

# ADOPTION OF HIGH YIELDING VARIETIES OF RICE BY THE FARMERS

A Thesis

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**ADOPTION OF HIGH YIELDING VARIETIES OF RICE  
BY THE FARMERS**

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## *CERTIFICATE*

This is to certify that thesis entitled, "ADOPTION OF HIGH YIELDING VARIETIES OF RICE 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 MASTER OF SCIENCE in AGRICULTURAL EXTENSION AND INFORMATION SYSTEM, embodies the result of a piece of bona fide research work carried out by MUHAMMAD ABUL MASUD Reg. No. 26266/00553 under my supervision and guidance. No part of the thesis has been submitted for any other degree or diploma.

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

**Dated:**

Place: Dhaka, Bangladesh



(Md. Rafiqul Islam)

Supervisor

# TABLE OF CONTENTS

**ITEMS**

**PAGE**

## TABLE OF CONTENTS

I

### LIST OF TABLES

V

### LIST OF FIGURE

V

### ABSTRACT

VI

## CHAPTER 1

### INTRODUCTION

General Background

1

Statement of the problem

3

Specific Objectives

4

Justification of the Study

5

Assumptions of the Study

6

Limitations of the study

6

1.7 Definition of the Terms

7

## **CHAPTER 2**

### **REVIEW OF LITERATURE**

- 2.1 Review of literature on General Context of Adoption  
10
- 2.2 Relationship between farmers' characteristics and the adoption of agricultural Technologies  
13
  - 2.2.1. Age and adoption of agricultural Technologies  
13
  - 2.2.2. Level of Education and adoption of agricultural Technologies  
13
  - 2.2.3. Farm size and adoption of agricultural Technologies  
14
  - 2.2.4. Annual income and adoption of agricultural Technologies  
15
  - 2.2.5. Knowledge on HYV rice and adoption of agricultural Technologies  
15
  - Contd**
  - 2.2.6. Extension media contact and adoption of agricultural Technologies  
16
  - 2.2.7. Organizational participation and adoption of agricultural Technologies  
17
  - 2.2.8. Cosmopolitaness and adoption of agricultural Technologies  
17
  - 2.2.9. Innovativeness and adoption of agricultural Technologies  
18
  - 2.2.10. Inputs availability and adoption of agricultural Technologies

18

2.3. The Conceptual Framework of the Study

19

**CHAPTER 3**

**METHODOLOGY**

3.1 Locale of the Study

21

3.2 Population and Sampling Design

21

3.3 Measurement of Variables

24

3.3.1 Measurement of independent variables

24

3.3.1.1. Age

25

3.3.1.2 Level of Education

25

3.3.1.3. Farm size

25

3.3.1.4 Annual income

26

3.3.1.5 Knowledge on HYV rice

26

3.3.1.6 Extension media conduct

27

3.3.1.7 Organizational participation

29

3.3.1.8 Cosmopolitaness

30

3.3.1.9 Innovativeness

	31
3.3.1.10. Inputs availability	31
3.3.2 Measurement of dependent variable	31
3.3.2.1. Adoption of HYV rice	31
3.4 Statement of the Hypothesis	33
3.5 Data Collection	33
3.6 Data coding and tabulation	34

**Contd.**

3.7 Statistical Analysis	34
--------------------------	----

**CHAPTER 4**

***RESULTS AND DISCUSSION***

4.1. Selected characteristics of the farmers (Independent variables)	35
4.1.1 Age	37
4.1.2 Level of Education	37
4.1.3 Farm size	38

4.1.4	Annual income	38
4.1.5	Knowledge on HYV rice	39
4.1.6	Extension media conduct	40
4.1.7	Organizational participation	40
4.1.8	Cosmopolitaness	40
4.1.9	Innovativeness	41
4.1.10	Inputs availability	42
4.2	Adoption of HYV Rice	42
4.3	Relationships between the Selected Characteristics of the Farmers and their adoption of selected HYV rice	45
4.3.1	Relationships between age of the Farmers and their adoption of selected HYV rice	46
4.3.2	Relationships between the Levels of Education of the Farmers and their adoption of selected HYV rice	47
4.3.3	Relationships between the Farm size of the Farmers and their adoption of selected HYV rice	48
4.3.4	Relationships between the Annual Income of the Farmers and their adoption of selected HYV rice	49



4.3.5 Relationships between the Knowledge on HYV rice of the Farmers  
and

their adoption of selected HYV rice

50

4.3.6 Relationships between the Extension media conduct of the  
Farmers and their adoption of selected HYV rice

51

### **Contd**

4.3.7. Relationships between the Organizational participation of the  
Farmers

their adoption of selected HYV rice

52

4.3.8. Relationships between Cosmopolitaness of the Farmers and  
their adoption of selected HYV rice

53

4.3.9. Relationships between innovativeness of the  
Farmers and their adoption of selected HYV rice

54

4.3.10. Relationships between inputs availability of the  
Farmers and their adoption of selected HYV rice

54

**CHAPTER 5**  
**SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS**  
**OF THE STUDY**

5.1. Summary of the findings

56

5.1.1. Selected characteristics of the HYV rice farmers

56

5.1.2. Adoption of HYV rice

58

5.1.3. Relationships between the selected characteristics of the  
farmers and their adoption of selected HYV rice

59

5.2 Conclusion

59

5.3 Recommendations

61

5.3.1. Based on the findings and the conclusion of the study, the  
following recommendations are made

61

5.3.2. Recommendations for further study

64

**BIBLIOGRAPHY**

65

**APPENDIX**

**A.** English Version of the Interview Schedule

i

**B.** Correlation Matrix of the dependent and independent variables

## LIST OF TABLES

<i>TABLE</i>	<i>PAGE</i>
1.1 The acreage and production of local and HYV rice varieties in Bangladesh	2
3.1 Distribution of population and sample of respondents in two selected village of Sonaimuri Upazila	24
4.1. Salient features of the respondents with their characteristics	36
4.2. Distribution of the respondents according to their adoption	42
4.3. Percentages of farmers adopted the different HYV rice	44
4.4. The rank order of these varieties according to their adoption index	45
4.5. Co-efficient of correlation of the selected characteristics of the respondents and their adoption of selected HYV rice	46

## LIST OF FIGURES

<b>FIGURE</b>	<b>PAGE</b>
2.1. Conceptual framework of the study	20
3.1.1. A map of Noakhali district Sonaimuri(Begumganj) Upazila	22
3.1.2. A map of Sonaimuri(Begumganj) Upazila showing Nateshwar Union	23
4.1. Extent of adoption of selected HYV rice cultivation by the farmers	43

## **ABSTRACT**

The main purpose of the study was to determine and describe the extent of adoption of high yielding varieties (HYV) of rice by the farmers of Nateshwar union under Sonaimuri (Begumganj) Upazila in Noakhali district. Attempts were also made to describe some of the selected characteristics of the HYV rice farmers and their relationship with their adoption of HYV rice. Data were obtained from 100 randomly selected farmers of three villages namely Nateshwar, Mirzanagar and Kazinagar with the help of an interview schedule. Data were collected during 11 October to 30 October 2006. The findings revealed that majority (64%) of the HYV rice farmers had medium adoption compared to 16% having low adoption and 20% having high adoption. The selected three varieties were BR14, BRRI Dhan-28, and BRRI Dhan-29. Among those selected varieties BRRI Dhan-29 variety was overwhelmingly accepted by the farmers and the adoption index was 2475. Correlation test was used to ascertain the relationship between the concerned variable of the study. Out of ten independent variables, farmers education, annual income, knowledge of HYV rice cultivation, extension media contact, organizational participation, and innovativeness and inputs availability had significant positive relationship with their adoption of HYV rice. On the other hand age, farm size and cosmopolitaness of farmers had no relationship with their adoption of selected HYV rice cultivation.

# CHAPTER 1

## INTRODUCTION

### **1.1. General Background**

Bangladesh is mainly an agro-based country with an area of 1, 47, 570 sq. kilometers. Agriculture is the backbone of the economy. About 76.78 percent of her population live in rural areas and 51.7 percent of the country's total populations are engaged in agriculture (BBS, 2005). According to the Monthly Statistical Bulletin, January-2006, Agriculture output prices have been found to contribute 21.77% to the GDP in which 12.19% comes from crops, 1.79% from forestry 2.93% from livestock and 4.86% from fisheries. Agriculture plays a vital role through employment generation, poverty alleviation, food security enhance standard of living by increasing income level of the rural people. In Noakhali district Gross cropped area is 560881 acres, Aus covered local varieties 112228 acres HYV 15428 acres, Aman covered local varieties 195495 acres HYV 29333 acres and Boro covered 78407 acres. (Agriculture sample survey, BBS-2005)

Rice is the staple food of Bangladesh. It grows in three seasons namely; Aus, Aman and Boro. 76.27 percent of the total cultivated land area used for rice (Aus, Aman and Boro) and its total production 26189000 metric tons (BBS, 2004). Among the total rice cultivated area, 8.90% land was under Aus, 34.96% land was under Aman and 30.91% land was under Boro (BBS, 2005). 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). The acreage and production of local and HYV rice varieties in Bangladesh 2000-2001 to 2000-2003 are shown in table 1.1

**Table 1.1 the acreage and production of local and HYV rice varieties in Bangladesh**

Year	Area in '000' acres			Production in '000' M.tons		
	Local	HYV	Total	Local	HYV	Total
2000-2001	4821	16860	26681	5654	19427	25086
2001-2002	9394	17010	26337	5175	19125	24300
2002-2003	9140	17474	26614	5226	19162	25187

Source: BBS, 2004

A remarkable change in rice production has already been observed in Bangladesh after introduction 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, efforts are being made to adopt the innovation. There is a grave need to increase the rice production. HYV varieties are always encouraged and emphasis given to adopt them by the farmers. To gear up the production of rice farmers are being encouraged to adopt HYV rice.

Per unit yield of various crops in Bangladesh is a miserably low due to limited adoption of modern varieties technology with their proper production, management technologies (Islam, 1996). Forty five percent rice areas are still under low yielding varieties. There is a little scope to increase its yield in Bangladesh. One of the best means to do it is adoption of HYV rice by the farmers.

Continuous scientific research in rice cultivation and other relative field have made it possible to find out certain useful technologies, which if used properly, will increase HYV rice production to a great extent. But most of the farmers do not possess adequate knowledge about HYV rice cultivation.

Agricultural extension service therefore, needs to develop sound programmes diffusion of HYV rice. In doing so it is necessary first to have a clear understanding of the existing knowledge possessed by the farmers.

The findings of the present study can be a key in extending the adoption of selected HYV rice cultivation in the country. These will be helpful for planning adaptive research, formulating extension messages and production plans. These will help to understand the picture of HYV rice cultivation, adopted by the farmers of Nateshwar Union under Sonaimuri (Begumganj) Upazila in Noakhali district. With this end in view the author became keenly interested to investigate the characteristics of the farmers related to adoption of HYV rice at Nateshwar

Union under Sonaimuri (Begumganj) Upazila in Noakhali district.

## **1.2. Statement of the Problem**

The success of any technology depends on its dissemination among the potential users, which ultimately is measured by the level of adoption of that technology. It is to be anticipated that certain sustainable development can take place in the agriculture of Bangladesh, if the technology can be transferred properly. In other improvement can be ensured by increasing the rate of adoption. For wider adoption of HYV rice, it is necessary to have a clear understanding of the present status of adoption of selected HYV rice by the farmers. It is also necessary to have an understanding of the facts, which contributed to adoption of selected HYV rice. An understanding of the relationship of the farmer's adoption behavior with their selected characteristics as well as the problems faced by the respondents will be helpful to the planners and extension workers.

In view of the foregoing discussion, the investigator under took a piece of study entitled, "Adoption of High Yielding Varieties of Rice by The Farmers of Union under Noakhali district".

The purpose of this study was to have answers to the following research questions:-

1. What is the extent of HYV rice adopted by the farmers?
2. What are the selected characteristics of the farmers having relationship with the adoption of selected HYV rice by the farmers?



### **1.3. Specific Objectives**

1. To determine and describe the extent of adoption of high yielding varieties of rice by the farmers, the selected varieties are (a) BR14 (b) BRRRI Dhan-28 and (c) BRRRI Dhan-29.

2. To determine and describe some selected characteristics of the farmers.

The selected characteristics are

- a) Age
- b) Education
- c) Farm size
- d) Annual Income
- e) Knowledge on HYV rice
- f) Extension media contact
- g) Organizational participation
- h) Cosmopolitanness
- i) Innovativeness
- j) Inputs availability

3. To explore the relationship between the selected characteristics of the farmers and their adoption of high yielding varieties of rice.

### **1.4. Justification of the Study**

The major focus of the study was to assess farmer's adoption of HYV rice. The findings of the study will be especially applicable to Noakhali district (the locale of the study). However, the findings will also have implications for other areas of the country having relevance to the social cultural contexts of the study area.

It is obviously true that farmers are the key elements of adoption of HYV rice. At

present there is a lack of adequate information to influence their adoption of HYV rice. This fact indicates the need for an investigation to ascertain the relationship of the characteristics of the farmers with their adoption of HYV rice. Findings of this study, therefore, are helpful to the planners and extension workers in planning and execution of programmes for enhancing the yield as production of rice.

In, Bangladesh the deficit of food grains is a chronic problem as the pressure of population is massive, so, to ensure adequate food supply, it is necessary to give thrust to increase food production by adoption HYV rice.

### **1.5. Assumptions of the Study**

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

1. The respondents included in the sample were competent to furnish proper responses to the items included in the interview schedule.
2. The researcher was well adapted with the study area and their social activities. The researcher collected data with utmost care and can be treated as reliable.
3. The questions included in the interview schedule were reasonably adequate to measure the adoption of HYV rice.

4. The responses furnished by the respondents were accurate, valid and they expressed their opinion on adoption of HYV rice.
5. The sample size was representative of the whole population of the study area.
6. The adoption of HYV rice was linearly related with selected characteristics of the farmers.
7. The findings of the study will have general application to other parts of the country with similar socio-economic and cultural characteristics of the farmers of the study area.

#### **1.6. Limitations of the Study**

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

1. The research was cramped to a block of three villages of Sonaimuri (Begumganj) Upazila under Noakhali district.
2. The major area of investigation was mostly confined to farmer's adoption of HYV rice.
3. Only three HYV rice varieties were selected to examine the extent of adoption among the farmers of Nateshwar Union.
4. The investigator depended on the data furnished by the selected farmers during their interview.
5. There are many attributes or characteristics of the farmers, which are always varies but only ten (10) were selected for investigation in this

study as stated in the objectives. This was done to complete the study within limited resources and time.

6. Reluctance of the farmers to provide information was overcome by establishing rapport.

However, the findings of the research will particularly be applicable to the block of Nateshwar Union under Sonaimuri (Begumganj) Upazila in Noakhali District. The findings may also be suitable where the situation is similar to the study area.

### **1.7. Definition of Terms**

A number of key terms have been used throughout the study are defined below to avoid confusion and misunderstanding.

#### **Adoption**

Adoption is the implementation of a decision to continue the full use of an innovation. According to Rogers, (1995), “Adoption is a decision to make full use of an innovation as the best course of action available”. When an individual takes up a new idea as the best course of action and practices it, then phenomenon is known as adoption (Ray, 1991).

#### **Age**

It means the age of a farmer that refers to the period of time from his birth to the time of investigation.

#### **Level of education**

Level of education of an individual farmer was defined as the formal education received up to certain level from an educational institute (e.g. School, College and

University) at the time of interview.

### **Farm size**

It refers to the total area on which a farmer's family carries farming operation.

The area was estimated in terms of full benefit of the farmer's family.

### **Annual income**

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

### **Knowledge on HYV rice**

It is the extent of basic understanding of the farmers in HYV rice. It also includes the basic understanding of the use of different agricultural inputs and practices.

### **Extension media contact**

It refers to an individual's exposure to or contact with extension media for dissemination of new technologies among the farmers.

### **Organizational participation**

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

### **Cosmopolitaness**

It referred to the orientation or exposure or involvement of an individual respondent which are external to his own social system.

**Innovativeness :**

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

**Inputs**

Inputs refers to some essential elements like seed, irrigation water, fertilizer, insecticide, information, agriculture tools, credit etc. which is useful in the agriculture production.

**HYV rice**

HYV rice is one kind of rice variety which gives high yield in comparison to local varieties, which is capable to resist disease and insects, it is an improved variety.

**Farmers**

It refers to those who cultivate high yielding varieties of various crops.

## **CHAPTER 2**

### **REVIEW OF LITERATURE**

The purpose of this chapter is to review of literature having relevance to the present study. The researcher made an elaborate search of available literature for the above purpose. The research or attempted to search the literatures on a number of studies have been conducted on the adoption of innovations by the farmers. Therefore, the finding of such studies related to the extent of adoption of HYV rice by the farmers and other partial studies have been reviewed 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 farmer's characteristics and their adoption of HYV rice and the third section deals with the conceptual framework of the study.

#### **2.1. Review of Literature on General Context of Adoption**

Razzaque (1977) studied on the extent of adoption of HYV rice 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 medium adoption and 40 percent low adoption.

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

percent had medium adoption of HYV rice as transplanted Aman.

Rahman (1986) conducted a study on the extent of adoption of four improved practices which were, use of fertilizers, line sowing, irrigation and use of insecticides in transplanted Aman rice cultivation in two village of Mymensingh district. It revealed that 22 percent of the farmers adopted all the four practices compared to 49 percent three practices, 22 percent adoption two practices, 5 percent adopted one practices and only 2 percent adopted 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 74 percent adopted HYV wheat cultivation and 26 percent farmers were non-adopters.

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

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.

Haider *et al.* (2001) studied the adoption level of improved package for T. Aman rice cultivation in Gouripur upazila of Mymensingh district. He found that the adoption level of farmers categories were 5 percent non adoption, 62 percent low adoption, 24.5 percent medium adopter and 8.5 percent high adopter. 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 modern Boro rice cultivation practices.**

**Hossain (2004) found that majority (77 percent) of the Boro rice farmer had medium adoption, 5 percent had**

**low adoption and 18 percent high adoption of modern  
Boro rice cultivation practices.**

**Hossain (2006) found that majority (49 percent) of the  
HYV rice farmer had medium adoption, 25 percent had  
low adoption and 26 percent high adoption of selected  
HYV rice.**

## **2.2. Relationship between Farmers Characteristics and the Adoption of Agricultural Technologies**

### **2.2.1. Age and adoption of agricultural technology**

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) Kashem (1991) observed that there was positive and significant relationship between the age of the marginal farmers and their adoption of jute technologies. Similar results were found by Ali *et al.* (1986), Singh and Rajendra (1990), Okoro *et al.* (1992), Narwal *et al.* (1991) and Hossain

*et al.* (1991).

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 age of the farmers had no significant relationship with their adoption regarding Aalok 6201 hybrid rice.

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

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

Hossain (2006) revealed that age of the farmers had a insignificant and positive relationship with their adoption of selected HYV rice cultivation practices.

### **2.2.2. Level of education and adoption of agricultural technology**

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).

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

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

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

### **2.2.3. Farm size and adoption of agricultural technology**

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

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

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

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

### **2.2.4. Annual income and adoption of agricultural technology**

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), Rahman (1986), 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.

Hussen (2001) found that the annual income had positive significant relationship with their adoption of modern sugarcane cultivation practices.

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

Aurangozeb (2002) observed that there was a positive relationship between annual income from field crop and adoption of integrated homestead farming technologies.

Hossain (2003) revealed that annual income of the farmers had a significant relationship with their adoption at modern Boro rice cultivation practices.

Hossain (2006) revealed that annual income of the farmers had a significant relationship with their adoption at selected HYV rice cultivation practices.

#### **2.2.5. Knowledge on HYV rice and adoption of agricultural technology**

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

agreement with that of Rogers and Shoemaker (1971).

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

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

Hossain (2006) revealed that knowledge on HYV rice of the farmers had a high significant relationship with their adoption at selected HYV rice cultivation practices.

#### **2.2.6. Extension media contact and adoption of agricultural technology**

Bezborra (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 cooperative farmers in Nigeria. The findings of the study indicated a positive relationship between extension contact and adoption of improved practices.

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

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 modern maize cultivation

technologies.

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

### **2.2.7. Organizational participation and adoption of agricultural technology**

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

Ali (1984) found that organizational participation of contact farmers had significant positive contribution to their agricultural knowledge.

Haque (1993) ) found insignificant relationship between organizational participation of the framers and their knowledge on BR14 rice cultivation.

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 framers and their knowledge on Binadhan-6.

Hossain (2006) found insignificant relationship between organizational participation of the framers and their knowledge on selected HYV rice cultivation.

### **2.2.8. Cosmopolitaness and adoption of agricultural technology**

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

Chowdhury (1997) found that there was no significant relationship between the farmer's cosmopolitanism and their adoption of selected BINA technologies. Similar results were observed by Hossain (1991), Mohammad (1974), Sobhan (1975) and Islam (1996).

Hussen (2001) found that the cosmopolitanism had positive significant relationship with their adoption of modern sugarcane cultivation practices.

Aurangozeb (2002) observed that there was significant relationship between cosmopolitanism and adoption of integrated homestead farming technologies.

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

Hossain (2004) revealed that cosmopolitanism of the farmers had a in significant and negatively relationship with their adoption of modern Boro rice cultivation practices.

### **2.2.9. Innovativeness and adoption of agricultural technology**

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

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

Aurangozeb(2002) observed that there was significant relationship between innovativeness and adoption of integrated homestead farming technology.

Rahman (2003) revealed that the highest proportion (63 percent) at the farmers



had low innovativeness as compared to 22 percent medium innovativeness and 15 percent very low innovativeness.

#### **2.2.10. Inputs availability and adoption of agricultural technology**

Kohli and Singh (1997) found that inputs played a large role in the rapid adoption of HYVs in Punjab. They claim that the effort made by Punjab's government to make technological innovations and their complementary inputs more easily and cheaply available allowed the technology to diffuse faster there than in the rest of India. (Website)

Butzer et al. (2002) use a choice of technique framework to characterize the decision to adopt HYVs in India. They find that since HYVs require higher levels of fertilizer and irrigation to realize their yield potential, their introduction corresponded with a large jump in the demand for fertilizer and irrigated land. They then concluded that it was this factor accumulation that drove the rapid rate of adoption and subsequent growth in

4 SARAH BAIRD agriculture.

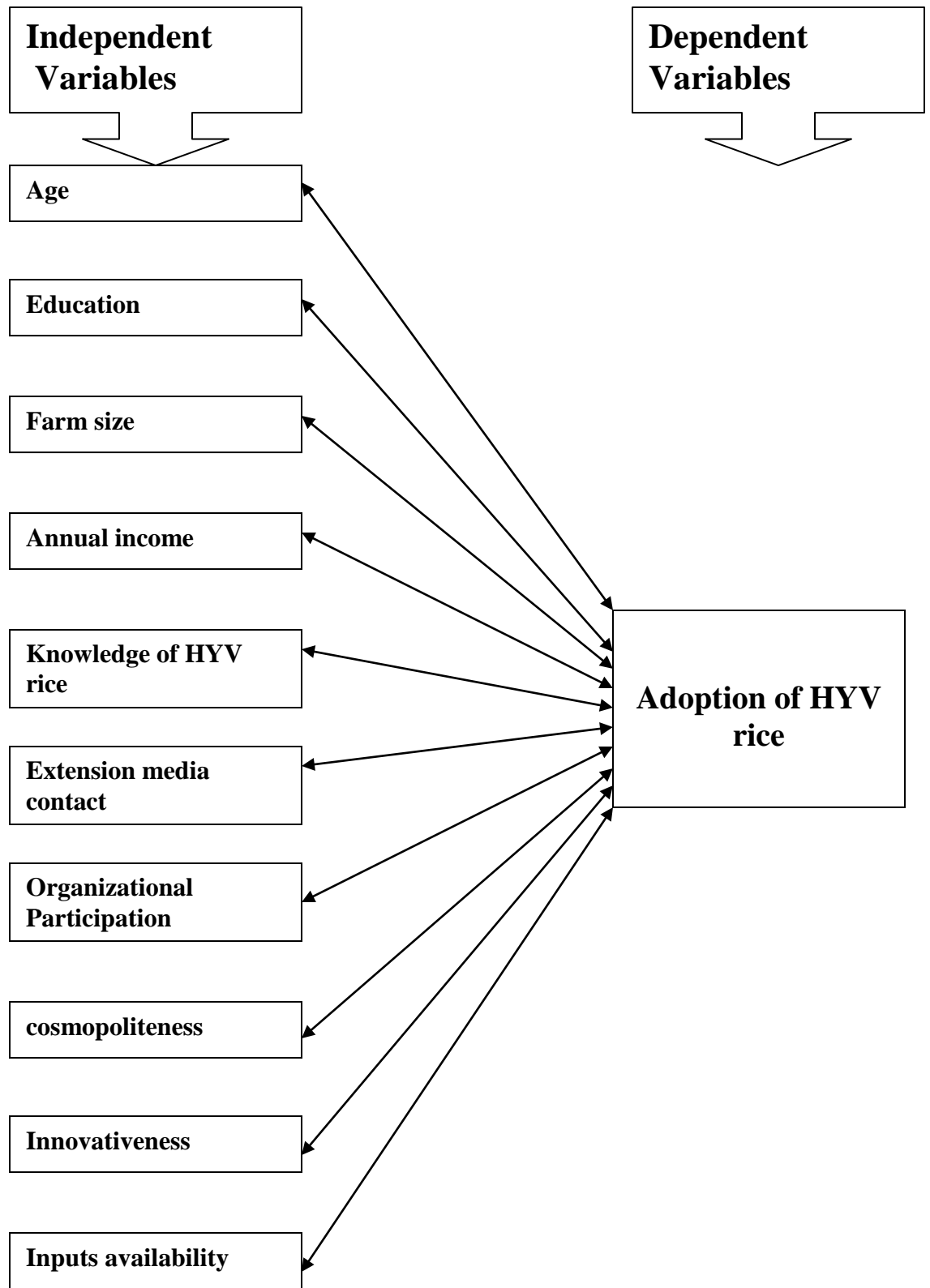
Foster and Rosenzweig (1995) and Conley and Udry (2002) use a target-input model of new technology which assumes that the best use of inputs is unknown and stochastic. Applying this model to HYV adoption in India, Foster and Rosenzweig (1995) find that initially farmers may not adopt a new technology because of imperfect knowledge about management of the new technology; however, adoption eventually occurs due to own experience and neighbors' experience. Using a similar approach,

Conley and Udry (2002) look at Pineapple cultivation in Ghana to see whether an individual farmer's fertilizer use responds to changes in information about the fertilizer productivity of his neighbors. They found that a farmer increases (decreases) his fertilizer use when a neighbor experienced higher than expected profits using more (less) fertilizer than he did, indicating the importance of social learning. Both these models, however, assume that input prices are fixed. In addition they ignore potential constraints on the supply of inputs and other localized conditions. Although in some situations these assumptions may not be

empirically important, in the context of the adoption of HYVs, input prices and availability may be critical factors in determining adoption. (Website)

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

In scientific research, selection and measurement of variables constitute an important task. The hypothesis of a research when constructed properly contains at least two important elements i.e. “a dependent variable” and “an independent variable”. An independent variable is that factor which is manipulated by the researcher in his attempt to ascertain its relationship to an observed phenomenon. In view of prime findings of review literature, the researcher constructed a conceptual framework of the study, which is self-explanatory and is presented in Fig. 2.1.



**Figure 2.1 Conceptual Framework of the study**

## **CHAPTER 3**

### **METHODOLOGY**

Methods and procedures followed in conducting the study have been discussed in this chapter. Further, the chapter includes the operational format and comparative reflection of some variables used in the study. Also statistical methods and their use have been mentioned in the section of this chapter.

#### **3.1. Locale of the study**

Sonaimuri (Begumganj) Upazila under Noakhali district was purposefully selected as locale of the study. This Upazila has 10 Unions, out of them Nateswar Union was purposively selected. Nateswar Union consists of six villages. Again out of six villages three villages namely Nateswar, Mirzanagar and Kazinagar were randomly selected.

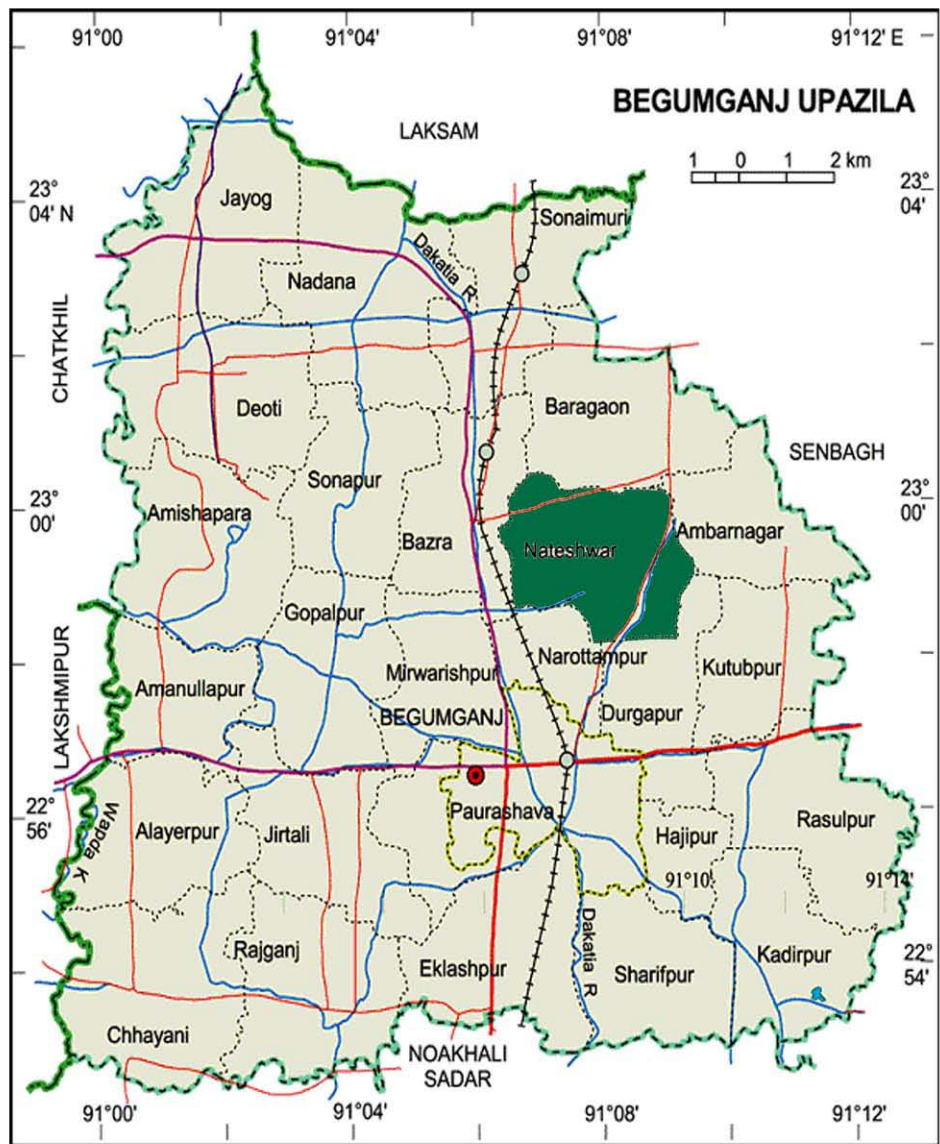
#### **3.2. Population and Sampling Design**

An up to date list of all farm family heads of the selected villages were prepared with the help pilot survey and Sub-Assistant Agricultural Officer. The list comprised a total of 400 farmers in the study area. These farmers constituted the population of this study. There were 170 farmers in Nateswar and 120 farmers in Mirzanagar and 110 farmers in Kazinagar. Twenty five (25) percent of the population of each village was randomly selected as representative sample by using random number (kerlinger, 1973). Thus, the sample size for Nateswar was 43, Mirzanagar 30 and that of Kazinagar was 27 making the total sample size of 100 farmers. In addition to that, 2 percent of the population was selected randomly and proportionately from each of selected villages. Thus, the additional

sample, so drawn stood 10 farmers, which were included in the reserve list. In case, the individuals included in the original samples were not available or not found suitable at the time of data collection, the



Fig 3.1 A Map of Noakhali district which showing local area.



**Fig 3.2 A Map of Sonaimuri (Begumganj) Upazila showing Nateshwar Union of the Study area.**

Farmers of the reserve list were used for the purpose. The distribution of the farmers included in the population, sample and those in the reserve list appears in Table 3.1.

**Table 3.1 Distribution of population and sample of respondents in two selected**

**Villages of Sonaimuri (Begumganj) Upazila**

Sl. No.	Name of village	Total number of farmers (Only technology users)	Sample size	Number of farmers in the reserve list
1	Nateshwar	170	43	5
2	Mirzanagar	120	30	3
3	Kazinagar	110	27	2
Total		400	100	10

**3.3. Measurement of Variables**

**A variable is any characteristic, which can be assumed varying different values in successive individual cases (Ezekiel and Fox, 1959). A well organized piece of research usually contains at least two important variables, viz. an independent and a dependent variable.**



**An independent variable is that factor which is maintained by the researcher in his/her attempt to ascertain its relationship to an observed phenomenon. A dependent variable is that factor which appears, disappears or varies as the researcher introduces, removes or varies the independent variable (Townsend, 1953).**

### **3.3.1. Measurement of independent variables**

The independent variables of this study were ten (10) selected characteristics of the HYV rice farmers. These were: age, education, farm size, annual income, knowledge of HYV rice cultivation, extension media conduct, organizational participation, cosmopolitaness, Innovativeness, Input availability. The procedures followed in measuring the independent variables are briefly discussed below:

#### **3.3.1.1 Age**

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

#### **3.3.1.2. Education**

Education of a respondent was measured by the number of years of schooling he completed in formal and non-formal educational institutions. A score of one (1) was assigned for each year of schooling. For example, if a respondent did not

know how to read and write, he was given a score of zero (0) and one (1) for each year of schooling completed. A score of half (0.5) was assigned to those respondents who could sign only.

### **3.3.1.3. Farm size**

Farm size measured as the size of his farm (including HYV rice and other crops) on which he continued his farming operations during the period of study. It included the area of farm owned by him as well as those obtained from others as sharecropping, lease. 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:

$$F_s = A_1 + A_2 + \frac{1}{2}(A_3 + A_4) + A_5$$

Where,  $F_s$  = Farm size

$A_1$  = Homestead area (with pond)

$A_2$  = Own land under own cultivation

$A_3$  = Own land given to others on *borga*

$A_4$  = Land taken from others on *borga*

$A_5$  = Land taken from others on lease

### **3.3.1.4. Annual income**

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

for each one thousand taka of income.

### **3.3.1.5. Knowledge on HYV rice cultivation**

**In order of measure the knowledge of a respondent about HYV cultivation practices, a 20 item scale was constituted and included in the interview schedule. Each respondent was asked to answer all the 20 questions. The summation of obtained scores against 20 questions represented the knowledge about HYV rice of a respondent. Knowledge was measured by the total knowledge score about HYV rice cultivation. The total assigned score was 50. But the score of each question was not equal; it was determined according to the extent of difficult. Full score was assigned for each correct answer, one (1) for partially correct answer and zero (0) for the wrong answer. However, for correct responses to all questions, a respondent could get a total score of 50, while wrong responses to al questions, he could get 0 (zero) '0' indicates no knowledge and '50' indicates very high knowledge**

### **1.3.1.6 Extension media contact**

Extension media contact score was obtained by adding the weights assigned against all three sources listed in the instrument. Extension contact score could be ranged from 0 to 45; 0 indicated no extension contact and 45 indicated very high extension contact.

<b>Information sources</b>	<b>Extent of use</b>	<b>Weight assigned</b>
1. Sub-Assistant Agricultural Officer	Not even once	0
	1 time per months	1
	2 times per months	2
	3 or more times per months	3
2. Agricultural Extension Officer (AEO)	Not even once	0
	1-3 times per year	1
	4-7 times per year	2
	more than 7 times per year	3
3. Upazila Agriculture Officer (UAO)	Not even once	0
	1-3 times per year	1
	4-7 times per year	2
	more than 7 times per year	3
4. Local leader	Not even once	0
	1-2 times per month	1
	3-4 times per month	2
	5-6 times per month	3
5. Seed and fertilizer dealer	Not even once	0
	1 time per month	1
	2 times per month	2
	3 times per month	3
6. Group discussion	Not even once	0
	1-3 times per year	1
	4-9 times per year	2
	10-12 times per year	3
7. Result demonstration	Not even once	0
	1 time per year	1
	1 time per 2 year	2
	1 time per 3 year	3
8. Method demonstration	Not even once	0
	1 time per year	1
	1 time per 2 year	2
	1 time per 3 year	3
9. Agricultural training course	Not even once	0
	1 time per life	1
	2-3 times per life	2
	4-5 times per life	3

10. News paper	Not even once	0
	1-2 days per week	1
	3-4 days per week	2
	7 days per week	3
11. Farm radio talk	Not even once	0
	1-2 times per week	1
	3-4 times per week	2
	5-7 times per week	3
12. Agricultural program in television	Not even once	0
	1-2 times per month	1
	3-4 times per month	2
	5-7 times per month	3
13. poster	Not even once	0
	1-2 times per year	1
	3-4 times per year	2
	5-7 times per year	3
14. Leaflet	Not even once	0
	1-2 times per year	1
	3-4 times per year	2
	5-7 times per year	3
15. Agricultural fair	Not even once	0
	1 time per 3 or more year	1
	1 time per 2 year	2
	1 time per 1 year	3

### 3.3.1.7. Organizational participation

Organizational participation on the basis of participation by the respondent in different organizations during last five years. This was multiplied by its duration i.e., number of years. Scores were assigned for participation of a respondent in an

organization in the following manner.

<b><i>Nature of participation</i></b>	<b>Score</b>
No participation	0
Participation as ordinary member	1
Participation as Executive member	2
Participation as president or secretary	3

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

$$OP = P_{OM} NY + 2P_{EM} NY + 3 P_{PS} NY$$

Where,

OP = Organizational participation

$P_{OM}$  = Participation as ordinary member

$P_{EM}$  = Participation as executive member

$P_{PS}$  = Participation as president or secretary of executive committee

N = Number of organization

Y = Duration of participation in year

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

### **3.3.1.8. Cosmopolitaness**

Cosmopolitaness of a respondent was measured in terms of his nature of visits to

the nine different places external to his own social system. The scale was used for computing the cosmopolitanness scores is presented below

<b>Place of visit</b>	<b>Nature of visit</b>	<b>Score assigned</b>
1. Visit to other village	Not even once	0
	1-2 times per months	1
	3-4 times per months	2
	5 or more times per months	3
2. Own Upazila head quarter	Not even once	0
	1-2 times per year	1
	3-4 times per year	2
	5 or more times per year	3
3. Relativ'es house	Not even once	0
	1-2 times per months	1
	3-5 times per months	2
	6 or more times per months	3
4. Agricultural fair, rally, exhibition	Not even once	0
	1 time per 5 year	1
	2 times per year	2
	3 or more times per year	3
5. NGO office	Not even once	0
	1-2 times per month	1
	3-4 times per month	2
	5 or more times per month	3
6. Special day	Not even once	0
	1-2 times per year	1
	3-4 times per year	2
	5 or more times per year	3
7. Village development meeting	Not even once	0
	1-2 times per month	1
	2-3 times per month	2
	3 or more times per month	3

The cosmopolitanness score of a respondent was determined by adding the scores obtained for his visits to each of the seven types of places as shown in the interview schedule. The cosmopolitanness scores of an individual could range from 0 to 21 where 0 indicated no cosmopolitanness and 21 indicated very high cosmopolitanness.

### **3.3.1.9. Innovativeness**

Innovativeness is the degree to which an individual adopts an innovation relatively earlier than the other member in a social system (Rogers, 1995). Score were assigned on basis of time required by the individual to adopt each of the technology in the following member. When period of adoption, within 1-2 year score 3, within 3-4 year score 2, within 5 or above score 1, not at all score 0. Where total score 0 indicating no innovativeness and 24 score indicating very high innovativeness.

### **3.3.1.10. Input Availability**

Availability of input referred to the extent of availability of 8 essential inputs for rice cultivation. The essential inputs including seed, fertilizer, insecticide, irrigation water, farm implement, technical assistant, market facilities and credit facility. This variable was measured by assigning score for each of the 8 selected inputs facilities using a 4 points scale as follows: Always available-3, easily available-2, Available at a time-1 and not available-0. The total input facilities score of a respondent was computed by adding all the score obtained from each of the 8 available facilities. Thus the input facilities score of a respondent could range from 0-24. 0 indicating lowest level of inputs availability and 24 highest level of availability of respondent.

## **3.3.2. Measurement of dependent variable**

### **3.3.2.1. Adoption of HYV rice**

The procedure followed measuring the dependent variable is presented below:

Adoption of HYV of rice was the dependent variable of this study. It was



measured on the basis of the extent of adoption of HYV of rice by the farmer of Noakhali district for a period of two (2) year 2004-2005 and 2005-2006. Adoption has been measure in a number of ways in India (Ray, 1991). The simplest amongst them are preparation of indexes. Bose and Saxena (1965) developed an adoption index by asking farmers as how many variety of rice recommended by the extension service they had adopted and for how many year. The summation of years and the adoption of HYV rice will make the index. A more rigorous and widely used method of measuring adoption by computing adoption quotient developed by Chattapadhyay (1963). According to him, the adoption quotient is the ratio scale designed to quantify the adoption behavior of an individual. The method of adoption of quotient is more accurate as it involves all the related concepts like potentiality, extent of time consistency and weight age.

However, the overall HYV of rice adoption index was computed by using the following formula:

$$\text{Adoption of HYV rice index (MAQ)} = \frac{\sum \frac{e}{p}}{Ps} \times 100$$

Where,

e= extent (i.e. actual adoption) of adoption of HYV rice in a particular year

p=Potentiality (i.e. possible adoption) of HYV of rice in a particular year

Ps= period under study adoption of HYV of rice

In this study, it is two year i.e. 2004-2005 and 2005-2006. The HYV of rice adoption index was expressed in percentage. Hence, the HYV of rice adoption index of farmers could range from 0 to 100, where, 0 indicates no adoption and

100 indicate highest adoption. Islam (2002) and Hossin (2003) used this formula to measure the adoption of recommended practices.

Using above formula, MAQ was computed against each technology for individual farmers (Hossin 2004).

### **3.5. Statement of the Hypothesis**

**As defined by Goode and Hatt (1952) “A hypothesis, which can be put to a test to determine its validity. It may see contrary to, or in accord with common sense. It may prove to be correct or incorrect. In any event, however, it leads to an empirical test.” In studying the relationship between variables, research hypotheses are formulated which state the anticipated relationship between the variables. However, for statistical test it becomes necessary to formulate null hypothesis. 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 farmers selected characteristics and their adoption of selected HYV rice. The characteristics were: age, education, farm size annual income, knowledge of HYV rice cultivation, extension media conduct, organizational participation, cosmopolitaness, innovativeness and input availability.

### **3.6. Data collection**

Data were collected personally by the researcher himself by interviewing the sample of 100 HYV rice growers with the help of an 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 explanted 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 October 15 to October 30, 2006. The researcher sought the help from the local leaders and Sub-Assistant Agricultural Officer Dept. of Agil. Extension (DAE) for this purpose. Excellent co-operation was obtained from the respondents, the concerned local leaders and the Sub-Assistant Agricultural (DAE).

### **3.7. Data Coding and Tabulation**

**A detail coding plan was prepared. Data were coded into a coding sheet. These were then compiled, analyzed in**

**accordance with the objectives of the study by using computer system. Qualitative data were converted into quantitative from by means of suitable scoring techniques for the purpose of analysis.**

### **3.8. Statistical Analysis**

The collected data were compiled, tabulated, coded and analyzed in accordance with the objectives of the study. Qualitative data were quantified by mean of suitable scoring techniques. The statistical measures such as number and percentage distribution were used for describing the variables of the study. In order to explore the relationships between the knowledge and adoption of HYV rice and the selected characteristics of the farmers, the Pearson Product Moment Correlation was computed. Correlation matrix was also computed to determine the interrelationships among the variables. Five percent (0.05) and one percent (0.01) level of significance was used as the basis of rejecting any null hypothesis. If the computed value of co-efficient of correlation 'r' was equal to or greater than table value at designated level of significance for the relevant degrees of freedom, the null hypothesis was rejected and it was concluded that there was significant relationship between the concerned variables. However, when the computed value of co-efficient of correlation was found to be smaller than the tabulated value at the designated level of significant for the relevant degrees of freedom, it was concluded that the null hypothesis could not be rejected and hence there was no relationship between the concerned variables.

## **CHAPTER 4**

### **RESULTS AND DISCUSSION**

The findings of the study and interpretations of the results have been presented in this Chapter. The first section deals with the selected characteristics of the respondents, while the second section deals with the adoption of selected HYV rice. In the third section, the relationships between the extent of adoption of selected HYV rice and the selected characteristics of farmers have been discussed.

#### **4.1. Selected Characteristics of the Farmers (independent variables)**

Ten characteristics of the farmers were selected to find out their relationships with the adoption of selected HYV rice. The selected characteristics included age, education, farm size, annual income, knowledge on HYV rice cultivation, extension media conduct, organizational participation, cosmopolitaness, innovativeness ,inputs availability . These characteristics of the farmers are described in this section. The results on the selected characteristics of the presented in Table 4.1.

**Table 4.1 Salient features of the respondents with their characteristics**

Characteristics	Measuring unit	Range		Categories	Farmers		Mean	SD
		Possible	Observed		Number (N=100)	Percent (%)		
Age	Actual Years	Unknown	23-80	Young aged (up to 34)	18	18	48.31	14.60
				Middle aged (35-50)	45	45		
				Old (51 and above)	37	37		
Education	Year of schooling	Unknown	0-16	No education (0)	10	10	5.69	4.17
				Can sign only (0.5)	17	17		
				Primary (1-5)	31	31		
				Secondary (6-10)	31	31		
				Above secondary (>11)	11	11		
Farm size	Actual (in ha)	Unknown	.25-3.41	Small (up to 0.99)	50	50	1.19	.77
				Medium (1-2.99)	32	32		
				Large (3.00 and above)	18	18		
Annual income	Computed Scores	Unknown	35-2470	Low income (up to 104)	19	19	245.9	283.04
				Medium income (105-380)	65	65		
				High income (381 and above)	16	16		
Knowledge on HYV rice cultivation	Computed Scores	0-50	20-48	Low knowledge( up to 25)	13	13	32.83	7.13
				Medium knowledge ( 25-40)	65	65		
				High knowledge ( 41 and above)	22	22		
Extension media conduct	Computed Scores	0-45	5-26	No extension contact(0)	0	0	14.78	5.08
				Low extension contact (up to 10)	26	26		
				Medium extension contact(11 to 20)	59	59		
				High extension contact (21 and above )	15	15		
Organizational participation	Computed score	0-120	0-42	No participation (0)	41	41	7.16	9.30
				Low participation (1-10)	33	33		
				Medium participation (11-20)	16	16		
				High participation (>20)	10	10		
Cosmoploiteness	Scores	0-21	2-15	Low (up to4)	28	28	6.86	2.98
				Medium (5-10)	58	58		
				High (11 and above)	14	14		
Innovativeness	Scores	0-24	3-15	Low (up to 7)	20	20	9.35	2.30
				Medium (8-12)	72	72		
				High (13 and above)	8	8		
Inputs availability	Scores	0-24	6-21	Low (up to 11)	24	24	14.18	3.5
				Medium (12-18)	68	68		
				High(19 and above)	8	8		



#### **4.1.1. Age**

Age of the respondents ranged from 23 to 80 years, the average being 48.31 years and the standard deviation was 14.60. On the basis of age, the farmers were classified into three categories: Young aged (up to 34), middle aged (35-50) and old aged (50 and above). Table 4.1 contains the distribution of the respondents according to their age.

Data presented in Table 4.1 indicated that the highest proportion (45 percent) of the respondents fell in the middle aged category compared to 18 percent young and 37 percent old age category. It may also be revealed that 63 percent of the respondents under study area comprised of the younger to middle aged categories. The findings indicate that a large proportion of 45 percent of the farmers were middle aged. Young people are generally receptive to new ideas and things. They have a favorable attitude towards new ideas. However, the older farmers because of their longer farm experience might have valuable opinions in regard to adoption of HYV rice cultivation. The extension agents can make use of these views and opinions in designing their extension activities.

#### **4.1.2. Education**

Education of a respondent was measured by the level of his formal education i.e. highest grade (class) passed by him. The education score of the respondents ranged from 0 to 16, the average being 5.69 and the standard deviation was 4.17. Based on their level of education, the respondents were grouped into five categories: no education (0), can sign only (0.5), primary education (1-5), Secondary education (6-10), and above secondary education (>11). Data presented in Table 4.1 indicate that a large proportion (31 percent) of the respondents fell under category of primary and secondary education compared to



10 percent no education, 17percent can sign only, and 11 percent having above secondary education. As education can enlighten a family, it may contribute to the adoption of HYV rice. In fact there is no much difference between no education and can sign only. So in the study area illiteracy percentage is more than national average. Literacy percentage must be increased in the study area for the shake of adoption of agricultural innovations. The findings indicate that education of an individual is likely to be more receptive to the modern facts and ideas; they have much mental strength in deciding on a matter related to problem solving or adoption of technologies in their daily life. Thus, farming community in the area may be well considered as a suitable ground for the adoption of technologies, or execution of change programmed whatever needed.

#### **4.1.3. Farm size**

The study farm size varied from 0.25 to 3.41 hectares. The average farm size was 1.19 hectares with a standard deviation of.77. The respondents were classified into three categories based on their farm size as followed by DAE (DAE, 1995): small farm size (up to 0.99 ha) medium farm size (1-2.99 ha) and large farm size (3.00 and above). The distribution of the respondents according to their farm size is shown in Table 4.1.

Data presented in the Table 4.1 show that the highest proportion (50 percent) of the farmers had small farm compared to 32 percent had medium farm and 18 percent having large farm. The average farm size of the farmers of the study area is small. This might be due to the fact that the farmers of the study area were high density of population.

#### **4.1.4. Annual income**

Annual income of the respondents ranged from 35 to 2470 with a mean of 245.9 and standard deviation 283.04. Based on their annual income, the respondents were classified into three categories: low income (up to 104), medium income (105-380), high income (381 and above). The distribution of the respondents according to their family income is shown in Table 4.1.

Data shown in Table 4.1 revealed that highest proportion (65 percent) of the respondents had medium annual income compared to 19 percent under low income group and 16 percent under high income group. Thus, the overwhelming majority (81 percent) of the respondents had medium to high family income indicating that HYV rice cultivation technologies are usually practiced by the farmers having comparatively higher economic standard.

The average income of the farmers of the study area is much higher. This might be due to the fact that the farmers of the study area were not only engaged in agriculture. They also earn from other sources such as service, business etc. Farmers with the 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 respondents/farmers might face difficulties in adopting HYV rice.

#### **4.1.5. Knowledge on HYV rice cultivation**

Knowledge on HYV rice scores of the respondents observed ranged from 20-48 with an average of 32.83 and standard deviation of 7.13 against the possible range 0 to 50. On the basis of knowledge score on HYV rice, the respondents were

classified into three categories, low knowledge (up to 25), medium knowledge (26 to 40) and high knowledge (41 and above). The distribution of the respondents according to their knowledge on HYV rice is shown in Table 4.1.

Data contained in Table 4.1 indicate that the majority (65 percent) of the farmers had medium knowledge compared to 13 percent fell in low knowledge and 22 percent possesses high knowledge. It reveals that the majority 87 percent of the farmers in the study area were under high knowledge to medium knowledge categories. Farmers are known important procedure to cultivate HYV rice.

#### **4.1.6. Extension media conduct**

The computed extension media contact scores of the respondents ranged from 5 to 26 with an average 14.78 and standard deviation of 5.08 against the possible range of 0 to 45. On the basis of contact with Extension media conduct scores, the respondents were classified into four categories: No extension contact (0), low extension contact (up to 10), medium extension contact (above 11 to 20) and high extension contact (above 21). The distribution of the respondents according to their contact with extension media conduct is shown in Table 4.1.

Data presented in Table 4.1 indicate that the highest proportion (59 percent) of the farmers of the study area had medium extension contact, while 26 percent had low extension contact and 15 percent had high extension contact. The findings of the study indicated that most of the respondents had medium and low extension contact for getting necessary agricultural information.

#### **4.1.7. Organizational participation**

The observed organizational participation scores of the farmers ranged from 0 to

42 against the possible range 0-120 with an average 7.16 and standard deviation 9.30. Depending on the organizational participation scores, the farmers were classified into four categories namely; No participation (0), Low participation (1-10), Medium participation (11-20) and High participation (>20).

Data contained in Table 4.1 revealed that the highest proportion (41 percent) of the farmers had no organizational participation as compared to 33 percent having low participation, 16 percent medium and 10 percent had high organizational participation.

#### **4.1.8. Cosmopolitaness**

Cosmopolitaness scores of the respondents ranged from 2 to 15 against the possible range of 0 to 21 with an average of 6.86 and the standard deviation of 2.98. On the basis of their cosmopolitaness into three categories: low cosmopolite (up to 4), medium cosmopolite (5-10) and high cosmopolite (11 and above). The distribution of the respondents according to their cosmopolitaness is shown in Table 4.1.

Data contained in Table 4.1 indication that the majority (58 percent) of the respondents were medium cosmopolited compared to 28 percent of them being low cosmopolited and only 14 percent highly cosmopolite". Data also revealed that majority (86 percent) of the respondents had medium to low cosmopolitaness. Most of the farmers of study area are extrovert and they communicate different type people in different place.

#### **4.1.9. Innovativeness**

The maximum innovativeness score of the respondent was 15 and the minimum

was 3 against the possible range 0-24. However, the average was 9.35 and the standard deviation 2.30. Based on their innovativeness score, the respondents were classified into three categories: low innovativeness (up to 7), moderately innovative (8-12) and highly innovative (13 and above). The distribution of the respondents according to their innovativeness is shown in Table 4.1.

Data contained in table 4.1 indicate that the highest proportion (72 percent) of the farmers had medium innovativeness as compared to 20 percent low innovativeness and only 8 percent high innovativeness. Data also revealed that the majority (80 percent) of the respondent farmers of the study area had a medium to high level of innovativeness. It may also be concluded that all the farmers of the study area had innovativeness. These two results would help the extension planners to chalk out a future extension program for the transfer of technologies to the potential farmers.

#### **4.1.10. Inputs availability**

Inputs availability scores of the respondents ranged from 6 to 21 with an average of 14.18 and standard deviation of 3.5 against the possible range 0 to 24. On the basis of Inputs availability scores, the respondents were classified into three categories, low availability (up to 11), medium (12 to 18) and high knowledge (19 and above). The Inputs availability distribution of the respondents according to is shown in Table 4.1.

Data contained in Table 4.1 indicate that the majority (68 percent) of the farmers had medium inputs availability compared to 20 percent fell in low knowledge and

8 percent possesses high Availability. It reveals that the majority 76 percent of the farmers in the study area were under high to medium categories.

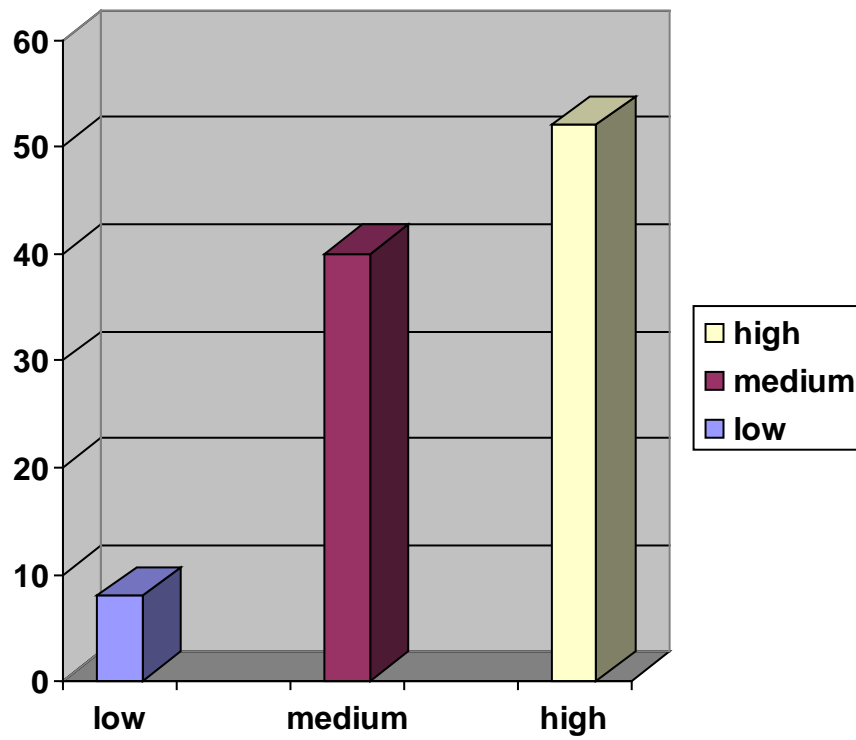
#### 4.2. Adoption of HYV rice by the farmers

The adoption of HYV rice of the respondents ranged from 33 to 100 against the possible range 0 to 100. The average adoption was 76.26 with a standard deviation of 17.69 Based on the adoption scores the respondents were classified into three categories. Low adoption (upto 50), medium adoption (above 51 to 75) and high adoption (76 and above). The distribution of respondents according to their adoption of HYV rice has been shown in Table 4.2.

**Table 4.2. Distribution of the respondents according to their adoption:**

Technologies	Measuring unit	Range		Categories	Farmers		Mean	SD
		Possible	Observed		Number (N=100)	Percent (%)		
Adoption of HYV rice	Computed	0-100	23-100	Low adoption (up to50)	8	8	76.26	17.69
				Medium adoption (above 51 to 75)	40	40		
				High adoption (76 and above)	52	52		

Data contained in Table 4.2 revealed that the highest proportion (52 percent) of farmers fell under the high adoption category, while (40 percent) had medium adoption and (8 percent) had low adoption. Thus an overwhelming majority of the farmers had medium to high adoption. It is a good signal for HYV rice cultivation. For clarity of understanding a bar diagram has been presented in Figure 4.1.



Extent of farmer's adoption

Fig: 4.1 Extent of adoption of HYV rice by the farmers

**Table 4.3 Percentages of farmers adopted the different HYV rice**

Name of the variety	No of farmers adopted the variety	percent
Total BR14	57	57
Only BR14	4	4

Total BRRI Dhan-28	84	84
Only BRRI Dhan-28	3	3
Total BRRI Dhan-29	89	89
Only BRRI Dhan-29	4	4
BR14 + BRRI Dhan-28	5	5
BR14 + BRRI Dhan-29	7	7
BRRI Dhan-28 + BRRI Dhan-29	35	35
BR14 + BRRI Dhan-28 and 29	42	42

The researcher researched with three HYV rice varieties i.e. BR14, BRRI 28, and BRRI 29. In case of varieties BR14 it was found that 57% farmers cultivated this variety and their adoption index was 1006 in case of BRRI Dhan-28 it was found that 84% farmers cultivated this variety and their adoption index was 1877. In case of BRRI Dhan-29 it was found that 89% farmers cultivated this variety and their adoption index 2475. Maximum 42 percent farmers adopted three varieties, 35 percent farmers adopted BRRI Dhan-28 +29, 7 percent BR14 + BRRI Dhan-29, 5 percent BR14 +BRRI Dhan-28, 4 percent only BRRI Dhan-29, 3 percent only BRRI Dhan-28 and 4 percent only BR14 adopted.

**Table 4.4 The rank order of these varieties according to there adoption index.**



Variety	Adoption index	Rank order
BR14	1006	3
BRR1 Dhan-28	1877	2
BRR1 Dhan-29	2475	1

Form the above discussion it was found most of the farmers (89 percent) adopted the variety BRR1 Dhan-29 because this variety is more productive and quality of rice is more superior then other varieties.

#### **4.3. Relationships between the Selected Characteristics of the Farmers and their Adoption of Selected HYV rice**

This section deals with the relationship between the selected characteristics of the farmers and their adoption of selected HYV rice. The selected characteristics constituted independent variable and adoption of selected HYV rice by the farmers constituted the dependent variable.

Pearson's product moment correlation co-efficient 'r' has been used to test the hypothesis concerning the relationships between two variables. Five percent and one percent level of significance was used as the basis of acceptance or rejection of a hypothesis. The summary of the results of the correlation co-efficient between the selected characteristics of the respondent farmers and their adoption of selected HYV rice is shown in Table 4.5.

**Table 4.5 Co-efficient of correlation of the selected characteristics of the respondents and their adoption of selected HYV rice**

Dependent variable	Independent variable	Computed value of 'r'	Table value of 'r' of 98 degrees of freedom	
			0.05	0.01
Adoption of HYV rice	Age	0.024 <sup>NS</sup>	0.196	0.256
	Education	0.201*		
	Farm size	0.056 <sup>NS</sup>		
	Annual income	0.203*		
	Knowledge of HYV of rice cultivation	0.223*		
	Extension media conduct	0.208*		
	Organizational participation	0.217*		
	Cosmopolitaness	-.069 <sup>NS</sup>		
	Innovativeness	0.220*		
	Inputs availability	0.330**		

NS=Not significant

\* = Significant at 0.05 level of probability

\*\* = Significant at 0.01 level of probability

#### **4.3.1. Relationship between age of the farmers and their adoption of HYV rice**

The relationship between age of the farmers and their adoption of HYV rice was examined by testing the following null hypothesis:

“There is no relationship between age of the farmers and their adoption of selected HYV rice.”

As show in the Table 4.4 the co-efficient of correlation between the concerned variables was computed and found to be 'r'= 0.024 which led to the following observation.

- Firstly, the relationship showed a positive trend.
- Secondly, a low relationship was found to exist between two variables.
- The computed value of 'r' (0.024) was smaller than the table value ( $r = 0.196$ ) with 98 degrees of freedom at 0.05 level of probability.
- Hence, the concerned null hypothesis could not be rejected.

The findings imply that the age of the farmers had not significant relationship with their adoption of selected HYV rice.

It might be concluded that the age of the farmers was not an important factor for adoption of HYV rice. The age of the farmers is a factor for making favorable decision towards the adoption of HYV rice. Usually the young and middle aged farmers are more interested to adopt HYV rice because they have more risk taking ability than the old aged farmers. The present findings although indicated a significant relationship between age and adoption of selected HYV rice but in real situation the young and middle aged farmers are more receptive of HYV rice than those of the old farmers. This finding has conformity with the findings of Rahaman (1986), Kher (1992), and Islam (1993).

#### **4.3.2. Relationship between the education of the farmers and their adoption of Selected HYV rice**

The relationship between the education of the farmers and their adoption of selected HYV rice was examined by testing the following null hypothesis: “There is no relationship between education of the farmers and their adoption of selected HYV rice.”

The co-efficient of correlation between the concerned variables was found to be ‘r’= 0.201 as shown in Table 4.4. This led to the following observations regarding the relationship between the two variables under consideration:

- The relationship showed a tendency in the positive direction between the concern variables.
- The relationship between the concerned variables was moderate.
- The computed value of ‘r’ (0.201) was greater than the table value ( $r = 0.196$ ) with 98 degrees of freedom at 0.05 level of probability.
- The concerned null hypothesis was rejected.

The findings indicate that the education of the farmers had a significant and positive relationship with their adoption of selected HYV rice. Similar findings were also observed by Hamid (1995), Khan (1993) and Hoque (1993).

Education enables individuals to gain knowledge and thus increases their power of understandings. Consequently, their outlook is broadened and horizon of knowledge is expanded. Thus adoption of selected HYV rice may be higher among those farmers who had higher education.

#### **4.3.3. Relationship between farm size of the farmers and their adoption of selected HYV rice**

The relationship between farm size of the farmers and their adoption of selected HYV rice was examined by testing the following null hypothesis:

“There is no relationship between farm size of the farmers and their adoption of selected HYV rice.”

Computed value of the co-efficient of correlation between farm size of the farmers and their adoption of selected HYV rice was found to be ‘ $r = 0.056$ ’ as shown in Table 4.4. The following observations were recorded regarding the relationship between the two variables on the basis of the co-efficient of correlation.

- The relationship showed a tendency in the positive direction between the concerned variables.
- A very low relationship was found between the two variables.
- The computed value of ‘ $r$ ’ (0.056) was found to be smaller than the table value ( $r = 0.196$ ) with 98 degrees of freedom at 0.05 level of probability.
- The concerned null hypothesis could not be rejected.

The findings imply that the farm size of the farmers had a relationship with their adoption of selected HYV rice. The findings are quite rational because adoption of selected HYV rice is relatively costly. Hence, large farmers get more scope than the small farmers because they can invest more money.

#### **4.3.4. Relationship between annual income of the farmers and their adoption of selected HYV rice**

The relationship between annual income of the farmers and their adoption of selected HYV rice was examined by testing the following null hypothesis:

“There is no relationship between annual income of the farmers and their adoption of selected HYV rice.”

Computed value of the co-efficient of correlation between annual income of the farmers and their adoption of selected HYV rice was found to be  $r = 0.203$

as shown in Table 4.4. The following observations were recorded regarding the relationship between the two variables on the basis of the co-efficient of correlation:

- The relationship showed a tendency in the positive direction between the concerned variables.
- A moderate relationship was found between the two variables.
- The computed value of  $r$  (0.203) was found to be greater than the table value ( $r = 0.196$ ) with 98 degrees of freedom at 0.05 level of probability.
- The concerned null hypothesis was rejected.

The researcher concluded that annual income of the farmers had a positive significant relationship with their adoption of selected HYV rice.

The findings are quite logical because HYV rice cultivation was costly. It needs more improved seed, fertilizer, insecticides irrigation and more adoption of various intercultural practices for a long duration. Thus availability of found or cash is essential to solve those financial issues for cultivation by the farmers to a considerable extent. Hussen (2001), found that the annual income of the cane growers had a positive significant relationship with their adoption of modern sugarcane cultivation practices. Khan (1993), Pal (1995) and Chowdhury (1997) also found the similar findings. Adopt selected HYV rice.

#### **4.3.5. Relationship between knowledge on HYV rice of the farmers and their adoption of selected HYV rice**

The relationship between knowledge on HYV rice of the farmers and their adoption of selected HYV rice was examined by testing the following null hypothesis

“There is no relationship between knowledge on HYV rice of the farmers and their adoption of selected HYV rice.”

Computed value of the co-efficient of correlation between knowledge on HYV rice of the farmers and their adoption of selected HYV rice was found to be ‘r’= 0.223 as shown in Table 4.4. The following observations were recorded regarding the relationship between the two variables on the basis of the co-efficient of correlation.

- The relationship showed a positive trend.
- A moderate relationship was found between the two variables.
- The computed value of ‘r’ (0.223) was found to be greater than the table value ( $r = 0.196$ ) with 98 degrees of freedom at 0.05 level of probability.
- The concerned null hypothesis was rejected.

The researcher concluded that the knowledge on HYV rice of the farmers had a positive significant relationship with their adoption of selected HYV rice cultivation. Hoffer and Stangland (1958), Moulik *et al.* (1966); Ernest, (1973); Ramachandran, (1974); Somasundaram and Singh (1978); Bezbor, (1980); Grewal (1980); Ali and Chowdhury, (1983); Ali *et al.* (1986); Reddy, *et al.* (1987); Ali (1993) and Bashir (1993) found the similar findings.

#### **4.3.6. Relationship between extension media contact of the farmers and their adoption of selected HYV rice**

The relationship between contact with extension staff of the farmers and their adoption of selected HYV rice was examined to the following null hypothesis:

“There is no relationship between extension media contact of the farmers and their adoption of selected HYV rice.”

The co-efficient of correlation between the concerned variables was found to be ‘r’= 0.208 as shown in Table 4.4. This led to the following observations were recorded regarding the relationship between the two variables under consideration:

- The relationship showed a positive trend.
- A moderate relationship was found between the concerned variables.
- The computed value of ‘r’ (0.208) was greater than the table value ( $r = 0.196$ ) with 98 degrees of freedom at 0.05 level of probability.
- The concerned null hypothesis was rejected.

Thus, the researcher concluded that the extension contact of the farmers had positive significant relationship with their adoption of selected HYV rice.

The extension contact strengthened the base of their knowledge. The knowledge definitely acts as motivator towards adoption of new technologies. Hussien (2001) found that extension contact of the growers had significant relationship with their adoption of modern sugarcane cultivation practices. Kashem *et al.* (1990), Bashar(1993), Sarker (1997), Pal (1995), Chowdhury (1997) also found the similar findings.



#### **4.3.7. Relationship between organizational participation and their adoption of selected HYV rice**

The relationship between organizational participation of the farmers and adoption of HYV rice was examined by testing the following null hypothesis

“There is no relationship between organizational participation and their adoption of selected HYV rice”

Co-efficient of correlation between the conceded variables was found to be ‘r’= (0.217) as shown in Table 4.4. This led to the following observations regarding the relation between the two variables under consideration:

- The relationship showed a positive trend.
- A moderate relationship was between the two variables.
- The computed value of ‘r’ (0.217) was greater than the tabulated value ( $r=0.196$ ) 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 organizational participation of the farmers had a significant relationship with their adoption of HYV rice.

#### **4.3.8. Relationship between cosmopolitaness of the farmers and their adoption of selected HYV rice**

The relationship between cosmopolitaness of the farmers and their adoption of selected HYV rice was examined to the following null hypothesis:

“There is no relationship between cosmopolitanism of the farmers and their adoption of selected HYV rice.”

The co-efficient of correlation between the concerned variables was found to be ‘r’ = -0.069 as shown in Table 4.4. This led to the following observations regarding the relationship between the two variables under consideration.

- The relationship showed a negative trend.
- A very low relationship was found to exist between the two variables.
- The computed value ‘r’ (-0.069) was smaller than the table value (r = 0.196) with 98 degrees of freedom at 0.05 level of probability.
- Hence, the concerned null hypothesis could not be rejected.

The researcher concluded that cosmopolitanism of the farmers had no relationship with their adoption of selected HYV rice.

Thus, findings indicated that the cosmopolitanism does not influence significantly to adopt selected HYV rice, because most of the surrounding farmers had awareness regarding year-round HYV rice yield production concept. Alam (1997) found that cosmopolitanism had no significant relationship with their use of improved farm practices in HYV rice cultivation. Hossain (1991) had also similar findings.

#### **4.3.9. Relationship between innovativeness and their adoption of selected HYV rice**

The relationship between innovativeness and their adoption of selected HYV rice was examined to the following null hypothesis:

“There is no relationship between innovativeness and their adoption of selected HYV rice.”

Computed value of the co-efficient of correlation between attitude towards HYV rice and their adoption of selected HYV rice was found to be ‘r’= (0.220) as shown in Table 4.4. The following observations were recorded regarding the relationship between the two variables on the basis of the co-efficient of correlation.

- The relationship showed a positive trend.
- A moderate relationship was found between the concerned variables.
- The computed value of ‘r’ (0.220) was found to be greater than the table value ( $r = 0.196$ ) with 98 degrees of freedom at 0.05 level of probability.
- Hence, the concerned null hypothesis was rejected.

The researcher thus concluded that the innovativeness of the farmers had relationship with their adoption of selected HYV rice. It could influence directly to adopt new technologies. Hence, extension workers who are strongly contributed to be created need awareness, consciousness and activeness of them to adopt selected HYV rice.

#### **4.3.10. Relationship between inputs availability of the farmers and their adoption of selected HY V rice**

The relationship between inputs availability of the farmers and their adoption of selected HYV rice was examined by testing the following null hypothesis

“There is no relationship between inputs availability of the farmers and their

adoption of selected HYV rice.”

Computed value of the co-efficient of correlation between inputs availability of the farmers and their adoption of selected HYV rice was found to be ‘ $r$ ’ = 0.330 as shown in Table 4.4. The following observations were recorded regarding the relationship between the two variables on the basis of the co-efficient of correlation.

- The relationship showed a positive trend.
- A high relationship was found between the two variables.
- The computed value of ‘ $r$ ’ (0.330) was found to be greater than the table value ( $r = 0.256$ ) with 98 degrees of freedom at 0.01 level of probability.
- The concerned null hypothesis was rejected.

The researcher concluded that the inputs availability of the farmers had a positive and highly significant relationship with their adoption of selected HYV rice cultivation.

## CHAPTER 5

### SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

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

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

Three villages namely, Nateshwar, Mirzanagar and Kaginagar of Sonaimori (Begumganj) Upazila under Noakhali District. The sample was 100 rice farmers were drawn from a population of 400. Data were collected by using a structured interview schedule. The study with the following specific objectives: i) To determine the extent of adoption of HYV of rice by the farmers, ii) To determine the selected characteristics of farmers and iii) To explore the relationship between each of the selected characteristics of the farmers and their adoption of HYV of rice.

The major findings of the study are summarized below selected characteristics of HYV rice farmers.

##### **5.1.1. Selected characteristics of the HYV rice farmers**

###### **Age**

Age of the farmers ranged from 23-80 years. The average 48.31 years with a standard deviation 14.60. The highest proportion (45 percent) of the farmers was middle aged while 18 percent were young and 37 percent old.

###### **Education**

Education of the farmers ranged from 0 to 16 years of schooling. The average

score being 5.69 and the standard deviation was 4.17. Large proportion (31 percent) of the farmers having both primary and secondary education (scores 1-10) compared to 17 percent having can sign only (score 0.5), 10 percent having no education (scores, 0), 11 percent having high education scores (11-16).

### **Farm size**

Farm size of the farmers ranges from 0.25-3.41 hectares with an average 1.19 and standard deviation .77 the highest proportion (50 percent) of the farmers belonged to small farm size compared to 32 medium and 18 percent with large farm size respectively.

### **Annual income**

Annual income scores of the farmers range from 35-2470 with an average of 145.9 and the standard deviation 283.04. The highest proportion 65 percent the farms having had medium annual income compared to 19 percent under low annual income and 12 percent having high annual income.

### **Knowledge on HYV Rice**

Knowledge on HYV rice scores of the farmers ranged from 20-48 against the possible range 0-50. The highest proportion (65 percent) of the farmers had medium knowledge compared to 22 percent had high knowledge and 13 percent had low knowledge.

### **Extension media conduct**

Conduct with extension media of the farmers ranged from 5 to 26 the average score being 14.78 with the standard deviation was 5.08. The highest proportion 59 percent of the respondents had medium contact compared to 26 percent low

extension conduct, 15 percent high extension contact.

### **Organization participation**

Organization participation of the farmers ranged from 0-42. The average score being

7.16 With the standard deviation 9.29. The highest proportion (41 percent) of the farmers have no organizational participation compared to 33 percent low participation 16 percent medium participation and 10 percent high participation.

### **Cosmopolitaness**

Cosmopolitaness scores of the farmers ranged from 2-15. The average cosmopolitaness was 6.86 with the standard deviation 2.98. The highest proportion (58 percent) of the farmers had medium cosmopolitaness compared to 28 percent low cosmopolitaness and 14 percent high cosmopolitaness.

### **Innovativeness**

Innovativeness scores of the farmers ranges from 3-15 against the possible score 0-24. The average Innovativeness score was to be 9.35 with standard deviation of 2.30. The highest proportion (72 percent) of the farmers had moderately Innovativeness Compared to 20 percent low Innovativeness and 8 percent having highly Innovativeness.

### **Inputs availability**

Inputs availability scores of the farmers ranged from 6-21 against the possible range 0-24. The highest proportion (68 percent) of the farmers had medium knowledge compared to 24 percent had low knowledge and 8 percent had high knowledge.

#### **5.1.2. Adoption of HYV rice**

Adoption scores of the farmers ranged from 33-100 against the possible range 0-100. The average adoption score was found to be 76.26 with a standard deviation of 17.69. The highest proportion 52 percent had high adoption and 40 percent medium adoption and 8 percent had low adoption.

The researcher researched with three HYV rice varieties i.e. BR14, BRRI Dhan-28 and BRRI Dhan-29. In case of varieties BR14 it was found that 57% farmers cultivated this variety and their adoption index was 1006.05 in case of BRRI Dhan-28 it was found that 84% farmers cultivated this variety and their adoption index was 1876.89. In case of BRRI Dhan-29, we found that 89% farmers cultivated this variety and their adoption index 2475.26.

#### **5.1.3. Relationship between the selected characteristics of the farmers and with their adoption selected HYV Rice.**

To explore the relationship of the ten selected characteristics of the farmers with their adoption of selected HYV rice. Pearson's product moment co-efficient of correlation (r) was computed.

Correlation analysis indicate that education, annual income, knowledge HYV rice



cultivation, extension media conduct, organizational participation, innovativeness and inputs availability of the farmer were found to have positive significant relationship with their adoption of selected HYV rice age, farm size, and cosmopolitaness were found to have insignificant relationship with their adoption of selected HYV rice.

## **5.2. CONCLUSION**

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. The adoption of HYV of rice the farmers were moderate, as nearly 84 percent of the farmers had medium to high adoption. However, to meet the ever demand of food, there is a need to further enhance the rate and extent of adoption of selected HYV rice among the farmers. Particularly, both the Government Organization (GO) and Non-Government Organization (NGO) workers should provide appropriate technical and management related information to the farmers through continued extension and other support services. It may be concluded that the adoption of selected HYV rice was moderate and needs further improvement.
2. Most of the HYV rice farmers were middle and young aged. Age of the HYV rice farmers showed positive and significant relationship with their adoption. Therefore, it may be concluded that special attention needed to be given on any particular age group.
3. Findings of the study showed a significant relationship of education with their adoption of HYV rice. Education is a contributory factor of gaining knowledge and skill and has creating positive attitude in an individual. There is a need to

enhance the educational level of the farmers. It may, therefore, be concluded that enhancement of formal education among the farmers may contribute positively towards the formation of favorable opinion towards the selected HYV rice and subsequently their increased adoption by the farmers.

4. Annual income of the farmers showed positive and significant relationship with their adoption of selected HYV rice. It may be concluded that the availability of money is more essential to reduce financial hardship of the farmers to a considerable extent for the adoption of HYV rice.

5. Knowledge on HYV rice of the farmers had a significant positive relationship with their adoption of HYV rice. Having more knowledge an individual farmer becomes aware of the recent information on the various aspects of HYV rice. So, it can be concluded that knowledge is an important factor for higher adoption of selected HYV rice by the farmers.

6. Extension media conduct of the farmers had a positive significant relation with their adoption of selected HYV rice. It can be concluded that any attempt to increase the extension contact of the farmers would be helpful to increase the level of adoption of HYV rice.

7. Innovativeness of the farmers had a significant positive relationship with their adoption of HYV rice. The having moderate innovativeness, they are able to adopt selected HYV rice. It can be concluded that innovativeness is a valuable factors for adoption of selected HYV rice.

8. Inputs availability of the farmers had a highly significant positive relationship with their adoption of HYV rice. Having more inputs an individual farmer

becomes agree to the recent information on the various aspects of HYV rice. So, it can be concluded that Inputs availability is an important factor for higher adoption of selected HYV rice by the farmers.

### **5.3. RECOMMENDATIONS**

**5.3.1. Based on the findings and the conclusions of the study the following recommendations are made**

**1. An increased rate and extent of adoption of selected HYV rice cultivation are vitally important for increasing the HYV rice production. But a considerable (80 percent) of the farmers had either medium on low adoption of the HYV rice cultivation. It is, therefore, recommended that an effective step should be taken by the Department Agricultural Extension (DAE) and Non-Government Organizations (NGOS) for strengthening extension services in order to change adoption behavior of the HYV rice growers. There is also a need for developing more HYV varieties of rice by BRRI.**

2. Age of the HYV rice farmers had positive significant relationship with their adoption of HYV rice. It is recommended that the extension workers should work with the farmers of all age groups to promote cultivation of HYV rice. However, they will have to work more with comparatively larger member of middle aged farmers as majority of the farmers belonged to this group.

3. Education of the HYV rice farmers had significant rice relationship with their adoption of HYV rice. It indicates the importance of education of the HYV rice

growers for rapid adoption of HYV rice. The findings also indicate that 10 percent of the farmers have no education under the above situation; it may be recommended that arrangements should be made for increasing the literacy level of the HYV rice farmers by the concerned authorities through the establishment of night school, adult education and other extension methods.

4. The annual income of the farmers had significant positive relationship with their adoption of HYV rice. It leads to the recommendation that extension service should provide adequate farm management advice to the farmers for increasing their farm income. It is real fact that if income be increased, farmer's receptive capacity to adopt improved technologies will be increased and thereby production will be increased. Ultimately it will create a vicious circle of improvement for the clientele.

5. Knowledge on HYV rice was significant and positive correlation to the adopting of HYV rice. This indicates an urgent need for an effective educational program to increase the knowledge for developing favorable knowledge of the farmers towards the adoption of HYV rice. Hence, it may be recommended that arrangements should be made by the relevant authorities to increase the knowledge on HYV rice of the farmers through increased extension media conduct, training programs and so on.

6. Extension media conduct of the farmers in the study area has been found to be quite low through such contact is very necessary for high adoption of HYV rice. This is supported by the findings of the study, which showed that extension

contact of the HYV rice farmers had significant positive correlation with the adoption of HYV rice. 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 workers should maintain a close link with the farmers.

7. Innovativeness had significant and positive correlation to the adoption HYV rice. To improve innovativeness of the farmers, effective policy is needed. So, concern authorities should take necessary steps to improve innovativeness towards HYV rice cultivation.

8. Inputs availability was highly significant and positive correlation to the adopting of HYV rice. This indicates an urgent need for an effective inputs increase the awareness for developing favorable of the farmers towards the adoption of HYV rice. Hence, it may be recommended that arrangements should be made by the relevant authorities to increase inputs on HYV rice of the farmers through increased availability of credit, fertilizer, effective information, good seed and market facility.

### 5.3.2. RECOMMENDATIONS FOR FURTHER STUDY

A small piece of study as has been conducted can not provide all information for

the proper understanding of the farmers towards the HYV rice cultivation. Therefore, the following recommendations were made for further study.

1. The present study was conducted at Nateshwar Union under Sonaimori (Begumganj) Upazila in Noakhali District. It is recommended that similar studies should be conducted in other areas of Bangladesh.
2. This study investigated the relationship of ten characteristics of the farmer with their adoption of HYV rice. Therefore, it is recommended that further study should be conducted with other characteristics of the farmers.
3. The present study was concerned only with the extent of adoption of HYV rice. It is therefore, suggested that future studies should include attributes in relation to adoption stages and adopter categories.
4. The present study considered only three selected HYV of rice, other HYV of rice should be selected for further studies.
5. Studies need to be undertaken to ascertain the principles and procedures for establishment and maintenance of nursing organization in the rural area of Bangladesh.
6. Research should also be undertaken to identify the factors causing hindrance to the high adoption of HYV rice.

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**APPENDIX -A**

(English Version of the Interview Schedule)  
**Department of Agricultural Extension and Information System**  
**Sher-e-Bangla Agricultural University, Dhaka- 1207**

**AN INTERVIEW SCHEDULE**

**On**

**Adoption of High Yielding Varieties of Rice by the Farmers**

Name of the farmer .....

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

Upazila .....

(Please answer the following questions, answer will be kept confidential)

**1. Age**

How old are you? ..... years.

**2. Level of Education**

What is your level of education? (Give tick mark where applicable)

- I. Can not read and write .....
- II. Can sign only .....
- III. Read up to class .....

**3. Farm size (in ha):** Give a description of your land ownership and land.

<b>Sl. No.</b>	<b>Types of ownership</b>	<b>Area (ha)</b>
1	Homestead (Including pond)	
2	Own land under own cultivation	
3	Own land given to others on barga	
4	Land taken from others on barga	
5	Land taken from others on lease	
6	Total	



#### 4. Annual Income (in taka):-

##### A. Income from agricultural crops

Sl. No.	Name of crops	Production (Kg or Mound)	Value / Kg or Mound	Total value (Tk)
1	Aus			
2	Aman			
3	Boro			
4	Wheat			
5	Jute			
6	Pulse			
7	Oil crops			
8	Spices			
9	Vegetables			
10	Fruits			
11	Others			
12	Sugarcane			
13	Others (specify)			
	Sub-total (A)			

##### B. Income from domestic animals and Fisheries:

Sl. No.	Source of income	Total production (Kg/Mounds)	Value/ Kg or Mound	Total value (Tk)
1	Livestock			
2	Poultry			
3	Fisheries			
	Sub-total (B)			

##### C. Income from non-agricultural sources:

Sl. No.	Sources of income	Total value (Tk)
1	Service	
2	Business	
3	Day labor	
4	Other family members	

5	Others (if any)	
	Sub-total (C)	

### 5. Knowledge on HYV rice cultivation

Please answer the following questions

Sl. No.	Questions	Score	
		Weighted	Obtained
1.	Name four rice varieties	4	
2.	How many seedlings do you transplant per hill in rice?	2	
3.	Mention two major function of urea on rice	2	
4.	What is the importance of water in rice field	4	
5.	When the first top dressing of urea is done after transplanting?	2	
6.	Name four common fertilizers available at your local market	4	
7.	Mention the name of two organic manures	2	
8.	Mention four important disease of rice	4	
9.	Mention two major harmful insects of rice	2	
10.	What are the deficiency symptoms of TSP fertilizer?	2	
11.	Name two beneficial pests	2	
12.	Name two green manuring crops	2	
13.	Name two insecticides available in your local market	2	
14.	What is IPM?	4	
15.	How would you use IPM in field?	2	
16.	Name two predator insects	2	
17.	What do you mean by balanced fertilizer?	2	
18.	Do you have any idea of split fertilizer application?	2	
19.	What are the characteristics of good seed?	2	
20.	How would you improve of your soil?	2	

## 6. Extension Media contact

Sl. No.	Communication media	Extent of communication media			
		Regularly	Occasion ally	Rarely	No association
1	Sub-Assistant Agricultural Officer	3 times per month	2 times per month	1 times per month	
2	Agricultural Extension officer (AEO)	8 times per year	4-7 times per year	1-3 times per year	
3	Upazila Agricultural Officer (UAO)	8 times per year	4-7times per year	1-2 times per year	
4	Local leader	5-6 times per month	3-4 times per month	1-2 times per month	
5	Seed and fertilizer dealer	3 times per month	2 times per month	1time per month	
6	Group discussion	10-12 times per year	4-9times per year	1-3 times per year	
7	Result demonstration	1 time per year	1time per 2 years	1 time per 3 years	
8	Method demonstration	1 time per year	1 time per 2 year	1 time per 3year	
9	Agricultural training	4-5 times in life	2-3 times in life	1time in life	
10	Daily news paper	7 times per week	3-4 times per week	1-2 time per week	
11	Farm radio talk	7 times per week	3-4 times per week	1-2 times per week	
12	Agricultural programs in Television	5-7 times per month	3-4 times per month	1-2 times per month	
13	Poster	5-7 times per year	3-4 times per year	1-2 times per year	
14	Leaflet	5-7 times per year	3-4 times per year	1-2 times per year	

15	Agricultural fair	1 time per year	1 time per 2 years	1 time per 3 years	
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## 7. Organizational participation

Please mention the Organization that you are associated with:

<b>Name of the organization</b>	<b>No association</b>	<b>General member with duration</b>	<b>Executive member with duration</b>	<b>President/ Secretary of the committee with duration</b>
a. Union council				
b. Cooperative Society				
c. NGO (specify the name)				
d. School Committee				
e. Madrasa Committee				
f. Bazar Committee				
g. Club				
h. Other				

## 8. Cosmopolitaness

How often do you visit the place outside your village for various purposes

SL NO	Place of visit	Frequency of visit			
		Frequently	Occasionally	Rarely	Never
1	Visit out side of your village	5 or mor times/month	3-4 times/month	1-2 times/month	
2	Visit Upazila agriculture office	5 or mor times/year	3-4 times/month	1-2 times/month	
3	Visit relative house	10 or mor times/month	3-5 times/month	1-2 times/month	
4	Visit agriculture fair	1or mor times/year	1or mor times/2year	1or mor times/3year	
5	Visit NGO office	5 or mor times/month	3-4 times/month	1-2 times/month	
6	Attend special day	5 or mor times/year	3-4 times/year	1-2 times/year	
7	Attending	3 or mor	2-3	1-2	

	village development activities	times/month	times/month	times/month	
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### 9. Innovativeness:

Please give your information about the use of following technologies

SL. No.	Name of technology	Don't use	Period of adoption		
			Within 1 to 2 years	Within 3 to 4 years	Within 5 years and above
1.	Cultivation of modern variety variety of different vegetables				
2.	Use of power pump				
3.	Use of compost				
4.	Use of bio-fertilizer				
5.	Use of guti urea				
6.	Use of mixed fertilizer				
7.	Use of power tiller				
8.	Use of IPM				

### 10. Inputs availability

Please give your information about following inputs

Sl. No.	Inputs	Extent of Inputs availability			
		Always (3)	Easily (2)	At times (1)	Not at all (0)

1.	Availability of HYV rice seeds.				
2.	Availability of Fertilizer				
3.	Availability of Insecticide				
4.	Availability of Irrigation water				
5.	Availability of Farm implementation				
6.	Availability of technical assistance				
7.	Availability of Market facility				
8.	Availability of credit facility				

### 11. Adoptions of HYV rice varieties

Recommended Variety	Extent of use		2004-2005		Extent of use		2005-2006	
	Yes	No	Effective area(ha)	Potential area(ha)	Yes	No	Effective area(ha)	Potential area(ha)
a. BR 14								
b. BRRI Dhan 28								
c. BRRI Dhan 29								

Thank you for your kind cooperation and help

*Interviewed by-*

**Name:**

\_\_\_\_\_  
Signature with

date

