ADOPTION OF BRRI DHAN 29 PRODUCTION TECHNOLOGIES BY THE FARMERS

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CERTIFICATE

This is to certify that thesis entitled "**ADOPTION OF BRRI DHAN 29 PRODUCTION TECHNOLOGIES BY THE FARMERS"** Submitted to the Faculty of Agriculture, Sher-e-Bangla Agricultural University, Dhaka, in partial fulfillment of the requirements for the degree of **MASTERS OF SCIENCE IN AGRICULTURAL EXTENSION AND INFORMATION SYSTEM,** embodies the result of a piece of *bona fide* research work carried out by **Mohammad Zahorul Islam** Roll No. 27535/00709, Registration No. 27535/00709 under my supervision and guidance. No part of the thesis has been submitted for any other degree or diploma.

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

Dated: 19.2.08
Dhaka, Bangladesh

Prof. Mohammad Hossain Bhuiyan
(Supervisor)

DEDICATED TO MY BELOVED PARENTS AND BROTHERS

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ABSTRACT

ADOPTION OF BRRI DHAN 29 PRODUCTION TECHNOLOGIES BY THE FARMERS

The main purpose of the study was to determine and describe the extent of adoption of BRRI dhan 29 production technologies by the farmers and to explore the relationships between the selected characteristics of the respondents and their extent adoption of BRRI dhan 29 production technologies. The study was conducted in Shambhag union covering two villages of Dhamrai upazila under Dhaka district. Data were collected from the farmers by using a pre-tested interview schedule during the period from 15th July to 17th August 2007. From the study it was found that the highest proportion (74 percent) of the farmers had high adoption of BRRI dhan 29 production technologies compared to medium (26 percent) adoption of BRRI dhan 29 production technologies. Pearson Product Moment Correlation(r) test was used to ascertain the relationships between the concerned dependent and independent variables of the study. Findings revealed that education, farm size, annual family income, commercialization, cosmopoliteness and extension contact showed positive significant relationship with their adoption. On the other hand age, family size and organizational participation did not show any significant relationship with their adoption of BRRI dhan 29 production technologies.

CHAPTER-I
INTRODUCTION

CHAPTER 1

INTRODUCTION

1.1 General Background

Bangladesh is predominantly an agricultural country. Comprising 139.76 million (BBS-2005) sq. km. of area with an estimated population is about more than 140 millions. This country is regarded as one of the most densely populated area of the world. About 79.9 percent of its population live in rural areas and 62 percent of the country's total labour force are engaged in Agriculture (BBS, 2003). According to the BBS report, agriculture output prices have been found to contribute 23.50% to the GDP in which 13.44% comes from crops, 1.90% from forestry, 2.93% from livestock and 5.23% from fisheries (BBS 2003). Agriculture plays a vital role in the development of Bangladesh economy through production, employment generation and poverty alleviation.

As the population of the country is ever increasing, the farm holding size of a family is ever decreasing. Practically nowadays 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 2005 (BBS-2005). This situation is steadily declining although there is acute food deficiency in the country.

Rice is the major food crop in Bangladesh. It is the people's main food and energy source. It grows in three seasons namely; Aus, Aman and Boro. Nearly 76.27

percent of the total cultivated area used for rice (Aus, Aman and Boro) and its total production 2,61,89,000 metric tons (BBS, 2004). Among the total rice production area, 11.11 percent land was under Aus, 52.46 percent land was under Aman and 36.43 percent land was under Boro (BBS, 2004). Currently the average yield of rice in Bangladesh is around 1.8 t/ha (Anonymous. 1999), which is less than the world average of 2.9 t/ha and frustratingly much below the highest producing country average in Korea (6.1 t/ha). The average rice yields of some countries are: USA 6.62 t/ha, South Korea 6.87 t/ha, Japan 6.41 t/ha and China 6.32 t/ha (FAO, 2000).

A remarkable change in rice production has been already observed in Bangladesh after introducing of HYV varieties of rice. Bangladesh Rice Research Institute (BRRI) has developed and released 46 Modern Varieties (MVS) having potential to produce 2.0 or more times yield than those of traditional varieties.

Whenever an innovation is generated, effort has been made to diffuse the innovation. There is a grave need to increase the rice production. HYV varieties are always encouraged and emphasize is given to adopt them by the farmer. Among those HYV varieties BRRI Dhan 29 variety was overwhelmingly accepted by the farmers.

Among the Boro HYV BRRI dhan 29 has high performance. Its therefore necessary that concept and benefits of the BRRI dhan 29 along with modern

production technologies should disseminated to the farmers in a convincing and attractive manner. So that farmers response quickly to adopt those technologies.

Since the country is densely populated there is a least scope to increase production by horizontal expansion. Consequently intensive or vertical expansion by using high cost agricultural practices and input are the only way to increase food production. This inputs considered are usually MV seeds, fertilizers, irrigation, pesticides etc. Accordingly efforts are being made to encourage farmers to accept and make use of the research findings. Nevertheless, the technologies are not being used by all the farmers at an equal rate. Some of there respond to an innovation quickly while other delay or sometimes don't adopt at all.

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

It is, therefore, necessary that the concept and benefits of modern technologies should be disseminated to the farmers in convincing and attractive manner, so that farmer response quickly to adopt those technologies. This is undoubtedly an educative process and, concerned mainly with increasing agricultural production

and improving living standards of farmers. Recently the government has taken a new agricultural extension policy to reach the desired goal.

An individual usually doesn't adopt a new technology unless he finds the benefit of it by himself. Even if he is convinced about its benefit still he may not use the same due to lack of financial capability. Sometimes he may have means to use the technology but his social norms and traditions does not encourage him to use the same for prestigious factors. All these personality socio-economy, socio-cultural and psychological factors work on an individual when he is confronted with a new situation or with a changed program. Dhaka district sometimes is considered as surplus rice production zone of the country, where BRRI Dhan 29 was a major enterprise. Dhamrai upazila area, therefore, considered a most suitable location to study the phenomena of adoption of BRRI Dhan 29 technologies by the rice growers. Studies on individual, group and society revealed that acceptance of modern technologies is conditional upon many factors. Some of these are social, personal, economical and situational factors. While conducting any study on the adoption of modern technologies, these factors need to be taken into account. A very few previous research work tried to find out the above facts. Therefore, the present research felt necessity to conduct a research entitled " Adoption of BRRI dhan 29 production technologies by the farmers."

1.2 Statement of the Problem

The success of any technology depends on its dissemination among the potential users, which ultimately is measured by the level of adoption of that technology. 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. Adoption of BRRI Dhan 29 technologies are influenced by the farmer's demographic and socio-economic position. An understanding about the same will be useful to the researchers, planners and extension workers in doing research, planning and execution of extension programs for enhancing adoption of BRRI dhan 29 cultivation. The purpose of this study therefore, was to explore the relationships between different characteristics of the farmers and their adoption of BR 29 technologies in rice cultivation. This was done by seeking answers to the following questions:

1. What are the characteristics of BRRI dhan 29 growers ?
2. To what extent the BRRI dhan 29 production technologies were adopted by the farmers?
3. To what extent the relationship between selected characteristics of farmers with their adoption of BRRI dhan 29 production technologies?

1.3 Objectives of the Study

The following objectives were formulated to give clear direction to the study:

(1) To determine and describe some selected characteristics of the BRRI dhan 29 growers. The selected characters include:

(a) Age

(b) Education

(c) Family size

(d) Farm size

(e) Annual income

(f) Commercialization

(g) Organizational participation

(h) Cosmopoliteness

(i) Extension contact

(2) To determine and describe the adoption of the selected recommended BRRI dhan 29 technologies by the farmers like:

(a) Seedling growing method

(b) Seedling age

(c) Line transplanting

(d) Balanced fertilizer dose

(e) Supplementary irrigation

(f) Plant protection measure

(3) To explore the relationship between the selected characteristics of the farmers with their extent of adoption of BRRI dhan 29 technologies.

1.4 Scope and Limitation of the Study

Considering the time, money and other necessary resources available to make the study manageable and meaningful, it was necessary to consider the following limitations:

1. The study was confined in two villages of one union under Dhamrai Upazila of Dhaka district.

2. Nine characteristics of BRRI rice growers were selected.

3. Head of the farm families were considered as the population of the study.

4. There are many technologies associated with BRRI dhan 29 production. Here Seedling growing method, seedling age, line transplanting method, balance fertilizer dose, supplementary irrigation and plant protection measures were considered.

5. The study was confined with the BRRI Dhan 29 rice growers during Boro season of the year 2006-2007.

1.5 Assumptions

While undertaking the study the following assumptions were taken into account:

1. The respondents were capable of providing proper responses to the questions included in the instrument.

2. Views and opinions furnished by the farmers included in the sample were representative of the population.

3. The responses furnished by the respondents were reliable i.e. they expressed the truth about their conviction and opinions.

1.6 Statement of Hypothesis

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 characteristics of the farmers and their adoption of BRRI dhan 29 production technologies". The selected characteristics of the farmers were:

(i) Age

(ii) Education

(iii) Family size

(iv) Farm size

(v) Annual family income

(vi) Commercialization

(vii) Organizational participation

(viii) Cosmopoliteness

(ix) Extension contact

1.7 Definition of Related Terms

The terms which used throughout the study were defined below for the clarity of understanding:

Age

It refers to the period of time from his birth to the time of investigation. In this study the age of BRRI dhan 29 growers were considered only.

Education

Education refers to the desirable change of human behavior, i.e. change in knowledge, skill and attitude of an individual through reading, writing and other related activities. In this study education status of BRRI dhan 29 growers of Dhamrai upazila was taken into consideration.

Family size

It refers to the total number of family members of the BRRI dhan 29 growers of Dhamrai Upazila.

Firm size

Farm size refers to the total area a BRRI dhan 29 grower on which family carry out farming operation. The area was estimated in terms of full benefit of the farmer's family.

Annual family Income

It refers to the earning by the respondents himself and the members of his family from agriculture and other sources during a year. It is expressed in taka.

Organizational participation

Organizational participation of a BRRI dhan 29 growers refers to his direct contact with various organizations within a specific period of time. An individual could take part in various activities of organization as ordinary member, executive committee member or officer (president, secretary etc). All these forms of participation were considered to operationalize the variable.

Cosmopoliteness

It refers to the degree of external orientation of a BRRI dhan 29 grower to his own social system.

Commercialization

It refers to the sold value of crops out of his produced value of crops of a BRRI dhan 29 grower in a year.

Extension contact

It is referred to the respondent's becoming accessible to the influence of different information media through different extension teaching methods.

Adoption

It is the decision to make full use of an innovation as the best course of action available (Rogers 1983)

Innovation

An innovation is an idea, practices or object perceived as new by an individual. In this study, BRRI Dhan 29 is treated as innovation.

Extent of adoption

Ray (1991), defined extent of adoption as "The degree to which the farmer has actually adopted a practice"

BRRI Dhan 29

It referred the modern variety which introduced by Bangladesh Rice Research Institute (BRRI) and possesses the quality for better performance in respect of yield, quality, insect and disease resistance and this Boro rice grown during November to February where seedling are raised in a seedbed and transplanted in the main field.

Seedling growing method

It refers to a standard method of raising seedling recommended by BRRI. Here it is also included the use of chemical fertilizer in the seedbed when necessary.

Seedling age

It refers to the optimum age of seedling for transplant that is recommended by BRRI. For BR 29, BRRI suggested the time as 30-35 days.

Balanced fertilizer dose

The balanced fertilizer dose is refers the recommended doses of various chemical fertilizer for Dhamrai upzilla. Those are mentioned below:

Urea - 217 kg/ha	TSP - 51 kg/ha
MP - 60 kg/ha	Gypsum - 30 kg/ha
ZnSO4 - 5 kg/ha	

Supplementary irrigation

BRRI Dhan 29 cultivation usually requires artificial application of water, i.e. irrigation water. Supplementary irrigation referred to the use of irrigation water at the time of shortage of water or drought in cropping period.

Plant protection measures

It is refers to the insecticide and fungicides used in BRRI Dhan 29 cultivation against insects and disease respectively.

Assumption

An assumption is "the supposition that an apparent fact of principle is true in the light of the available evidences" (Gool, 1945).

Hypothesis

Defined by Goode and Hatt (1952), a proposition which can be put to "a test to determine its validity". It may be true or false, it may seem contrary to or in accord with common sense. However, it leads to an empirical test.

Null hypothesis

The hypothesis which is picked for statistical test is null hypothesis (Ho). In this study the null hypothesis was stated that there was no relationship between the concerned variables and adoption of selected recommended BRRI dhan 29 technologies.

Statistical test

A body of rules which help to take decision regarding acceptance or rejection of the hypothesis is defined as test. In this study if a null hypothesis is rejected it is assumed that there is a relationship between the variables.

CHAPTER-II
REVIEW OF LITERATURE

CHAPTER II

REVIEW OF LITERATURE

To find out the adoption of BRRI dhan 29 production technologies and its relationship with selected characteristics of the farmers were the main task of the study. This Chapter contains synthesis of selected literature those were related to the present study. The researcher made an elaborate search of available literature for this purpose. There was no literature directly related to the present study. Therefore, the present researcher searched relevant studies conducted by different scientist and authors on the adoption of innovations. The finding of such studies related to the extent of adoption of innovation by the farmers and other partial studies have been reviewed and partially discussed in this Chapter.

This Chapter is divided into three major sections, the first section deals with the review of literature on general context of adoption, the second section deals with the relationship between farmers' characteristics and their adoption of innovation and the third section deals with the conceptual framework of the study.

2.1 General context of adoption of innovation

Hossain (1971) 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 dose of fertilizers. It 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.

Karim (1973) conducted a study on the adoption of fertilizers by transplanting aman growers in former Keyotkhali union of Mymensingh district. He studied the adoption of three fertilizers namely urea, Triple super phosphate (TSP) and muriate of potash (MP). He found that four percent of the respondent growers had high adoption of fertilizers while nine percent had medium adoption and 4l percent low adoption. Remaining forty six percent (46 percent) of the respondent growers did not use any of the three fertilizers.

Rahman (1974) studied the adoption of IR-20 variety of paddy by the farmers in Bhabakhali union of Mymensingh district. He found that 29 percent of the growers had medium adoption on of IR-20 while 31 percent of the growers did not adopt the innovation.

Mohammad (1974) studied the extent of adoption of insect control measures by the farmers in Khamar union of Rajshahi district. He found that among the respondent farmers, 25 percent did not adopt insect control measures, 28 percent had high level of adoption, 32 percent had medium level of adoption and 25 percent had low level of adoption.

Sobhan (1975) studied the extent of adoption of ten winter vegetables namely, tomato, radish, lettuce, potato etc. in Boilor union of Mymensingh district. Overall adoption scores indicated that 27 percent of the farmers did not adopt winter vegetables cultivation while 48 percent had low adoption and 25 percent high adoption.

Ahmed (1977) studied the extent of adoption of three specific practices of jute cultivation in Noapara union of Faridpur district. He observed that among the respondent farmers 98 percent adopted the recommended varieties of jute, 72 percent adopted plant protection measures and 49 percent adopted recommended dose of fertilizer.

Razzaque (1977) 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, 6.6 percent of the farmers had high adoption of HYV rice, 33.3 percent had medium adoption and 40 percent had low adoption.

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

Hossain (1983) studied the extent of adoption of HYV rice as transplanted aman and other related aspect in Bhabakhali union of Mymensingh district. He observed that among the respondent farmers, 54 percent had high adoption of HYV rice and 40 percent had medium adoption of HYV rice as transplanted aman.

Haque (1984) investigated the extent of adoption of improved practices in sugarcane cultivation in selected areas of Jessore district. He observed that 62.75 percent respondent growers adopted early time of planting while 60.75 percent of the respondent growers adopted recommended dose of fertilizer and 54.9 percent respondent growers adopted trench method.

Rahman (1986) studied the adoption of four improved practices namely, use of fertilizers, line sowing, irrigation and use of insecticides in transplanted aman rice cultivation in two villages of Mymensingh district. It revealed that 22 percent of the respondent farmers adopted all the four practices in combination against 49

percent adopted three practices, 22 percent adopted two practices, 5 percent adopted one practice and only 2 percent adopted none of the four practices.

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

Gogoi and Gogoi (1989) conducted a study on the adoption of recommended plan protection in rice in Jorhat district of Asam state in India. The recommended practices were selection, seed treatment, growing of tolerant or resistant variety prophylactic measures and chemical protection measures. The study revealed that among the respondents 50 percent had low-level adoption, 36.36 percent had medium level adoption and 13.64 percent had high level of adoption of the recommended plant protection practices.

Naika and Rao (1989) found in some selected villages of Mysore district that Morearea was brought under plant protection chemicals after adoption of recommended plant protection chemicals. The area increased from 45.75 acres to 104.75 acres in adopter villages and from 8 acres to 11 acres in non-adopter villages.

Juliana *et al.* (1991) undertook a study on the adoption of integrated pest management practices in five villages of Vasudevanalhur block in Tirunelvi district, Tamilnadu, India. They found that about 50 percent of marginal farmers, 47.50 percent of small farmers and 52.50 percent of large farmers had medium adoption and 42.50 percent of large farmers, 22.50 percent of small farmers and 5 percent of the marginal had high level of adoption. In both cases large farmers participation in adoption was higher in comparison to other categories of respondent farmers.

Kher (1992) conducted a study on the adoption of improved wheat cultivation practices in selected villages of Rajouri block. He found that 72 percent of the respondent had medium level of adoption, 17 percent low level of adoption and 11 percent high level of adoption.

Singh *et al.* (1992) undertook a research study in India on factors affecting the adoption of improved sugarcane production technologies. They observed that majority of the sugarcane growers had the medium level of adoption and were partial adopters of the 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.

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

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

Rahman (1999) studied the adoption of balanced fertilizer by the Boro rice farmers of Ishwarganj thana. He found that the extent of use of balanced nitrogenous fertilizer, 48.57 percent of the farmers had optimum adoption and above optimum respectively. In respect of extent of use of balanced phosphoric fertilizer, 79.05 percent of the farmers had below optimum adoption compared to 20.95 percent having optimum adoption. Regarding the extent of use of balanced Potassic fertilizer, 80.95 percent of the farmers had below optimum adoption compare to

18.10 and 0.95 percent having optimum and above optimum adoption, respectively.

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

Haidar *et al.* (2001) studied the adoption level of improved package for T- Aman rice cultivation in Gouripur upzila 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 programmer of T. Aman rice.

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.

Rahman (2003) revealed that about half (47 percent) of the growers had medium adoption, 44 percent had low and 1 percent had high adoption of year round homestead fruit cultivation practices.

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

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

2.2 Relationship between the farmers characteristics and their Adoption of Innovations

2.2.1 Age and Adoption of innovations

Haque (1984) studied adoption of improved sugarcane practices in some selected areas of Jessore district. The findings of the study indicated a positive relationship between the age and adoption of improved sugarcane cultivation practices.

Pathak and Samal (1992) observed that there was positive and significant relationship between the age of the marginal farmers and their adoption of jute technologies. Similar findings were observed by Ali *et al.* (1986), Singh and Rajendra (1990), Okoro and Obibuaka (1992), Kashem and Hossain (1992), Kashem(1991), Sarder(2002), Hossain(2003) and Hossain(2006)

Singh (1991) conducted a study to determine the extent of adoption of selected recommended practices. He found no relationship between the age of the farmers and their level of adoption of plant protection measures.

Islam (1993) observed that there was no relationship between the age of potato growers and their adoption of improved practices in potato cultivation. Similar results were observed by Karim and Mahaboob (1986), Rahman (1986), Singh (1982), Kher (1992), Pathak *et al.* (1992) Narwal *et al.* (1991), Hossain *et al.* (1991) and Rahman (2001).

Islam (1996) conducted a study on farmers' use of indigenous technical knowledge (ITK) in the context of sustainable agricultural development. He found that age of the farmers had significant negative relationship with their extent of use of ITK.

2.2.2 Education and adoption of innovations

Mustafi *et al.* (1987) reported that education did not have any significant effect on the adoption of modern varieties of rice in Bangladesh.

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

Hasan (1996) concluded a study on adoption of some selected agricultural Technologies among the farmers as perceived by the frontline GO and NGO workers. He observed that education have no significant relationship with the perceived adoption of selected agricultural, technologies. Similar results were found by Kher (1992) and Islam (1996).

Sarker (1997) conducted a study to determine the relationship between the charactedstics of potato growers and their adoption of improved potato cultivation practices in five villages of Comilla district. He found that education of potato growers had significant relationship with their adoption of improved potato cultivation practices.

Alam (1997) observed that the level of education of the farmer had a positive and significant relationship with the use of improved farm practices. Sarker (1997) and Chowdhury (1997) also found similar findings about the relationship between education and adoption of improved technologies.

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 academic qualifications of the farmers had a significant and positive relationship with their adoption regarding Aalok 6201 hybrid rice.

Hossain (2003) concluded that education of the farmers had a significant and positive relationship with their adoption and modem Boro-rice cultivation practices.

Hossain (2006) concluded that the education of the farmers had a significant and positive relationship with their adoption selected of HYV rice. Similar findings were also observed by Humid (1995, khan (1993) and Haque (1993).

2.2.3 Family size and adoption of innovatios

Hossain (1983) in his study in Bhabakhali union of Mymensingh district observed that family size of the farmers had no significant relationship with their adoption of HYV rice as transplanted aman. Though the relationship was not statistically significant, the chi square value for the relationship was quite large and approaching the level of significance. There was an appreciable trend of adoption of small family category, being much lower than that in the medium family and the big family categories.

Kashem (1987) in his study did not find any significant relationship between family size and agricultural knowledge of the farmers.

Mustafi *et al.* (1987) in their study found that the number of family members had no significant effect on the adoption of modem varieties of rice in Bangladesh.

Rathore and Shakhawat (1990) found that the knowledge about improved agricultural practices of Bajra cultivation by farmwomen was found to be significantly associated with their size of family.

Alam (1997) in his study found that family size of the farmers had positive and significant relationship with their use of farm practices in rice cultivation.

Chowdhury (1997) conducted a research study on the 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 their adoption of selected BINA technologies. Similar findings were observed by Barkatullah (1985), Okoro and Obibuaka (1992), Pathak and Samal (1992), Ali (1993) and Sarker (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 of Aalok 6201 hybrid rice.

Hossain (2003) found that family size of the farmers had no significant relationship with their adoption of modern Boro rice cultivation practices.

Hossain (2006) concluded that family size of the farmers had significant relationship with their adoption of HYV rice.

2.2.4 Farm size and adoption of innovations

Rahman (1986) observed that farm size had significant and positive relationship with their adoption of improved practices in transplanted aman rice.

Mustafi *et al.* (1987) in their study found that size of farm had significant and positive relationship with the adoption of modern varieties of rice in Bangladesh.

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

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

significant relationship with their use of improved farm practices in rice cultivation.

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

Hossain(2003) concluded that farm size of the farmers had a significant and positive relationship with their adoption of modern Boro rice cultivation.

Hossain(2006) found that the farm size of the farmers had an insignificant relationship with their adoption of selected HYV rice.

2.2.5 Annual family income and adoption of innovations

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

Sarker (1997) found that family income of potato growers had significant positive relations with their adoption of improved potato cultivation practices. Similar results were observed by Hossain (1999), Chowduary (1997), Sarker(1997),

Alam(1997), Rahman (2001), Hussen (2001), Aurangozeb (2002), Hossain (2003), Hossain (2006),Rahman (1986) and Kashem (1991).

Pal (1995), Islam (1993) and Khan (1993), Islam (1996) found a significant negative relationship between the annual income of the farmers and their extent of use of ITK. Hossain (1983) and Hoque (1993) found similar results.

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 annual income of the farmers had a significant and positive relationship with their adoption of Aalok 6201 hybrid rice.

2.2.6 Commercialization and adoption of innovations

Raj and Knight (1977) conducted a research on the influence of farm practices attributes on innovation decision process by the farmers of Dharmapuri district in Tamilnadu, India. They found that profitability was significantly correlated with the adoption of recommended farm practices. They defined profitability as the amount of production cost compared with sold cost. So, profitability as used by them is synonymous with the commercialization of the present study.

Ahaduzzaman (1999) conducted a study on the adoption of modern T. Aman technologies among the rice growers in Sadar Thana of Rangpur District. He

found that commercialization of the farmers had an insignificant and positive relationship with their adoption of modern T. Aman technologies.

2.2.7 Organizational participation and adoption of innovations

Hossain (1971) study revealed a positive significant relationship of organizational participation of the farmers with their adoption of recommended doses of fertilizers and plant protection measures. Similar result was also reported by Hossain (1991).

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

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

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

Hossain (2000) found insignificant relationship between organizational participation of the farmers and their knowledge on Binadhan-6.

Hossain (2003) concluded that organizational participation of the farmers had no significant relationship with their adoption of modern Boro rice cultivation.

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

2.2.8 Cosmopoliteness and adoption of innovations

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

Chowdhury (1997) conducted a study on the adoption of selected BINA technologies by the farmers of Boira union in Mymensingh district. He found no significant relationship between the cosmopoliteness of the farmers and their composite adoption of selected BINA technologies, Similar findings were also observed by Mannan (1972), Muhammad I974), Sobhan (1975), Hossain (1991) and Islam (1996).

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 cosmopoliteness of the farmers had a significant and positive relationship with their adoption of Aalok 6201 hybrid rice.

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

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

Hossain (2006) concluded that cosmopoliteness of the farmers had no significant relationship with their adoption of selected HYV rice.

2.2.9 Extension Contact and adoption of innovations

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

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

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

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

Juliana *et al.* (1991) found that mass media exposure of the farmers were positively associated with their extent of adoption of integrated pest management practices.

Singh (1991) observed in his study that mass contact of the farmers had significant relationship with their level of adoption of plant protection measures.

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

relationship of extension contact of the farmers with their use of improved farm practices in rice cultivation.

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

Sardar (2002) concluded that the extension contact had positively significant relationship with their adoption of IPM practices.

Haque (2003) concluded that extension contact of the farmers had a significant positive relationship with their adoption of modem maize cultivation technologies.

Hossain (2003) concluded that communication exposure of the farmers had a significant and positive relationship with their adoption of modern Boro rice cultivation.

Hossain (2006) concluded that the extension contact of the farmers had positive significant relationship with their adoption of selected HYV rice.

2.3 Conceptual Framework of the Study

Review of the past studies and literature indicated various factors influenced the adoption of BRRI Dhan 29 Production Technologies by the farmers. It is sometimes difficult to deal with all the factors in a single study. Related literature, discussion with the experts and research fellows in the relevant field and available resources at hand helped the researcher in selecting nine variables to assess the adoption of BRRI Dhan 29 Production Technologies by the growers.

In this study, researcher therefore, tried to assess the reflection of some selected variables. An independent variable is that factor which is manipulated by the researcher in his attempt to ascertain its relationship to an observed phenomenon. A simple conceptual Framework for the study is shown below:

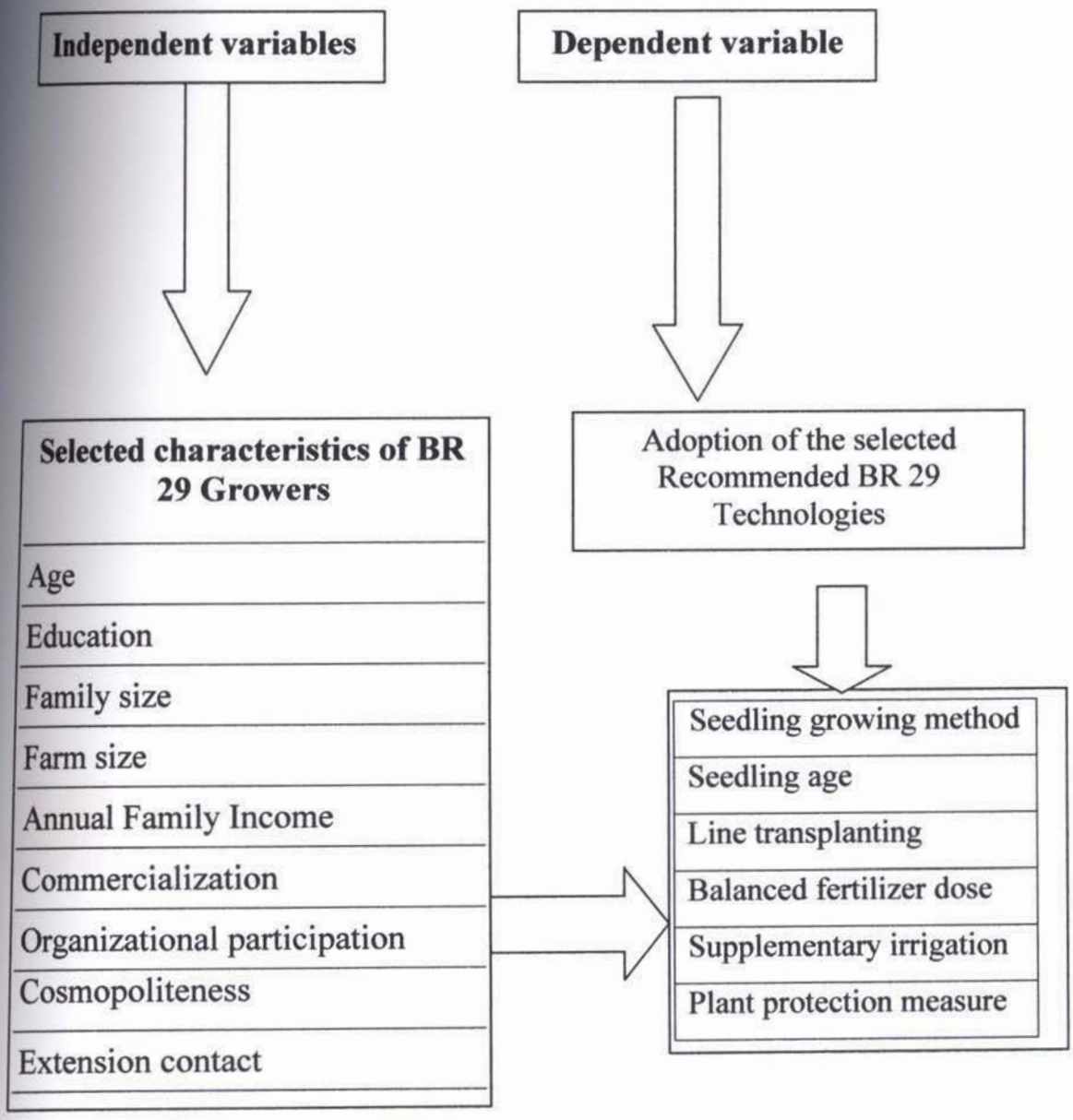

Fig. 2.1 Conceptual Framework of the study

CHAPTER-III
METHODOLOGY

CHAPTER III

METHODOLOGY

Methodology refers to the methods and procedures in the research work. For any scientific investigation methods and procedures are very important and require a very careful consideration. The researcher was very much careful for using proper methods in all aspects of the investigation. Methods and procedures followed in conducting the study have been discussed in this chapter. Further, the chapter includes the operational format and comparative reflection of some variables used in the study. Also statistical methods and their use have been mention in this chapter.

3.1 Locale of the Study

Two villages namely Shailan and Chapil of Dhamrai upazila under Dhaka district were purposively selected as the locale of the study. The study area is about 30 km from the district head quarter and situated north side of Dhaka- Aricha highway. Fig. No.3.1and 3.2 shows the map of the locale of the study.

3.2 Design of the Study

The design of the study was a descriptive survey research. It was designed to describe the relationship between selected characteristics of the farmers and their extent of adoption of BRRI dhan 29 production technologies.

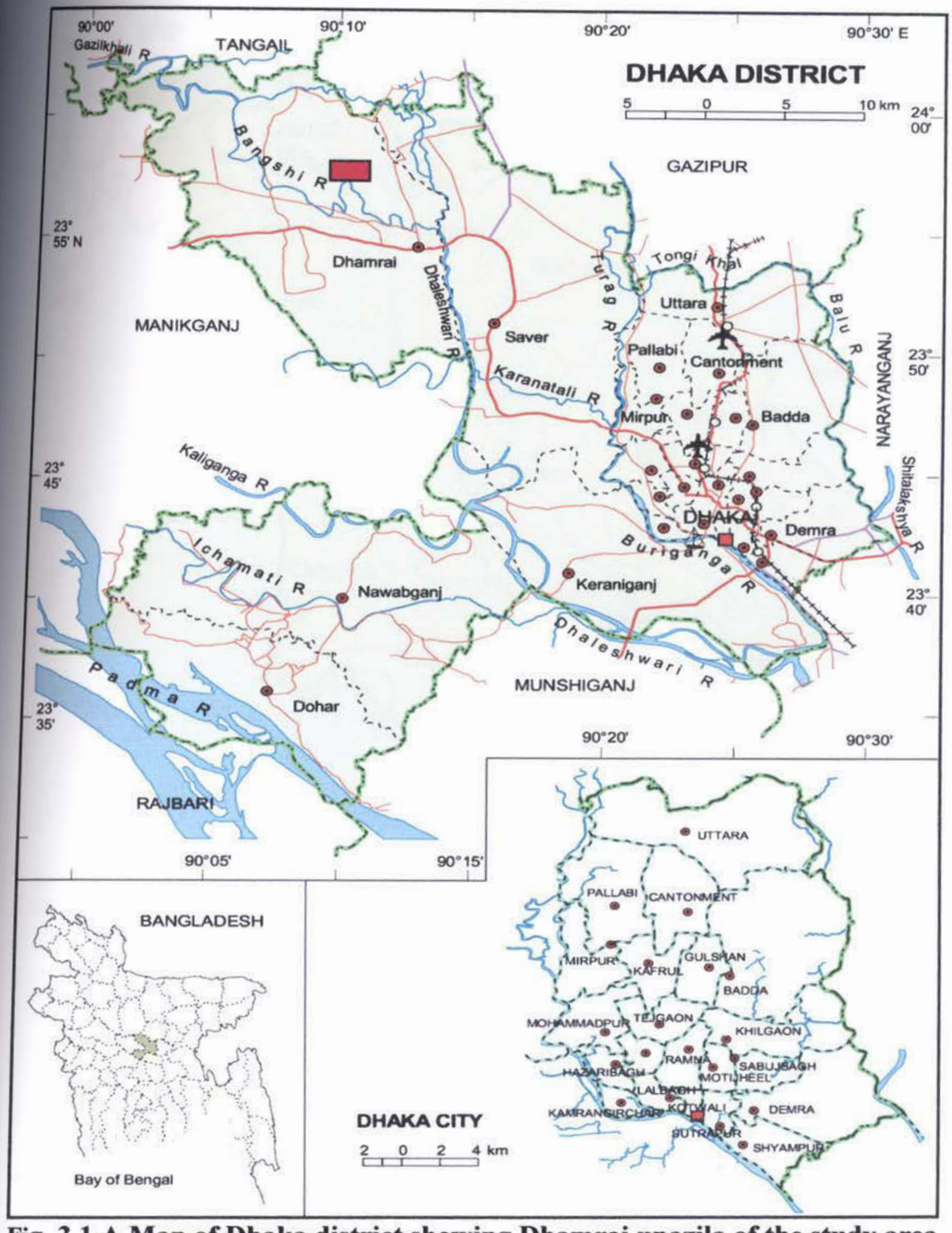

Fig. 3.1 A Map of Dhaka district showing Dhamrai upazila of the study area

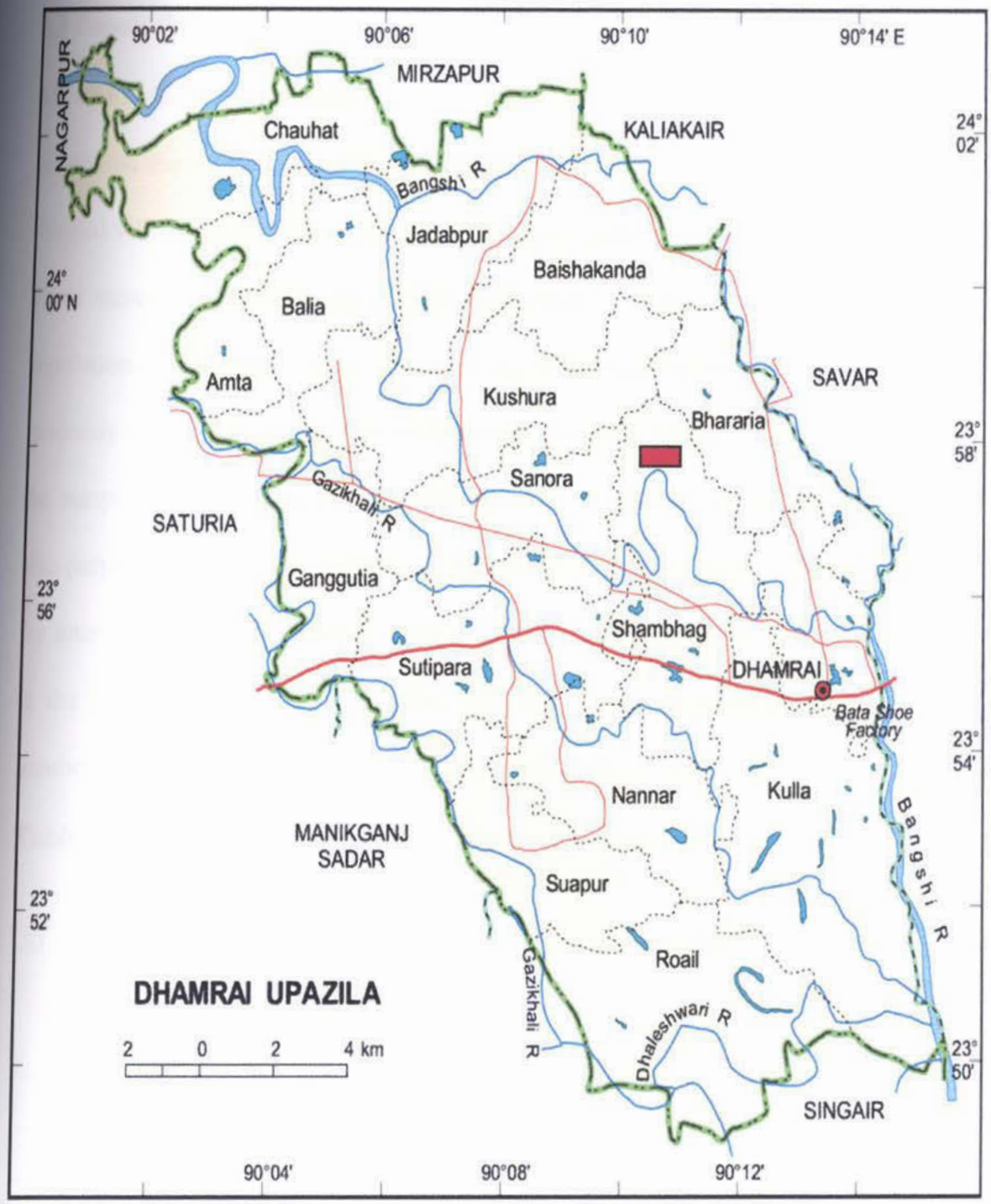

Fig. 3.2 A Map of Dhamrai upazila under Dhaka district showing the study area

3.3 Population and Sampling Design

All BRRI dhan 29 growers of Shailan and Chapil village of Dhamrai upazila constituted the population of the study. Update lists of all farm family heads of the selected villages were prepared with the help of Sub-Assistant Agriculture officer. There were 1003 farmers in Shailan and Chapil villages which constituted the population of the study. Ten (10%) percent of the population were proportionately randomly selected as the sample of the study by using random number table. Thus, the sample size of the study was 100 farmers. A reserve list of ten farmers was also prepared by the same method so that the respondents of this list could be used for interview if the respondents included in the original sample were not available at the time of data collection. The distribution of the population sample and number of farmers in the reserve list are shown in Table 3.1

Table 3.1 Distribution of population and sample of respondents in two selected villages of Dhamrai upazila.

Sl. no	Name of the village	Population	Sample size	Number of farmers in the reserve list
1	Shailan	562	56	6
2	Chapil	441	44	4
Total		1003	100	10

3.4 Development of the Instrument

In order to collect relevant information from respondents interview schedule was carefully designed focusing the objectives of the study. Both open and close form, simple and direct questions were included in the interview schedule. The questions were systematically arranged to help the respondents to understand the consequence easily. Scales were developed for collecting information required for measuring the selected characteristics.

3.5 Validity and reliability

An instrument is considered as valid when it measures what it claims to measure. It is usually deemed to be valid when the objectives of the study are reflected in the instrument. Validity as "Descriptive term used for a measure that accurately reflects the concept that is included to measure" Bobbie (1986). A test or scale is reliable if it yields consistent results when repeated measurements are taken on the same subjects under the similar condition. In the present study adequate care was taken to prepare the data collecting instruments in general and the scales in particular. Based on the comments and suggestions made by the experts, the interview schedule was modified and used for pilot testing.

3.6 Pilot Testing and Final Version

Borg and Gall (1979) indicated that the instrument with a sample of instrument with a sample of individuals similar to the groups one wishes to use in the research should be tested in a pilot programme before using the instrument in the actual study. Accordingly the interview schedule that was initially developed was tested with a similar group of farmers to be excluded for sampling. Fifteen BRRI dhan 29 growers were interviewed by using the instrument. The pretest helped to examine the suitability of different questions and statements of the instrument in general. Necessary corrections, additions, alterations and rearrangements were made in the schedule on the basis of the experience of the pretest. Thus, the final version of the instrument was developed for collation of data from intended respondents.

3.7 Data Collection

Data were collected personally by the researcher himself by interviewing the sample of BRRI dhan 29 growers with the help of interview schedule. The researcher made all possible efforts to explain the purpose of the study to the farmers. Rapport was established with the farmers prior to interview and the objectives were clearly explained by using local language as far as possible. As a result, the respondents did not hesitate to furnish proper responses to the questions and statements which were collected during the period from 15 July to 17 August 2007.The researcher sought the help from the local leaders and the Sub-Assistant

Agricultural officer for this purpose. Excellent co-operation was obtained from the respondents, the concerned local leaders and the Sub-Assistant Agricultural.

3.8 Data Coding and Tabulation

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

3.9 Variables of the Study

Selection and measurement of variables is an important task in any descriptive research. A research hypothesis contains at least two elements independent variable and a dependent variable. An Independent variable is the factor which is manipulated by the experimenter to ascertain its relationship to an observed phenomenon. A dependent variable is the factor which appears, disappears or varies as the experimenter introduces, removes or varies the independent variable (Townsend, 1953). Measurement of the variables of the study are discussed below:

3.9.1 Measurement of independent variables

The independent variables of this study were nine (9) selected characteristics of the BRRI dhan 29 rice farmers. These were: age, education, family size, farm size,

annual family income, commercialization, organizational participation, cosmopoliteness and extension contact. The procedures followed in measuring the independent variables are briefly discussed below:

3.9.1.1 Age

Age of the respondents was determined by the number of years from their birth to the time of data collection. A score of one (1) was assigned for each and every complete year of a respondent's age. Based on the information of the respondents' age they were classified into three categories, young (below 35years), middle aged (36-50years) and old aged (51 years and above).

3.9.1.2 Education

Education was measured by the number of classes passed by an individual. Zero (0) for no schooling, A score half (.5) was assigned to those respondents who could sign only, One (1) score was assigned for each year of schooling. For example, if a respondent passed SSC his education score was 10.

3.9.1.3. Family size

Family size of a respondent was determined in term of actual numbers in his family including himself. His wife, sons, daughters, brothers, sisters, parents and any other person who jointly live and eat together at the time of interview. The

scoring was done by the actual number mentioned. For example, if a respondent had five members in his family then the family size score would be five (5).

3.9.1.4. Farm size

Farm size was measured as the size of his farm (including BRRI dhan 29 and other crops) on which he continued his operations during the period of study. It included the area of farm owned by him as well as those obtained from others as sharecropping, lease or mortgage. The area was being estimated in terms of full benefit to the growers in term of hectare. The farm size of a respondent was measured by using the following formula:

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

Where,

Fs =Farm size

A_1 = Homestead area (with kitchen garden and pond)

A_2 = Own land under own cultivation

A_3 = Land taken from other on *borga*

A_4 = Own land given to others on *borga*

A_5 = Land taken from others on lease

3.9.1.5. Annual family income

Annual income of a respondents was determined on the basis of his earnings from agriculture and other various sources of his family during 2006-2007.For calculation of income score, one(1) was assigned for each one thousand taka income.

3.9.1.6 Commercialization

The term used to refers to the percentage of the value of crop sold out total value of crop raised. The score was measure by the following formula:

$$\text{Commercialization} = \frac{\text{Total value of crop sold}}{\text{Total value of crop raised}} \text{ X } 100$$

The commercialization possible range from 0.00 to 100 where 0 indicate no commercialization and 100 indicate high commercialization.

3.9.1.7 Organizational participation

Organizational participation of the respondents was measured on the basis of participation by the respondent in different organizations during last years. Score were assigned for participation of a respondent in an organization in the following manner.

OP= Np+ Om+ Em+ Ob

Nature of participation	Score
No participation (Np)	0
Participation as ordinary member (Om)	1
Member of the Executive committee (Em)	2
Participation in executive committee officer (Office barrier)	3

The possible range 0-21 where 0 indicate no organizational participation and 21 high organizational participation.

3.9.1.8. Cosmopoliteness

Cosmopoliteness of the respondents was measured on the basis of their visit to seven different places out side his own social system. The respondents were asked to indicate the nature of visit to seven selected places as frequently, oftenly, occasionally, rarely and not at all basis and scores were assigned as 4,3,2,1and 0 for the alternative responses respectively. Logical frequencies of visits were assigned to the five nature of visit as indicated in the question number 8 of interview Schedule. The Cosmopoliteness score of a respondent was determined by adding the scores obtained for his visits to each seven types of places as shown in item no. seven in the interview schedule. The Cosmopoliteness scores of individuals could range from 0- 28 where 0 indicate no Cosmopoliteness and 28 indicated very high Cosmopoliteness.

3.9.1.9. Extension contact

This term refers to one's becoming accessible to the influence of extension programme through different communication media and sources. Here the score was measured as 0 for not at all, 1 for rarely, 2 for occasionally, 3 for oftenly and 4 for frequently of the contact respectively. Logical frequencies of contacts were assigned to those alternative responses as indicated in question number 9 of the interview schedule.

Respondent's extension contact score was obtained adding the weights for his responses to all sources listed in the instrument. The extension contact scores of individuals could range from 0-44. Where 0 indicate no extension contact and 44 indicated very high extension contact.

3.9.2. Measurement of dependent variable

3.9.2.1 Adoption of BR 29 rice cultivation practices

Adoption of modern Boro rice cultivation practices was the dependent variable of this study. It was measured on the basis of the extent of adoption of BRRI dhan 29 production technologies by the farmer for a period of 5 years (2002-2003 to 200 6-2007). According to Wahab (1979) the adoption quotient is the ratio scale designed to quantify the adoption behavior of an individual. The method of adoption quotient is more accurate as it involves all the related concepts like potentiality, extent of time consistency and weightage. However, the overall BRRI

29 rice production technologies adoption practices adoption quotient in this study was computed by using the following formula:

$$AQ = \frac{T_3 - (T_3 - T_2)}{T_3} X \frac{T_3 - (T_3 - T_1)}{T_3} X \frac{e}{p} X 100$$

Where,

AQ = Adoption Quotient

T_1 = Year since the practice under study was introduced

T_2 = Year since the user became aware of the practice

T_3 = Year since the practice was adopted by the user

e =Average actual area (acre/ha) under the practice under study last five years

p= Average potential area ((acre/ha) under the practice during the last five years

(Source: Kashem-2003.)

The calculation of Adoption Quotient (AQ) for BRRI dhan 29 production technologies is shown below:

Name of adopter: Golum Mostufa

Name of the variety: BRRI dhan 29

Introducing year (T_1) : 1994

Awareness year (T_2) : 1998

Adoption year (T_3) : 1999

Average actual area (ha) under practices (e) : 0.980(ha)

Average potential area (ha) of practice : 1.174(ha)

$$AQ = \frac{1999-(1999-1998)}{1999} \times \frac{1999-(1999-1994)}{1999} \times \frac{.980}{1.174} \times 100$$

$= 0.998 \times 0.997 \times 0.75 \times 100$

$= 74.6$

The possible range of adoption from 0 to 100 indicated in percentage. Where 0 indicated no adoption and 100 indicated high adoption.

3.10 Statement of the Hypothesis

As defined by Goode and Hatt (1952) "A hypothesis is a proposition, which can be put a test to determine its validity. It may seen 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." In studying the relationship between variables, research hypotheses are formulated which state the anticipated relationship between the variables. However, for statistical test it becomes necessary to formulate null hypothesis. A null hypothesis states that there is no relationship between the variables. If a null hypothesis is rejected on the basis of a statistical test, it is assumed that there is a relationship between the concerned variables. There was no relationship between the selected characteristics of the farmers and their adoption

of BRRI dhan 29 production technologies. The characteristics were: Age, Level of Education, Family size, Farm size, Annual income, Commercialization, Organizational participation, Cosmopoliteness and Extension contact.

3.11 Statistical Treatment

Statistical measures, such as frequency, percentage, range, mean, standard deviation and rank order were used for descriptive data. For clarity of understanding tables and figures were used when necessary for visual presentation of data. Correlation of coefficient test was used to determine the relationship between and among the categories of farmers with regard to their adoption to BRRI Dhan 29 production technologies based on selected characteristics. Throughout the study the 0.01 and 0.05 levels of probability was used as the basis of rejection or accepting a null hypothesis. It the computed value of 'r' was equal to or greater than the table value of 'r' at 0.01 and 0.05 levels for the relevant degrees to freedom, the null hypothesis was rejected and vice-versa for acceptance.

CHAPTER-IV
FINDINGS AND DISCUSSION

CHAPTER IV

FINDINFS AND DISCUSSION

Data received from 100 BRRI dhan 29 growers were compiled, tabulated and analyzed in the line with the objectives. Procedures of using data for the measurement needed some discussion for clarity of understanding. Data obtained from respondents by interview were measured, analyzed, tabulated and statistically treated according to the objectives of the study. This chapter deals with the findings of the study which have been discussed under the following headings: Socio-economic characteristics of farmers, extent of adoption of BRRI dhan 29 production technologies by the farmers and relationships between the selected characteristics of the farmers and their extent of adoption of the BRRI dhan 29 production technologies.

4.1 Selected Characteristics of the BR 29 Rice Farmers

In this section the findings of the BRRI dhan 29 rice farmers selected characteristics have been discussed. The selected characteristics are (i) age (ii) education, (iii) family size (iv) farm size (v) annual income (vi) commercialization (vii) organizational participation (viii) cosmopoliteness and (ix) extension contact.

Descriptive statistics of the BRRI dhan 29 farmers nine selected characteristics have been discussed bellow:

4.1.1 Age

Age of the farmers was found to range from 23 to 72 years. The average age was 52.24 years with the standard deviation 11.915. Based on their age, the farmers were classified into three categories as shown in Table 4.1.1

Table 4.1 Distribution of farmers according to their age

Categories	Number	Percentage	Mean	SD
Young (<35yrs)	11	11	52.24	11.915
Middle (36-55yrs)	49	49		
Old (> 55yrs)	40	40		
Total	100	100		

Data furnished in Table 4.1. indicate that the highest proportion (49 percent) of the farmers fell in the middle age category, while 11 percent and 40 percent belonged to young and old age categories respectively. However, data also revealed that 60 percent of the farmers in the study area were young to middle aged. Bashar (1993) and Hussen (2001) also found the similar findings in their study. Young people are generally receptive to new ideas and things. They have a favorable attitude towards use of new technology. However, the older farmers, because of their longer farm experience, might have valuable opinions in regard to adoption of modern agricultural technologies. The extension agents can make use of their views and opinions in designing their extension activities.

4.1.2 Education

Education scores of farmers ranged from 0 to 14. The average score was 6.650 with the standard deviation 3.6705. Based on their score, the farmers were classified into five categories as shown in Table 4.2

Table 4.2 Distribution of farmers according to their education

Categories	Number	Percentage	Mean	SD
No education	13	13	6.65	3.6705
Primary education (1-5)	33	33		
Secondary education (6-10)	40	40		
Higher secondary or above	14	14		
Total	100	100		

It is evident from Table 4.2. that a large proportion (40 percent) of the farmers fell under the category of "secondary education" compared to 13 percent with no education or can sign only, 33 percent having primary education and 14 percent having above secondary education. Bashar (1993) and Ali (1993) also found similar findings among the cane growers. The present literacy rate of the country is 56 percent (BBS, 2000), the findings indicate that in the study area, the literacy rate seems to be higher than the national level average.

4.1.3 Family size

The family size of the farmers ranged from 2 to 13 with an average 5.67 and standard deviation 1.928. On the basis of their family size, the farmers were classified into three categories as shown in Table 4.3

Table 4.3 Distribution of farmers according to their family size

Categories	Number	Percentage	Mean	SD
Small (up to 4)	33	33	5.67	1.928
Middle (5-6)	37	37		
High (> 6)	30	30		
Total	100	100		

Data presented in Table 4.3 reveal that the highest proportion (37 percent) of the farmers fell under the medium family category compared to 33 percent and 30 percent having small and large family category respectively. These findings indicate that more than 70 percent of the respondents had either small or medium family size. The data also indicate that the average family size (5.67 percent) of the respondents in the study area was higher than the national average of 5.4 (BBS, 1994). This may be due to the lack of proper adoption of family planning measures among the respondents or the prevalence of joint family system in the study area. Another reason was that the national average of 5.4 persons per family was concerned with rural and urban families, but the present study is concerned with the rural families only.

4.1.4 Farm size

The farm size of the farmers in the study area varied from 0.12 to 3.14 hectares (ha). The average farm size was 0.6248 ha with the standard deviation 0.52764. Based on their farm size, the farmers were classified into three categories as shown in Table 4.4.

Table 4.4 Distribution of farmers according to their farm size

Categories	Number	Percentage	Mean	SD
Marginal (up to 0.5 ha)	55	55	0.625	0.528
Small (0.51-1.0 ha)	33	33		
Medium (1.01-3.0 ha)	11	11		
Large (> 3ha)	1	1		
Total	100	100		

The Table 4.4 shows that the highest proportion (55 percent) of the farmers belonged to marginal farm size compared to 33 and 11 percent having small and medium farm size respectively and 1 (one) percent belonged large farm size. Thus, most of the farmers were in possession of marginal and small farm.

4.1.5 Annual family income

Annual income of the farmers ranged from TK. 25.00 to 411.00 (Taka in thousand) with the mean of Tk. 104.88 and standard deviation 63.783. On the basis of the annual income, the farmers were classified into three categories as shown in Table 4.5.

Table 4.5 Distribution of farmers according to annual family income

Categories	Number	Percentage	Mean	SD
Low (<75)	31	31	104.88	63.783
Middle (75-150)	52	52		
High > 150	17	17		
Total	100	100		

Data presented in Table 4.5. show that the highest proportion (52 percent) of the farmers had medium annual income, while only 31 percent had low income and 17 percent had high income. As a result, the most (83 percent) of the farmers in the study area were medium to low annual income earners.

The average income of the farmers in the study area is much higher than the average per capita income of the country i.e. 363 U.S. dollar (BBS, 2000). 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. Farmers with low income generally hesitate to adopt innovations in their own farms because of their lower risk bearing ability and their inability to make necessary financial investment. It is, therefore, likely that a considerable proportion of the farmers might face difficulties in adopting modern agricultural technologies.

4.1.6 Commercialization

The commercialization of the produced crop of the respondents ranged from 0 to 83.90 percent with an average of 36.0803 and the standard deviation was 22.629. Based on the commercialization, the respondents were classified in three categories as shown in Table 4.6.

Table 4.6 Distribution of farmers according to their commercialization

Categories	Number	Percentage	Mean	SD
Low (< 33)	39	39	36.08	22.629
Medium (33-66)	53	53		
High (> 66)	8	8		
Total	100	100		

Data contained in Table 4.6. revealed that majority (53 percent) of the respondents had medium level of commercialization of their produced crop while 8 percent had high and 39 percent had low commercial.

4.1.7 Organizational participation

The observed organizational participation scores of the farmers ranged from 0 to 7 with an average 2.31 and standard deviation of 1.6. Depending on the organizational participation scores, the farmers were classified into three categories as shown in Table 4.7.

Table 4.7 Distribution of farmers according to their organizational participation

Categories	Number	Percentage	Mean	SD
Low (< 3)	57	57	2.31	1.6
Medium (3-5)	40	40		
High (> 5)	3	3		
Total	100	100		

Data contained in Table 4.7. revealed that the highest proportion (57 percent) of the farmers had low organizational participation as compared to, 40 percent medium and 3 percent high organizational participation. It reveals that the majority of the farmers in the study area were in low to medium organizational participation category.

4.1.8 Cosmopoliteness

The observed cosmopoliteness scores of the farmers ranged from 5 to 20 against the possible range of 0 to 28. The mean score was 11.44 with the standard deviation 2.883. Based on the observed cosmopoliteness scores, the farmers were classified into three categories as shown in Table 4.8.

Table 4.8 Distribution of farmers according to their cosmopoliteness

Categories	Number	Percentage	Mean	SD
Low (0-8)	14	14	11.44	2.883
Medium (9-17)	80	80		
High (>17)	6	6		
Total	100	100		

Data contained in the Table 4.8. show that 80 percent of the farmers had medium cosmopoliteness as compared to 14 percent having low and 6 percent high cosmopoliteness. Data also revealed that majority (94 percent) of the farmers were under medium to low cosmopoliteness.

4.1.9 Extension contact

Observed Extension contact scores of the farmers ranged from 4 to 30 against the possible range of 0 to 48. The average extension contact score was 14.75 with the standard deviation 4.924. On the basis of their communication exposure score, the farmers were classified into three categories as shown in Table 4.9.

Table 4.9 Distribution of farmers according to their extension contact

Categories	Number	Percentage	Mean	SD
Low (<16)	66	66	14.75	4.924
Medium (16-32)	44	44		
High (>32)	0	0		
Total	100	100		

Data presented in Table 4.9. indicate that 66 percent of the farmers had low extension contact, while 44 percent had medium and 0 (zero) percent had high communication exposure.

The findings of the study indicate that most of the respondents had low and medium extension contact with various information sources for getting necessary agricultural information. Bashar (1993), Pal (1995), Hussen (2001) and Islam (2002) observed almost the similar findings for getting necessary agricultural information.

4.2. Adoption of BRRI Dhan 29 production technologies

Observed BRRI dhan 29 production technologies adoption scores of the farmers ranged from 62.64 to 97.20 against the possible range of 0 to 100. The average and standard deviation were 73.09 and 14.55 respectively. Based on the observed scores, the farmers were classified into three categories as shown in Table 4.10.

Distribution of the farmers According to their Adoption

Table 4.10 Distribution of farmers according to their extent of adoption of BRRI dhan 29 production technologies

Categories	Number	Percentage	Mean	SD
Medium (34-66)	26	26	73.09	14.55
High (> 66)	74	74		
Total	100	100		

Data presented in Table 4.10 revealed that the highest proportion (74 percent) of the farmers fell under the high adoption category while 26 percent medium adoption. Thus, the overwhelming cent percent of the farmers had high to medium adoption.

4.3 Relationship between the selected characteristics of BRRI dhan 29 growers and their adoption of BRRI dhan 29 production technologies

Table 4.11 Co- efficient of correlation showing relationship between BRRI dhan 29 farmers selected characteristics and their adoption of BRRI dhan 29 production technologies(N=100)

Independent variables	Dependent variables
Characteristics of the respondent	Correlation values
Age	-.102^{NS}
Education	.293**
Family size	.062^{NS}
Farm size	.204*
Annual income	.258**
Commercialization	.231*
Organizational participation	.040^{NS}
Cosmopoliteness	.242*
Extension contact	.236*

*= Significant at 0.05 level

**= Significant at 0.01 level

^{NS}= Not significant (Non significant)

4.3.1 Age and adoption of BRRI dhan 29 production technologies

The Relationship between age of the farmers and their adoption of BRRI dhan 29 production technologies was examined by testing the concerned null hypothesis.

Co-efficient of correlation between the concerned variables was found to be 'r'= -.102 as shown in Table 4.11. This led to the following observations regarding the relationship between the two variables under consideration:

* The relationship showed a negative trend.
* The computed value of 'r' (-0.102) was smaller than the tabulated value with 98 degrees freedom at 0.05 level of probability.

On the basis of above findings, the null hypothesis could not be rejected. Hence, the researcher concluded that age of the farmers had no significant relationship with their adoption BRRI dhan 29 production technologies. Similar findings were also observed by Rahman (1986), Kher (1992), Islam (1993), Chowdhury (1997), Mostofa (1999) and Rahman (2001),

4.3.2 Education and adoption of BR 29 rice production technologies

The relationship between education of the farmers and their adoption of modern rice cultivation practices was examined by testing the concerned null hypothesis. Co-efficient of correlation between the concerned variables was found to be 0.293** as shown in Table 4.11. This led to the following observations regarding the relationship between the two variables under consideration:

* The relationship showed a positive trend.

* The computed value of 'r' (0.293**) was larger than the tabulated value with 98 degrees of freedom at 0.01 level of probability.

On the basis of above findings, the null hypothesis was rejected and hence, it can be concluded that education of the farmers had a significant and positive relationship with their adoption of BRRI dhan 29 production technologies.

Also the findings indicated that more education of the farmers leads to a tendency towards more adoption of BRRI dhan 29 production technologies. Hossain (1971), Hoque (1993), Khan (1993), Pal (1995) and many others also found positive and significant relationship between the farmers' education and their adoption of modern technologies.

4.3.3 Family size and adoption of BRRI dhan 29 production technologies

The relationship between family size of the farmers and their adoption of BRRI dhan 29 production technologies was examined. Co-efficient of correlation between the concerned variables was found to be 'r' (0.062) as shown in Table 4.11.This led to the following observations regarding the relationship between the two variables under consideration:

- The relationship showed a positive trend.
- The computed value of 'r' (0.062) was smaller than the tabulated value with 98 degrees of freedom even at 0.05 level of probability.

On the basis of above findings, the null hypothesis could not be rejected. Hence, the researcher concluded that family size of the farmers had no significant relationship with their adoption of BRRI dhan 29 production technologies. Similar findings were observation by Haque (1993), Hossain (1991) and Islam (1993) but Shiper (1995) and Muttaleb(1995) found significant relationship.

4.3.4 Farm size and adoption of BRRI dhan 29 production technologies

The relationship between farm size of the farmers and their adoption of BRRI dhan 29 production technologies was examined. Co-efficient of correlation between the concerned variables was found to be 'r'=0.204* as shown in Table 4.11. This led to the following observations regarding the relationship between the two variables under consideration:

- The relationship showed a positive trend between the concerned two variables.
- The computed value of 'r' (0.204*) was larger than the tabulated value with 98 degrees of freedom at 0.05 level of probability.

On the basis of above findings, the null hypothesis was rejected and hence, the researcher concluded that farm size of the farmers had a significant and positive relationship with their adoption of BRRI dhan 29 production technologies. It means that farmers with large farm size were more likely to have more adoption. The findings are quite rational, because of adoption of BRRI dhan 29 production technologies. Hence farmers having large farm size get more scope than the small farmers as they can invest more money for adoption of improved cultural practices. Many researchers (Haque, 1993; Khan, 1993; Pal, 1995 and Chowdhury, 1997) also observed the similar significant positive relationship between these two variables.

4.3.5 Annual income and adoption of modern BRRI dhan 29 production technologies

The relationship between annual income of the manners and their adoption of BRRI dhan 29 production technologies was examined by testing the concerned null hypothesis.

Co-efficient of correlation between the concerned variables was found to be 'r'= 0.258** as shown in Table 4.11. This led to the following observations regarding the relationship between the two variables under consideration:

* The relationship showed a positive trend between the concerned two variables

* The computed value of 'r' (0.258**) was larger than the tabulated value with 98 degrees of freedom even at 0.01 level of probability.

On the basis of above findings, the null hypothesis was rejected. Hence, the researcher concluded that annual income of the farmers had a significant relationship with their adoption of BRRI dhan 29 production technologies.

The findings are quite logical, because BRRI dhan 29 cultivation is costly. It needs more fertilizers; insecticides and more adoption of various intercultural practices for a long duration (say 4-4.5 months). Thus availability of fund or cash is essential to solve those financial issues for cultivation by the farmers to a considerable extent. Khan (1993), Pal (1995) and Chowdhury (1997) also found the similar findings.

4.3.6 Commercialization and adoption of BRRI dhan 29 production technologies

The relationship between commercialization of the farmers and their adoption of BRRI dhan 29 production technologies was examined. Co-efficient of correlation between the concerned variables was found to be 'r'=0.231* as shown in Table

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

- The relationship showed a positive trend.
- The computed value of 'r' (0.231*) was greater than the tabulated value with 98 degree of freedom at 0.05 level of probability.

On the basis of above findings, the null hypothesis was rejected. Hence, the researcher concluded that commercialization of the farmers had a significant and positive relationship with their adoption of BRRI dhan 29 production technologies.

4.3.7 Organizational participation and adoption of BRRI dhan 29 production technologies

The relationship between organizational participation of the farmers and their adoption of BRRI dhan 29 production technologies was examined. Co-efficient of correlation between the concerned variables was found to be 'r' (0.040) as shown in Table 4.11. This led to the following observations regarding the relationship between the two variables under consideration:

- The relationship showed a positive trend.
- The computed value of 'r' (0. .040) was smaller than the tabulated value with 98 degrees of freedom at 0.05 level of probability.

On the basis of above findings, the null hypothesis could not be rejected. Hence, the researcher concluded that organizational participation of the farmers had no significant relationship with their adoption of BRRI dhan 29 production technologies.

Hossain (1983), Amin (1983), Balasubramanian and Kaul (1985) and Alam (1997) also observed similar relationship between the concerned variables.

4.3.8 Cosmopoliteness and adoption of BRRI dhan 29 production technologies

The relationship between cosmopoliteness of the farmers and their adoption of BR 29 rice production technologies was examined.

Co-efficient of correlation between the concerned variables was found to be 'r' = 0.242* as shown in Table 4.11. This led to the following observations regarding the relationship between the two variables under consideration:

- The relationship showed a positive trend.
- The computed value of 'r' (0.242*) was larger than the tabulated value with 98 degrees of freedom at 0.05 level of probability.

On the basis of above findings, the null hypothesis was rejected. Hence, the researcher concluded that cosmopoliteness of the farmers had a significant and positive relationship with their adoption of BR 29 rice production technologies.

The findings also justifiable because the cosmopolitan farmers might have more extension exposure which influenced them towards the adoption of BR 29 rice production technologies. Rahim (1961), Karim (1973), Haque (1984) and Pal (1995) also found the similar findings.

4.3.9 Extension contact and adoption of BRRI dhan 29 production technologies

The relationship between communication exposure of the farmers and their adoption of BR 29 rice production technologies was examined by testing the concerned null hypothesis.

Co-efficient of correlation between the concerned variables was found to be 'r'= 0.236* as shown in Table 4.11. This led to the following observations regarding the relationship between the two variables under consideration:

- The relationship showed a positive trend.
- The computed value of 'r' (0.236*) was larger than the tabulated value with 98 degrees of freedom even at 0.05 level of probability.

On the basis of above findings, the null hypothesis was rejected. Hence, the researcher concluded that extension contact of the farmers had a significant and

positive relationship with their adoption of BRRI dhan 29 production technologies.

Farmers become aware of the improved agricultural practices through the various extension communication media. Farmers having no or low extension contact are expected to be low in adoption of improved cultural practices because of their unawareness about the practices. It is likely that I with high extension contact received more information on farm affairs which strengthened the base of their agricultural knowledge. Such knowledge was probably conducive to motivate the farmers towards adoption of BR 29 production technologies. Kashem *et al.* (1990), Bashar (1993), Pal (1995), Chowdhury (1997) and Sarker (1997) also found the similar results.

CHAPTER-V

SUMARY, CONCLUSION AND RECOMMENDATION

CHAPTER V

SUMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIION

5.1 SUMMARY

The adoption of modern BRRI dhan 29 technologies among the rice growers depends upon a numbers of factors including farmer's characteristics. An understanding of the factors influencing this adoption behavior of the farmers is necessary to study to know the adoption and diffusion process in the country. Therefore, the present study was conducted in Dhamrai upazila under Dhaka district to attain the following specific objectives:

1. To determine and describe the selected characteristics of BRRI dhan 29 growers. The selected characteristics include: age, education, family size, farm size, annual income, commercialization, organizational participation, cosmopoliteness and Extension contact.

2. To determine the extent of adoption of the BRRI dhan 29 technologies. The selected technologies were: seedling growing method, seedling age,

line transplanting, balanced fertilizer dose, supplementary irrigation and plant protection measures.

3. To explore relationships of the selected characteristics of the farmers with their adoption of BR 29 technologies.

The study was conducted in two villages of Shambhag union of Dhamrai upazilla under Dhaka district. From a population of 100, a total number of 110 BR 29 growers were selected for interview. Data were collected by using an interview schedule. Collected Data were decoded, compiled, tabulated and analyzed in accordance with the objectives of the study. Statistical measures such as percentage distribution, range, rank order, average, standard deviation and adoption index were used to determine the extent of adoption of BRRI dhan 29 technologies by the farmers and their selected characteristics. Coefficients of correlation were calculated to explore the relationship between the selected characteristics and the extent of adoption BRRI dhan 29 technologies.

5.1.1Major findings

According to the objectives of the study, the findings were summarized as follows:

Selected characteristics of BRRI dhan 29 growers

Age

Age of the fanners ranged from 28 to 72 years. The average being 52.24 years with a standard deviation 11.915. The highest proportion (49 percent) of the farmers were middle aged, while 11 percent were young and 40 percent old.

Education

Education of the farmers ranged from 0 to 14 years of schooling. The average score was 6.65 and the standard deviation was 3.6705. Large proportion (40 percent) of the farmers had secondary education (scores 6 - 10) compared to 33 percent having primary education only 13 percent no education and 14 percent had above secondary education.

Family size

The family size of the farmers ranged from 2 to 13 with an average of 5.67 and standard deviation of 1.928. The highest proportion (37 percent) of the respondents had medium family compared to 33 percent small family and 30 percent large family size categories. Small and large families were found to be almost in equal proportion.

Farm size

Farm size of the farmers ranged from 0.12 to 3.14 hectares with an average of 0.6248 hectares and standard deviation 0.52764. The highest proportion (55 percent) of the respondent farmers belonged to marginal farm size compared to 33 and 11 percent with small farm size (33%) and medium farm size (11%) respectively.

Annual income

Annual income scores of the farmers ranged from 25.00 to 411.00 thousand with an average of 104.88 thousand and the standard deviation 52.6674. The highest proportion (52 percent) of the farmers had medium annual income compared to low annual income and having high annual income. Seventeen percent of the respondent had high income and 31% had low income.

Commercialization

The commercialization of the produced crop of the respondents ranged from 0 to 83.90 percent with an average of 36.0803 and the standard deviation was 22.629. The major proportion (53 percent) of the respondents had medium level of commercialization of their produced cropped while 8 percent had high and only 39 percent had low commercialization.

Organizational participation

Organizational participation scores of the farmers ranged from 0 to 7. The average score being 2.31 with the standard deviation 1.600. The highest proportion (57 percent) of the farmers had low organizational participation compared to 40 percent having medium participation and 3 percent having high participation.

Cosmopoliteness

Cosmopoliteness scores of the farmers ranged from 5 to 20 against the possible range of 0 to 28. The average cosmopoliteness score was 11.44 with the standard deviation 2.883. The highest proportion (80 percent) of the farmers had medium cosmopoliteness compare to 14 percent having low cosmopoliteness and 6 percent having high cosmopoliteness.

Extension contact

The extension contact scores of the farmers ranged from 4 to 30, against the possible ranged of 0 to 48. The average communication exposure was found to be 14.75 with the standard deviation of 4.924.The highest proportion (66 percent) of the respondents had low extension contact compared to 44 percent having medium and 0 (zero) percent with high communication exposure. None had high communication exposure.

5.2 Relationship of the selected characteristics of the farmers with their adoption of BRRI dhan 29 production technologies

Age and adoption

The null hypothesis could not be rejected on the basis of estimated 'r' value at 0.05 level of probability with 98 degrees of freedom. Hence, age of the farmers had no significant relationship with their adoption of BRRI dhan 29 production technologies.

Education and adoption

The null hypothesis was rejected on the basis of estimated 'r' value at 0.01 level of probability with 98 degrees of freedom. Hence, education of the farmers had significant relationship with their adoption of BRRI dhan 29 production technologies.

Family size and adoption

The null hypothesis could not be rejected on the basis of estimated 'r' value at 0.05 level of probability with 98 degrees of freedom. Hence, family size of the farmers had no significant relationship with their adoption of BRRI dhan 29 production technologies.

Farm size and adoption

The null hypothesis was rejected on the basis of estimated 'r' value at 0.05 level of probability with 98 degrees of freedom. Hence, farm size of the farmers had significant and positive relationship with their adoption of BRRI dhan 29 production technologies.

Annual income and adoption

The null hypothesis was rejected on the basis of estimated 'r' value at 0.01 level of probability with 98 degrees of freedom. Hence, annual income of the farmers had significant relationship with their adoption of BRRI dhan 29 production technologies.

Commercialization and adoption

The null hypothesis was rejected on the basis of estimated 'r' value at 0.05 level of probability with 98 degree of freedom. Hence, commercialization of the farmers had significant relationship with their adoption of BRRI dhan 29 production technologies.

Organizational participation and adoption

The null hypothesis could not be rejected on the basis of estimated 'r' value at 0.05 level of probability with 98 degrees of freedom. Hence, organizational

participation of the farmers had no significant relationship with their adoption of BRRI dhan 29 production technologies.

Cosmopoliteness and adoption

The null hypothesis was rejected on the basis of calculated 'r' value at 0.05 level of probability with 98 degrees of freedom. Hence, cosmopoliteness of the farmers had significant and positive relationship with their adoption of BRRI dhan 29 production technologies.

Extension contact and adoption

The null hypothesis was rejected on the basis of calculated 'r' value at 0.05 level of probability with 98 degrees of freedom which was found to be higher than table value. Hence, communication exposure of the farmers had significant and positive relationship with their adoption of BRRI dhan 29 production technologies.

5.2 Conclusions

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

1. Most of the BRRI dhan 29 farmers were either middle aged or old aged while age of the BRRI dhan29 farmers had no significant relationships with

their adoption. Therefore, it may be concluded that special attention need not to be given on all age in general but middle aged group in particular for diffusion program of BRRI dhan 29.

2. Findings of the study showed a significant relationship of education with the adoption of BRRI dhan 29 production technologies. Education is a contributory factor of gaining knowledge and skill and has created positive attitude in an individual towards good things. There is a need to enhance the educational level of the farmers. It may, therefore, be concluded that enhancement of non-formal education like extension to be strengthen among the farmers so that they form positive attitude towards the adoption BRRI dhan 29 production technologies.

3. Farm size of the BRRI dhan 29 farmers showed positive and significant relationship with their adoption of BRRI dhan 29 production technologies. The farmers having large farms are generally economically solvent and they are able to adopt the modern BRRI dhan 29 production technologies and are comparatively higher than any other crops. Seventy percent of the land is occupied by middle and large farm. Remaining 30% land is occupied by landless, marginal and small farm. However extension worker should equally give importance to all category of farm to diffuse BRRI dhan 29.

4. Annual income of BRRI dhan 29 rice farmers was significantly and positively associated with adoption. High annual income was possessed by the farmers to maintain higher economic and social status, and they were generally respected in the society. They had risk bearing ability and could undertake a venture if they were motivated. It may, therefore be concluded that farmers having more income will be in a better position to get more adoption regarding BRRI dhan 29.

5. Commercialization of BRRI 29 rice farmers were significant and positively associated with adoption. High commercialization was possessed by the farmers who maintain high economic status and they were generally respected in the society. They had risk bearing ability and could under take a venture if they were motivated.

6. Organizational participation of the BRRI dhan 29 farmers showed, organizational participation had no significant relationship with their adoption. Probably because they did not visualize any benefit that may be derived from organizational participation. Unfortunately, the level of participation of the respondents was found to be quite low. This is evident from the fact that 57 percent of the BRRI dhan 29 farmers had low participation. Hence, it may be concluded that there is need for higher

participation of the BRRI dhan 29 farmers and necessary steps may be taken by extension agencies to increase their organizational participation.

7. Cosmopoliteness of the farmers had significantly positive relationship with their adoption of BRRI dhan 29 production technologies. Through cosmopoliteness an individual becomes aware of the recent information and consequently they become motivated to adopt the BRRI dhan 29 production technologies due to influenced by others. The findings of the study lead to the conclusion that for successful adoption of BRRI dhan 29 production technologies, the farmers need to be cosmopolite for their better awareness on BRRI dhan 29 production technologies.

8. Extension contact of the farmers had a significant and positive relationship with their adoption of BR 29 rice production technologies. This means that higher the farmer's extent of exposure with different extension teaching methods, the higher was their adoption of modern practices. Such relationship might be due to the fact that grower with higher exposure to extension people received more useful information and acquired more motivated to adapt the BRRI dhan 29 production technologies.

5.3 Recommendations

5.3.1 Recommendations for policy implications

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

1. In view of the absence of any relationship between age of the farmers and their adoption of BRRI dhan29 production technologies, it is recommended that the extension workers should work with the farmers of all age groups to promote the cultivation of BRRI dhan 29. However, they will have to work more with comparatively larger member of middle aged farmers as majority of the farmers belonged to this group.

2. Education of the BR 29 rice farmers had moderate and highly significant relationship with their adoption. It indicates the importance of education of the BR 29 rice growers for rapid adoption of modem practices. The findings also indicate that 13 percent of the farmers have no education or can sign only. Under the above situation, it may be recommended that arrangements should be made for increasing the literacy level of the BR 29 rice farmers by the concerned authorities through the establishment of night school, adult education program and other extension methods.

3. Farm size had positive significantly relationship with their adoption of BRRI dhan 29 rice. In the study, 55 percent of BRRI dhan 29 farmers had

marginal farms. These farmers could give more attention to their farming operation as they generally work on their farm. Hence, the extension workers should utilize the medium farmers in their extension activities to introduce improved farm practices on a significant scale.

4. The annual income of the farmers had significant positive relationship with their adoption of BRRI dhan 29 production technologies. It leads to the recommendation that extension service should provide adequate farm management advice to the farmers for increasing their farm income. It is the real fact that if income be increased, farmers receptive capacity to adopt improved technologies will be increased and thereby production will be increased.
5. Commercialization of the farmers had significant positive relationship with their adoption of BR 29 rice production technologies. It leads to the recommendation that extension service should provide adequate farm management advice to the increasing commercialization. It is real fact that if commercialization increased there by production will be increased.

6. Since organizational participation had positive significant correlation with adoption of BRRI dhan 29 production technologies, it is recommended that the concerned authorities should take necessary steps to mobilize the

local organizations for the BRRI dhan 29 farmers. This will facilitate them to solve their problems collectively to adopt the new ideas and practices.

7. Cosmopoliteness of the farmers had significant and positive correlation with their adoption of BRRI dhan 29 rice cultivation practices and only 6 percent of the farmers had high cosmopoliteness. Therefore, it is recommended that the extension workers should mobilize the BRRI dhan 29 rice farmers for increasing their adoption of BRRI dhan 29 production technologies by arranging field tour and agricultural fair.

8. Extension contact of the farmers in the study area has been found to be quite low though such contact is very necessary for high adoption of innovation by the farmers. This is supported by the findings of the study, which showed that extension contact of the BRRI dhan 29 had highly significant positive correlation with their adoption of BRRI dhan 29 rice cultivation practices. Hence, the concerned authorities should take cognizance of these facts and should take necessary steps to increase the extension contact of the farmers. That means the extension woks should maintain a close link with the farmers.

5.3.2 Recommendations for further study

A small piece of study as has been conducted cannot provide all information for the proper understanding of the farmers towards the BR 29 rice. Therefore, the following recommendations were made for further study:

1. The present study was conducted in Dhamrai upazilla under Dhaka district. It is recommended that similar studies should be conducted in other areas of Bangladesh.

2. This study investigated the relationship of nine characteristics of the farmers with their adoption towards BRRI dean 29 rice as dependent variables. Therefore, it is recommended that further study be conducted with other independent and dependent variables.

3. In the present study age and family size had no significant relationship with adoption of BRRI dhan 29 production technologies by the farmers. Moreover, organizational participation had no significant relationship with the adoption of BRRI dhan 29 production technologies. In this connection, further verification is necessary.

4. A negative trend of relationship between age of the farmers and their adoption of BRRI dhan 29 production technologies. Also, the relationship

was not statistically significant. Generally a significant positive relationship is expected to be observed between family size of the farmers and their adoption of BRRI dhan 29 production technologies. Hence, further studies are necessary to find out the relationship between the concerned variables.

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

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INTERVIEW SCHEDULE ON

Adoption of BRRI Dhan 29 Production Technologies by the Farmers of Dhamrai Upazila.

Name of the farmer .....

Village : ..... P. O. :.....

Thana : ..... Dist. : .....

(Please Answer the following Questions)

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

2. What is your level of education?

a. i. No education at all .....

ii. Can sign only .....

b. Read up-to class: .....

3. How many members are there in your family?.....

4. Please indicate the area about your farm size

Land Description	Local Unit	(Ha)
Homestead land		
Own land under own cultivation		
Land given to others on borga		
Land taken from others on borga		
Land taken from others on lease		
Total		

5. Please indicate your annual income form different sources during last year (2006)

Source of Income				Total Amount in (Tk.)
A. Agriculture				
1. Aus	Area	Production	Income	
2. Aman				
3. Boro				
4. Jute				
5. Wheat				
6. Potato				
7. Pulses				
8. Oils				
9. Vegetable				
10. Spices and Condiments				
11. Fruits				
B. Poultry				
C. Dairy products				
D. Fisheries				
E. Business				
F. Services				
G. Others (Specify)				
Grand Total				

6. Commercialization

Please indicate your produced crop and sold crop amount and their price in 2006.

Name of Crop	Total yield (Unite)	Production		Sold		
		Total market price 2006 (Tk./Unit)	Total price of Produced crop (in Tk.)	Quantity sold (in Unit)	Market price per unit (in Tk.)	Total price in (Tk.)
1. Aus						
a. HYV						
b. Local						
2. Aman						
a. HYV						
b. Local						
3. Boro						
a. BRRI dhan 29						
b. BRRI dhan 30						
c. BRRI dhan 30						
d. Local						
4. Jute						
5. Sugarcane						
6. Mustard						
7. Pulses						
a) Gram						
b) Lentil						
c) Mungbean						
d) Mushkalai						
e) Khesari						
8. Potato						
9. Brinjal						
10. Pepper						
11. Onion						
12. Garlic						
13. Tobacco						
14. Others						

7. Organizational participation

Please mention the organization your are associated with

Name of the organization	No participation	Duration and Nature of participation		
		General member	Executive member	Office bearer
a. Union Council				
b. NGO Samitee (specify)				
c. Irrigation committee				
d. School Committee				
e. Madrasha committee				
f. Bazar Committee				
g. Others				

8. Cosmopoliteness

How often your visit places outside your village for various purposes?

Place visit	Frequently	Oftenly	Occasionally	Rarely	Not at all
Other Villages	>5 time/month ( )	4-5 time/month ( )	2-3 time/month ( )	1-2 time/month ( )	time/month (0)
Upazila Agriculture Office	>3 time/month ( )	3 time/month ( )	2 time/month ( )	1 time/month ( )	time/month (0)
Others Upazila Office	>3 time/month ( )	3 time/month ( )	2 time/month ( )	1 time/month ( )	time/month (0)
Own District Town	>9 time/year ( )	7-9 time/year ( )	4-6 time/year ( )	1-3 time/year ( )	time/year (0)
Others District Town	>4 time/year ( )	3 time/year ( )	2 time/year ( )	1 time/year ( )	time/year (0)
NGO Office	>9 time/year ( )	7-9 time/year ( )	4-6 time/year ( )	1-3 time/year ( )	time/year (0)
Meeting with Local Imam/School/Teacher /Learned Person	>6 time/year ( )	5-6 time/year ( )	3-4 time/year ( )	1-3 time/year ( )	time/year (0)

8. Cosmopoliteness

How often your visit places outside your village for various purposes?

Place visit	Frequently	Oftenly	Occasionally	Rarely	Not at all
Other Villages	>5 time/month ( )	4-5 time/month ( )	2-3 time/month ( )	1-2 time/month ( )	time/month (0)
Upazila Agriculture Office	>3 time/month ( )	3 time/month ( )	2 time/month ( )	1 time/month ( )	time/month (0)
Others Upazila Office	>3 time/month ( )	3 time/month ( )	2 time/month ( )	1 time/month ( )	time/month (0)
Own District Town	>9 time/year ( )	7-9 time/year ( )	4-6 time/year ( )	1-3 time/year ( )	time/year (0)
Others District Town	>4 time/year ( )	3 time/year ( )	2 time/year ( )	1 time/year ( )	time/year (0)
NGO Office	>9 time/year ( )	7-9 time/year ( )	4-6 time/year ( )	1-3 time/year ( )	time/year (0)
Meeting with Local Imam/School/Teacher /Learned Person	>6 time/year ( )	5-6 time/year ( )	3-4 time/year ( )	1-3 time/year ( )	time/year (0)

9. Please indicate the nature of your Extension contact

Name of the media	Frequently	Oftenly	Occasionally	Rarely	Not at all
a) Contact with SAAO	>3 time/month	3 time/month	2 time/month	1 time/month	0 time/month
b) Contact with AEO/AO	>6 time/year	5-6 time/year	3-4 time/year	1-2 time/year	0 time/year
c) Conducted result demonstration	>5 time in life	4-5 time in life	2-3 time in life	1 time in life	0 time in life
d) Participation in agricultural training	>2 time/year	1 time/year	1 time/2 year	1 time/4 year	0 time/4 year
e) Attend method demonstration meeting	>2 time/year	2 time/year	1 time/year	1 time/2 year	0 time/2 year
f) Contact with NGO officer	>4 time/month	3 time/month	2 time/month	1 time/month	0 time/month
g) Listening krishi radio programme	>4 time/month	3 time/month	2 time/month	1 time/month	0 time/month
h) Visit agricultural exhibition	>2 time/year	2 time/year	1 time/year	1 time/2 year	0 time/year
i) Watching Matio-O-Manush TV Programme	>4 time/month	3 time/month	2 time/month	1 time/month	0 time/month
j) Attend agricultural group meeting	>6 time/year	5-6 time/year	3-4 time/year	1-2 time/year	0 time/year
k) Read Krhishi katha, krishi magazine, leaflet, booklet, bulletin etc.	>7 time/year	5-6 time/year	3-4 time/year	1-2 time/year	0 time/year

Adoption :

10. Please answer those questions

When BRRI dhan 29 was first introduced? .....

When you heard about BRRI dhan 29?.....

When you started continued cultivation?.....

11. Total Area Under BRRI Dhan 29 cultivation in last five year

Year	Potential Area	Cultivated Area
2002-2003		
2003-2004		
2004-2005		
2005-2006		
2006-2007		

12. Please mention your level of adoption of BRRI Dhan 29 production technologies in last five years.

Technologies	Years	Potential area (p)	Effective area (e)	e/p
1. Seedling growing method	2002-2003			
	2003-2004			
	2004-2005			
	2005-2006			
	2006-2007			
2. Recommended seedling age	2002-2003			
	2003-2004			
	2004-2005			
	2005-2006			
	2006-2007			
3. Line transplanting	2002-2003			
	2003-2004			
	2004-2005			
	2005-2006			
	2006-2007			
4. Recommended balance fertilizer dose	2002-2003			
	2003-2004			
	2004-2005			
	2005-2006			
	2006-2007			
5. Supplementary Irrigation	2002-2003			
	2003-2004			
	2004-2005			
	2005-2006			
	2006-2007			
6. Plant Protection (IPM)	2002-2003			
	2003-2004			
	2004-2005			
	2005-2006			
	2006-2007			

Interviewed by

(Name : .....)

Signature : .....

Thank You for your co-operation

APPENDIX-B

Correlation Matrix

	V_1	V_2	V_3	V_4	V_5	V_6	V_7	V_8	V_9	V_{10}
V_1	1									
V_2	-0.269**	1								
V_3	0.345**	-0.073	1							
V_4	0.175	0.215*	0.419**	1						
V_5	0.152	0.267**	0.415**	0.752**	1					
V_6	0.242*	0.103	0.347**	0.561**	0.566**	1				
V_7	0.261**	0.119	0.289**	0.454**	0.374**	0.453**	1			
V_8	0.111	0.204*	0.163	0.496**	0.458**	0.435**	0.474**	1		
V_9	0.069	0.133	0.155	0.417**	0.382**	0.549**	0.363**	0.569**	1	
V_{10}	-0.102	0.293**	0.062	0.204*	0.258**	0.231*	0.040	0.242*	0.236*	1

*Significant at 0.05 level with 98 degree of freedom

** Significant at 0.01 level with 98 degree of freedom

V_1 = Age
V_2 = Education
V_3 = Family Size
V_4 = Farm Size
V_5 = Annual Family Income
V_6 = Commercialization
V_7 = Organizational Participation
V_8 = Cosmopoliteness
V_9 = Extension Contact
V_{10} = Adoption of BRRI 29