | 2 | |
| 6 | Mention two HYV varieties of T. Aman recommended for flood prone area. | 2 | |
| 7 | Mention two harmful weeds of rice field. | 2 | |
| 8 | What precautions should be followed at the time of pesticide application? | 2 | |
| 9 | Mention at least one insecticide, fungicide and one herbicide used in rice cultivation. | 2 | |
| 10 | How much cow dung is required for rice cultivation per bigha? | 2 | |
| 11 | What types of irrigation are needed in boro rice cultivation? | 2 | |
| 12 | How much irrigation is required in boro rice cultivation? | 2 | |
| 13 | Mention two major problems of rice cultivation. | 2 | |
| 14 | Mention the fertilizer doses in rice cultivation (Urea, TSP, MP). | 2 | |
| 15 | In which season yield of rice is high? | 2 | |
| 16 | Mention two important machineries mostly use in rice cultivation. | 2 | |
| 17 | Mention the optimum age of seedlings for transplanting in Aus, Aman and Boro season. | 2 | |
| 18 | Mention the duration of Aus, Aman and Boro season. | 2 | |
| 19 | Name the intercultural operations required in seedbed. | 2 | |
| 20 | In which season rice cultivation is profitable- Aus, Aman or Boro? | 2 | |
| | Total | 40 | |

7. Organizational Participation

Please give a detail information about your organizational participation according to the following table.

| Sl. No. | Name of the organization | Nature of participation | | | | |
|---------|----------------------------------|-------------------------|-----------------|------------------|---------------------|------------------|
| | | No participation | Ordinary member | Executive member | President/Secretary | Duration (Years) |
| 1 | NGO co-operative | | | | | |
| 2 | Mosque/Mondir committee | | | | | |
| 3 | School committee | | | | | |
| 4 | Union parishad | | | | | |
| 5 | Farmers co-operative association | | | | | |
| 6 | Bazaar committee | | | | | |
| 7 | Youth club | | | | | |
| 8 | Village development committee | | | | | |
| 9 | Others (please specify) | | | | | |

8. Adoption of BRR I dhan 44

| Sl. No. | Adoption of BRR I dhan 44 | 2011 | | 2012 | |
|---------|-------------------------------------|--------------------|---------------|--------------------|---------------|
| | | Potential area (p) | Used area (u) | Potential area (p) | Used area (u) |
| 01 | Recommended variety (BRR I dhan 44) | | | | |

Thanks for your cooperation

Dated -----

Signature of the Interviewer

APPENDIX-B

Correlation Matrix of the Dependent and Independent Variables

| | | X ₁ | X ₂ | X ₃ | X ₄ | X ₅ | X ₆ | X ₇ | X ₈ |
|----------------|---|-----------------------|----------------------|-----------------------|----------------------|-----------------------|-----------------------|----------------------|----------------|
| X ₁ | Pearson Correlation Sig. (2-tailed) N | | | | | | | | |
| X ₂ | Pearson Correlation Sig. (2-tailed) N | .126 .189 110 | | | | | | | |
| X ₃ | Pearson Correlation Sig. (2-tailed) N | .069 .472 110 | .021 .829 110 | | | | | | |
| X ₄ | Pearson Correlation Sig. (2-tailed) N | -.076 .429 110 | .052 .590 110 | .667** .000 110 | | | | | |
| X ₅ | Pearson Correlation Sig. (2-tailed) N | -.217* .022 110 | -.121 .207 110 | .064 .510 110 | -.025 .798 110 | | | | |
| X ₆ | Pearson Correlation Sig. (2-tailed) N | -.231* .015 110 | -.135 .161 110 | .060 .536 110 | .004 .966 110 | .966** .000 110 | | | |
| X ₇ | Pearson Correlation Sig. (2-tailed) N | .112 .246 110 | .011 .911 110 | -.120 .212 110 | -.003 .977 110 | -.116 .228 110 | -.092 .339 110 | | |
| X ₈ | Pearson Correlation Sig. (2-tailed) N | -.224* .019 110 | -.125 .195 110 | .015 .879 110 | -.092 .337 110 | .978** .000 110 | .931** .000 110 | -.130 .175 110 | |

Where

** = Correlation is significant at 0.01 level (2-tailed)

* = Correlation is significant at 0.05 level (2-tailed)

X₁ = Family Size

X₂ = Annual Income

X₃ = Neighborhood Influence

X₄ = Family Influence

X₅ = Attitude towards BRR1 dhan 44

X₆ = Rice Cultivation Knowledge

X₇ = Organizational participation

X₈ = Adoption of BRR1 dhan 44

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