

**IDENTIFICATION AND EVALUATION OF BRRI DEVELOPED SALINE
TOLERANT RICE VARIETIES AS ADOPTED BY THE FARMERS OF
SOUTH WESTERN COASTAL REGION OF BANGLADESH**



A thesis
Submitted to
Agrotechnology Discipline
Khulna University
Khulna-9208

By
MD. MOSADDEK HOSSAIN
STUDENT No.: MS 070801



In partial fulfillment of the requirement for the degree of Masters of
Science in Agronomy
Course No. AT-6104

Copyright by Md. Mosaddek Hossain, 2012
Khulna, Bangladesh

SEPTEMBER, 2012

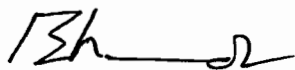
**KHULNA UNIVERSITY
AGROTECHNOLOGY DISCIPLINE
FINAL ORAL EXAMINATION OF THE M.Sc.(Agronomy) Thesis.**

**THE UNDERSIGNED CERTIFY THAT HE HAS READ AND RECOMMENDED
TO THE AGROTECHNOLOGY DISCIPLINE FOR ACCEPTANCE AS AN
M.SC.AG.(AGRONOMY) THESIS ENTITLED**

**“IDENTIFICATION AND EVALUATION OF BRRI DEVELOPED SALINE
TOLERANT RICE VARIETIES AS ADOPTED BY THE FARMERS OF SOUTH
WESTERN COASTAL REGION OF BANGLADESH”**

**BY
Md. Mosaddek Hossain
STUDENT No.: MS 070801**

**Approved as to style and content
By**



**Dr. Mohammad Bashir Ahmed
(Supervisor)**



**Dr. Md. Sarwar Jahan
(Co-Supervisor)**



**Professor Dr. Md. Monirul Islam
Chairman
Examination Committee**

**AGROTECHNOLOGY DISCIPLINE
KHULNA UNIVERSITY
KHULNA-9208**

SEPTEMBER, 2012

IDENTIFICATION AND EVALUATION OF BRRI DEVELOPED SALINE TOLERANT RICE VARIETIES ADOPTED BY THE FARMERS OF SOUTH WESTERN COASTAL REGION OF BANGLADESH

ABSTRACT

The main purpose of the study was to identify of BRRI developed saline tolerant rice varieties as well as to determine the extent of adoption of BRRI developed rice varieties as practiced by the farmers of Tala Upazila under Satkhira district and to evaluate the performance of identified BRRI developed saline tolerant rice varieties. Attempts were also taken to describe some of the selected characteristics of the saline tolerant rice farmers and their relationship with their extent of adoption of BRRI developed saline tolerant rice varieties. Data were obtained from randomly selected 100 farmers of selected 7 villages from six unions of Tala Upazila in Satkhira district through personal interview using an interview schedule during July 2011 to June 2012. The farmers of the study area adopted/practiced two saline tolerant rice varieties namely BRRI dhan 41 and BRRI dhan 47 in Aman and Boro season respectively. Majority (68%) of the respondents practiced BRRI dhan 47 followed by BRRI dhan 41 (36%) and only a few (4%) cultivated both BRRI dhan 41 and BRRI dhan 47. Three-fourth (75%) of the respondents had medium adoption and 22% high adoption and 03% had low adoption of BRRI developed saline tolerant rice varieties. The performance of the identified saline tolerant rice varieties were determined in terms of yield (t/ha), net return (Tk. /ha) and quality. Both BRRI dhan 41 (4.34t/ha) and 47 (5.87t/ha) showed good performance from yield point of view but BRRI dhan 47 shown better performance over BRRI dhan 41. Most

(94%) of the respondents got medium (BDT 10001-30000) to high (>BDT 30000) return by cultivating BRRI developed saline tolerant varieties (BRRI dhan 41 and 47). Though most (94%) of the respondents said both BRRI dhan 41 and BRRI dhan 47 are very fine but apparently BRRI dhan 47 was better than that of BRRI dhan 41. Both BRRI dhan 41 and BRRI dhan 47 are not usually aromatic. But from farmer's points of view BRRI dhan 47 is apparently little bit aromatic than BRRI dhan 41. BRRI dhan 41 is longer in size than that of BRRI dhan 47. Both BRRI dhan 41 and BRRI dhan 47 are very good in taste. Among the 12 selected characteristics of the respondents, educational qualification, extension media contact and agricultural knowledge showed a positive significant relationship. On the other hand training exposure showed a negative significant relationship with their extent of adoption of BRRI developed saline tolerant varieties.



Key words: Identification, Evaluation, BRRI, Saline, Tolerant, Adopted.

DEDICATED
TO MY
BELOVED PARENTS

ACKNOWLEDGEMENT

All praises are due to the 'Almighty Allah' the Omnipotent, Omnipresent and Omniscient, who enabled the author to pursue for the successful completion of this research work.

The author reckons at first a great pleasure and honor to express his heartfelt gratitude, deepest sense of appreciation, best regards and profound indebtedness to his honorable teacher and supervisor Dr. Mohammad Bashir Ahmed, Professor, Agro technology Discipline, Khulna University, Khulna, for his worthy guidance, valuable suggestions, constructive criticism, encouragement and continuous supervision throughout the study work and preparation of the thesis.

The author highly indebted and grateful to his respective teacher and co-supervisor Dr. Md. Sarwar Jahan Professor, Agro technology Discipline, Khulna University, Khulna, for his cooperation and kind help.

The author feels proud to express his sincere gratitude, grateful acknowledgement and profound thanks to Prof. Dr. Md. Monirul Islam, **Head**, Agrotechnology Discipline, Khulna University, Khulna, for his valuable advice and helpful suggestions.

The author also expresses his gratefulness to all the teachers of Agrotechnology discipline, Khulna University, Khulna, for their valuable advice and helpful suggestions.

The author expresses his thanks to Pronub Ghosh Bablu Chairman of Khalilnagar Union of Tala Upazill, who has shown deep interest in his work throughout and helped with his rich and varied experience and co-operation in various ways.

The researcher reckons special thanks to Mr. Poritosh Kumar Biswas and all other SAAO,s of Tala Upazilla for their cordial support and also deems his heartfelt gratitude to Kbd. Mr. G.M.A. Gafur, Upazilla Agriculture Officer, Tala Upazilla. The researcher is grateful to Mr. Mogammel Haque for his valuable cooperation during data analysis.

The author expresses his heartiest gratitude and indebtedness to all respondents of the study area who co-operated him by giving valuable information during collection of data.

The author expresses his boundless gratitude to his parents and other members of his family whose sacrifices, inspiration and continuous blessings opened the gate paved the way for their higher studies.

Special thanks are extended to Khulna University Library, Seminar Library of Agrotechnology Discipline, Khulna University, Khulna, from where they found valuable information to complete the study.

September, 2012

The author

CONTENTS

CHAPTER	TITLE	PAGE
	ABSTRACT	I-II
	ACKNOWLEDGEMENT	III-IV
	LIST OF TABLE	V-VI
	LIST OF FIGURES	VII
I	INTRODUCTION	1-8
	1.1. Background information	1-2
	1.2. Statement of the problem	2-3
	1.3. Objectives	3
	1.4. Justification of the study	3-4
	1.5. Assumptions of the study	4
	1.6. Limitation of the study	5
	1.7. Statement of Hypothesis	5-6
	1.8. Definition of terms	6-8
II	REVIEW OF LITERATURE	9-16
	2.1. Review of Literature on General Context of Adoption	9-10
	2.2. Relationship between farmer's Characteristics and the Adoption of Technologies	10-15
	2.3. The Conceptual Framework of the study	15-16
III	METHODOLOGY	17-27
	3.1. Locale of the Study	17
	3.2. Unit of analysis	17



CHAPTER	TITLE	PAGE
	3.3 Population and Sampling Design	17-19
	3.4 Instrument for Collection of Data	20
	3.5 Collection of Data	20-21
	3.6 Specification and Measurement of the Variables	21-27
	3.7 Data processing and analysis	27
IV	RESULT AND DISCUSSION	28-54
	4.1. Characteristics of the Respondents	28-37
	4.2. Identification of BRRI developed saline tolerant rice varieties	37-39
	4.3. Performance of the saline tolerant rice varieties	39-45
	4.4. Relationships between independent and dependent variables	45-54
V	SUMMARY, CONCLUSION AND RECOMMENDATIONS	55-60
	REFERENCES	61-66
	APPENDICES	67-72

LIST OF TABLES

Table	Title	Page
3.1	Distribution of population and sample of farmers in the study area	18
3.2	Places of visit with extent of visit	25
4.1	Distribution of respondents according to their age	28
4.2	Distribution of the respondents according to their profession	29
4.3	Distribution of respondents according to their level of education	30
4.4	Distribution of respondents according to their experience in farming	30
4.5	Distribution of respondents according to their family size	31
4.6	Distribution of respondents according to family member involved in agriculture	32
4.7	Distribution of respondents according to their farm size	32
4.8	Distribution of respondents according to their annual income	33
4.9	Distribution of respondents according to their score of organizational participation	34
4.10	Distribution of respondents according to their extension contact	35
4.11	Distribution of the respondents according to their score of training exposure.	35
4.12	Distribution of respondents according to their score of agricultural knowledge.	36
4.13	Distribution of respondents according to their score of cosmopolitaness	37

4.14	Distribution of the respondents according to practicing BRRI developed saline tolerant rice variety	38
4.15	Distribution of respondents according to their score of adoption of saline tolerant rice varieties	38
4.16	Distribution of respondents according to their getting yield in BRRI dhan 47.	40
4.17	Distribution of respondents according to their getting yield in BRRI dhan 41	40
4.18	Comparison of yield between BRRI dhan 47 and BRRI dhan 41.	41
4.19	Distribution of respondents according to net return of BRRI developed saline tolerant rice varieties	42
4.20	Comparison of net return between BRRI dhan 47 and BRRI dhan 41	42
4.21	Fineness of the BRRI developed saline tolerant HYV rice varieties according to the respondents	43
4.22	The aroma of the BRRI developed saline tolerant HYV rice varieties according to the respondents	44
4.23	The length of the BRRI developed saline tolerant HYV rice varieties according to the statement of the respondents	44
4.24	The taste of the BRRI developed saline tolerant HYV rice varieties according to the statement of the respondents	45
4.25	Relationship between the selected characteristics of farmer and their extent of adoption of BRRI developed saline tolerant varieties	46

LIST OF FIGURES

FIGURE	PAGE
1. Conceptual Framework of the study	16
2. A map of Tala Upazila showing the study area	19
3. Extent of adoption of BRRI developed saline tolerant rice varieties	39

CHAPTER 1

INTRODUCTION

1.1 Background information

Bangladesh is predominantly an agricultural country. The economy of Bangladesh is mainly depends on its agriculture. The agricultural sector contributes 20.87% of GDP among which 11.70% comes from crop sub-sector (Anonymous, 2008). Rice is the staple food of Bangladesh. Bangladesh Rice Research Institute (BRRI) is one of the largest agricultural research institutes under National Agricultural Research System (NARS). It was established in October 1970. Since its establishment, BRRI has been conducting research for the improvement of rice through variety development, screening of location specific varieties, disease resistance, pest resistance etc. It has so far developed 57 varieties since its establishment to date. Among the 57 varieties 52 has been released and practiced to different extent by the farmers of the country. Among them BRRI dhan 41, 47, 53, 54, 55, 56, and 57 are saline tolerant varieties. Out of these varieties BRRI dhan 47 is cultivated in Boro season and others in Aman season.

The rice-growing environments in Bangladesh are very diverse, varying from the drought-prone high lands in the north-west through the flood-affected central region to the coastal saline zone in the south. This diversity is indicated by the thirty major agro ecological zones (AEZ) into which the country has been divided on the basis of land, soil, hydrology and climate. This diversity in the rice-growing environments makes the task of BRRI scientists all the more challenging. Researches for the development of new rice varieties and production technologies for the diverse ecosystems existing in Bangladesh are conducted at the BRRI main station at Gazipur and at nine regional stations situated in Comilla, Habiganj, Sonagazi of Feni, Bhanga of Faridpur, Barisal, Rajshahi, Rangpur, Kushtia and Satkhira districts.

The institute is equipped with modern research facilities that include laboratories, greenhouses and experimental fields. BRRI has a modern germplasm bank, eight major laboratories, three greenhouses, four net houses and a 45-ha experimental farm at its headquarter at Gazipur. Besides, seven of the nine regional stations also have reasonably

are affected by varying intensities of salinity, resulting in very poor land utilization (Karim *et al*, 1990). Most of the southern districts of the country are under saline zones, which cover an area of 25-30 percent of the total arable land (Quazi *et al*, 1996). The average crop yield is very low in the region, which is obviously due to salinity problems, low soil fertility and drought in the dry season. The dominant crop in the coastal area is the local T-Aman rice. Although rice is the dominant crop of Bangladesh, modern rice cultivar tolerant to saline soil is few in number. Considering these points in view the following research questions were addressed by the present study.

- a. What are the BRRI developed saline tolerant rice varieties that are practiced by the farmers?
- b. What are the performances of BRRI developed saline tolerant rice varieties?
- c. What are the extents of adoption of BRRI developed rice varieties?
- d. Why are the relationship between the selected characteristics of the farmers and their extent of adoption of BRRI developed saline tolerant rice varieties?

1.3. Objectives

- i. To identify the BRRI developed saline tolerant rice varieties as cultivated by the farmers.
- ii. To evaluate the performance of identified BRRI developed saline tolerant rice varieties.
- iii. To determine the extent of adoption of BRRI developed rice varieties.
- iv. To determine the relationship between the selected characteristics of the farmers and their extent of adoption of BRRI developed saline tolerant rice varieties.

1.4. Justification of the study

The major focus of the study was to assess farmer's adoption of BRRI developed saline tolerant rice varieties. The findings of the study will be especially applicable to Satkhira 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 the saline tolerant HYV rice. At present there is a lack of adequate information about the extent of

adoption of BRRI developed saline tolerant rice varieties by the farmers. These facts lead an investigation to ascertain the extent of adoption as well as the relationship of the characteristics of the farmers with their adoption of saline tolerant HYV rice varieties. Findings of this study, therefore, are helpful to the planners and extension workers in planning and execution of programmes for enhancing the yield and 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 of saline tolerant HYV rice in the coastal areas.

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, 1945*). 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 questionnaire were reasonably adequate to measure the adoption of BRRI developed saline tolerant rice varieties.
4. The responses furnished by the respondents were accurate, valid and they expressed their opinion on the adoption of BRRI developed saline tolerant rice varieties.
5. The sample size was representative of the whole population of the study area.
6. The adoption of BRRI developed saline tolerant rice varieties were 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. Limitation of the study

In order to keep the study under manageable limit, the following limitation was recognized:

1. The research was confined to seven villages of six unions of Tala Upazila under Satkhira district.
2. The major areas of investigation were mostly confined to farmer's adoption of BRRI developed saline tolerant rice varieties.
3. Only two saline tolerant rice varieties developed by BRRI were selected to examine the extent of adoption among the farmers of Tala Upazila.
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 varied but only twelve out of thirteen were selected for investigation in this study. 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 Tala Upazila under Satkhira district. The findings may also be suitable where the situation is similar to the study area.

1.7. Statement of Hypothesis

In studying relationship between variables a hypothesis was formulated which stated the anticipated relationship between the variables. The null hypothesis were framed as `` There is no relationship between the selected characteristics of the farmers and their extent of adoption of BRRI developed saline tolerant rice varieties.`` The selected characteristics of the farmers were:

- Age
- Education
- Farming experience
- Family size
- Family member involved in agriculture
- Farm size
- Annual income
- Organization participation

- Extension contact
- Training exposure
- Agricultural knowledge
- Cosmopolitaness

1.8. Definition of terms

The terms those 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, the phenomenon is known as adoption (*Ray, 1991*).

Age

The age of a farmer 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 (eg. school, college and university) at the time of interview.

Farming experience

It refers to the period of working with rice cultivation and was measured by year of rice cultivation.

Family size

It refers to the total number of members including the respondent himself, his wife, children and other permanent dependents, who live and ate together as a family unit.

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.

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 operationalize the variable.

Extension contact

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

Training exposure

An individual in a formal training course was measured in terms of days of training.

Agricultural knowledge

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

Cosmopoliteness

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

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.

Farmer

It referred to the individual who cultivates high yielding varieties of various crops.

Yield

It refers to the final output of a crop from unit area of land.

Saline tolerant

It refers to the variety which can tolerate a reasonable level of salinity.

Assumption

An assumption refers to the supposition that an apparent fact of principle is true in the light of the variable evidences (Goode and Hatt, 1945).

Hypothesis

Defined by Goode and Hatt (1945), a proposition which can be put to ``a test to determine its validity``. It may be true or false, it may seem contrary to or in accord with common sense. However, it leads to an empirical test.

Null hypothesis

The hypothesis which is picked for statistical test is null hypothesis (H_0). In this study the null hypothesis was stated that there was no relationship between the concerned variables and extent of adoption of BRRI developed rice varieties.

Statistical test

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



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 BRRI developed saline tolerant varieties by the farmers. Therefore, the finding of such studies related to the extent of adoption of selected HYV rice cultivation 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 BRRI developed 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 in three villages of Bangladesh Agricultural University Extension Project area. He observed that among the respondent growers, 6.6 percent of the farmers had high adoption of HYV rice while 33.3 and 40 percent had medium and low adoption respectively.

Hossain (1983) studied the extent of adoption of HYV rice as transplanted Aman and other related aspects 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 adopted two practices, 5 percent adopted one practices and only 2 percent adopted 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.

Rahman (1999) studied the adoption of balanced fertilizer by the Boro rice farmers of Ishwarganj thana. He found that in respect of 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 highest proportion (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 while 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.

2.2. Relationship between Farmers's Characteristics and the Adoption of Technologies

2.2.1. Age and adoption of technologies

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

2.2.7. Annual income and adoption of technologies

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.

Iftekhar (2010) found that there exist an in-significant and negative relationship between the annual income of the respondents and their adoption of selected recommended agronomic practices of Boro rice

2.2.8. Organizational participation and adoption of technologies

Hossain (2006) found that there exist no significant relationship between the organizational participation of the farmers and their adoption of selected high yielding varieties.

Iftekhar (2010) found that there exist an in-significant and negative relationship between the organizational participation of the respondents and their adoption of selected recommended agronomic practices of Boro rice

2.2.9. Extension media contact and adoption of technologies

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 co-operative 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.

Iftekhar (2010) found that there exist an in-significant and positive relationship between extension and media contact of the respondents and their adoption of selected recommended agronomic practices of Boro rice

2.2.10. Training exposure and adoption of technologies

Iftekhar (2010) found that there exist an in-significant and negative relationship between the training exposure of the respondents and their adoption of selected recommended agronomic practices of Boro rice

2.2.11. Agricultural knowledge and adoption of technologies

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.

Iftekhar (2010) found that there exist an in-significant and positive relationship between agricultural knowledge of the respondents and their adoption of selected recommended agronomic practices of Boro rice

2.2.12. Cosmopolitaness and adoption of technologies

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 cosmopolitaness 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 cosmopolitaness of the farmers had positive significant relationship with their adoption of modern sugarcane cultivation practices.

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

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

2.3. The Conceptual Framework of the study

In scientific research, selection and measurement of variables constitute an important task. The hypothesis of a research while constructed properly contains at least two important elements i.e. "a dependent variable" and "an independent variable". 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

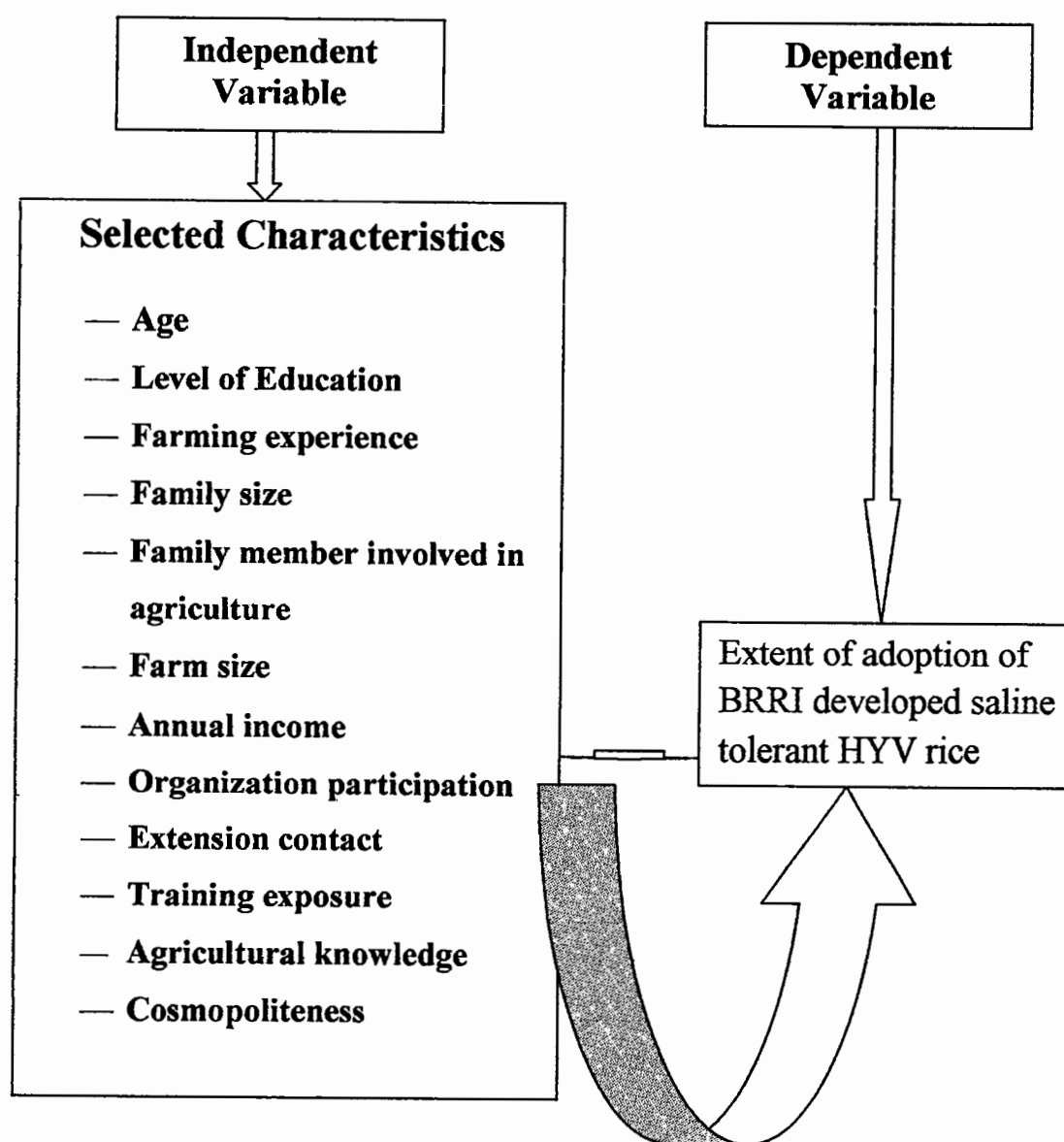


Figure 1. Conceptual Framework of the study

CHAPTER 3

METHODOLOGY

Research methodology is a systematic way to solve a research problem. It may be understood as a science of studying how research is done (Kothari, 1990). A researcher needs careful considerations before conducting a study. The researcher has great responsibility to clearly describe as to what sorts of research design, methods and procedures he would follow in collecting valid and reliable data and to analyze and interpret those to arrive at correct conclusion. The methods and procedures followed in conducting this study have been discussed in this chapter.

3.1 Locale of the study:

The study was conducted at Magura, Khalilnagor, Jalalpur, Sorula, Nagarghata and Tala Unions of Tala Upazila under Sathkhira District. The researchers purposively selected 7 villages from six unions. The selected villages of these Unions were Chargram, Dadkhati, Jathua, Toilkupi, Biguni, Nagarghata and Maghiara. Because these areas are much improved in saline tolerant HYV rice production.

3.2 Unit of analysis

The unit of analysis of the study was the farm households of the seven selected villages. The major criteria considered for selection of farm households from the study area were

- The farmers of these farm households were cultivators of BRRI developed saline tolerant rice varieties
- They were cultivating BRRI developed saline tolerant rice varieties to fulfill the demand and
- They were also cultivating BRRI developed saline tolerant rice varieties for their economic development

3.3 Population and Sampling Design

An up-to date list of all farm households of the selected villages was prepared with the help of the Sub Assistant Agriculture Officer's (SAAOs) working therein. The list comprised a total number of approximately 1000 farm families (Table 3.1). Thus, the 1000 farm households of seven selected villages of these Unions constituted the active population of the study. To make a representative sample, 10 percent (%) of the population was selected following proportionate random sampling technique. Thus,

the sample size so drawn stood as 100. Here the farmers indicate the holder or head of a farm household. The distribution of the population and sample is shown in Table 3.1.

Table 3.1 Distribution of population and sample of farmers in the study area

Sl. No.	Name of the Union	Name of the villages	Total number of farm households(N)	Sampling rate (%)	Number of respondents interviewed from each strata (N)
1.	Magura	Chargram	130	10%	13
2.	Khalilnagar	Dadkhati	80		08
3.	Tala	Maghiara	160		16
4	Sorulia	Toilkupi	110		11
		Biguni	90		09
5	Jalalpur	Jathua	230		23
6	Nagarghata	Nagarghata	190		19
	Total		1000		100

Source: Sub Assistant Agricultural Officer's (SAAO, s) Diary.

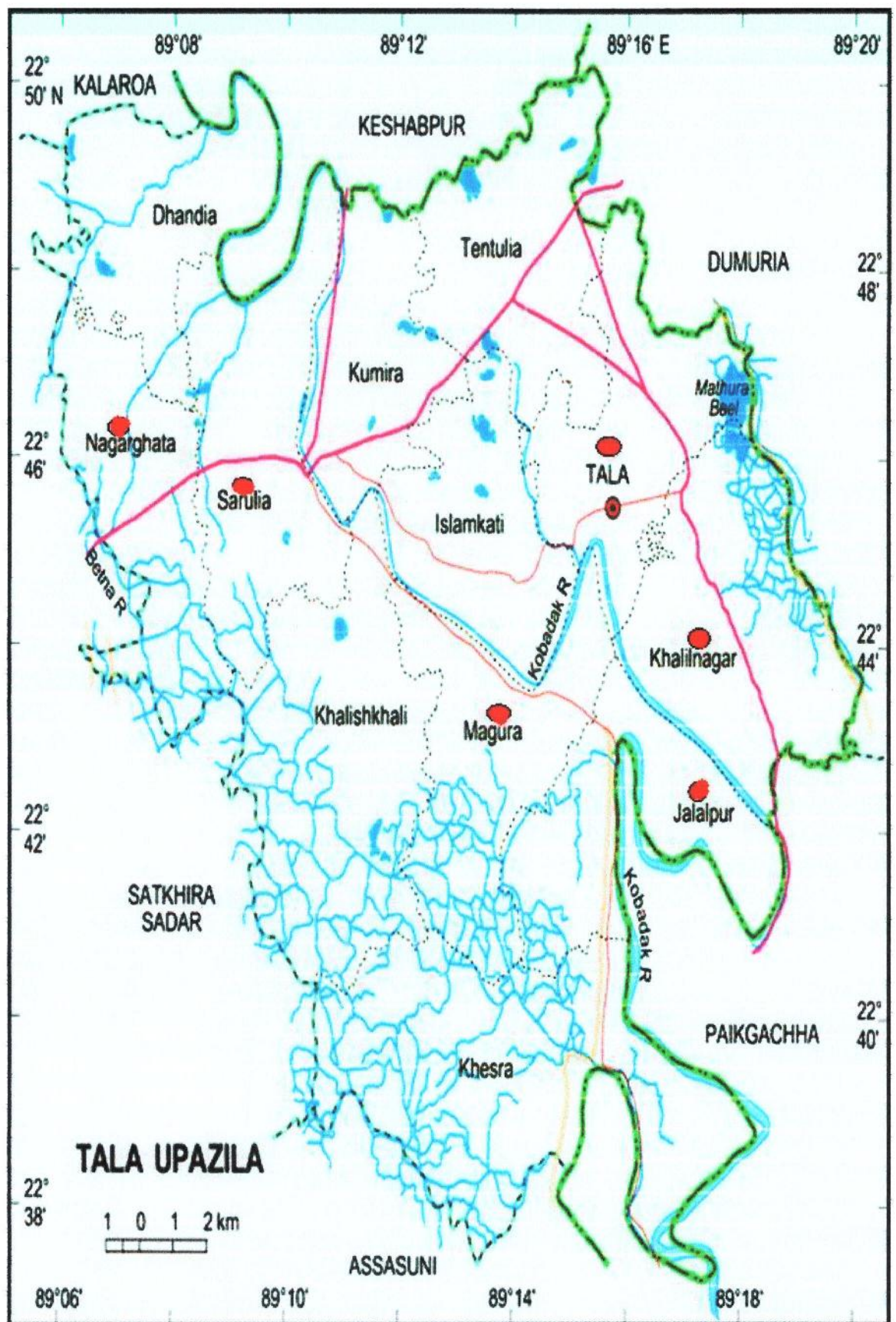


Fig 2: Map of Tala Upazila

3.4 Instrument for Collection of Data

An interview schedule was used as the research instrument in order to collect relevant information from the respondents. The interview schedule was carefully designed keeping the objectives of the study in mind. The interview schedule contained both closed and open-ended questions. Simple and direct questions were included in the interview schedule. Development of the interview schedule involved two phases. At the initial phase, the interview schedule basically aimed at a careful minute search of the cultivation of BRRI developed saline tolerant rice varieties by the farmers of these Unions. People in the Study area discussed spontaneously among themselves and explored out the most viable problems rice cultivation and adoption status of BRRI developed saline tolerant rice varieties. In addition to that, the researcher visited the whole study area and physically talked to the most innovative and experienced farmers of those Unions. This extensive and laborious survey coupled with the information accumulated in the initially-constructed interview schedule helped the researchers to make a list of the name of the saline tolerant rice growers of these Union. However, before taking final decision, the researchers consulted with several scientists, academicians, and researchers to make sure whether the identified data were meaningful. After preparation of the interview schedule, it was pre-tested with 10 farmers of those Unions. The pre-test result helped the researchers to examine the suitability of different statements. Based upon the pretest experience, necessary correction and modification were made in the schedule before it was run for final data collection. During modification of the schedule the researchers incorporated valuable suggestions from his research supervisor into it.

3.5 Collection of Data

Data for this study were collected by the researcher himself in a face-to-face situation from the respondents during July 2011 to June 2012. Before going to make an interview, appointments with the interviews were made in advance with the help of the concerned Sub Assistant Agriculture Officer (SAAO). All possible efforts were made to explain the purpose of the study to the respondents in order to get valid and pertinent information from them. The farmers of the selected areas helped the investigator greatly in collecting information. The researcher also obtained cooperation from the members of the Union Parishad of respective villages and local leaders during collection of data. At the beginning of the interview with any

respondent, the researcher took all possible care to establish rapport with him so that he did not hesitate to furnish proper responses to the questions and statements in the schedule. The questions were explained and clarified whenever any respondent felt difficulty in understanding properly. Moreover, at the time of data collection, the researcher was also careful about side talking and tried to avoid that problem tactfully. After completion of interview, each statement was checked and verified to make sure that answer to each item had been properly recorded. The researcher received full co-operation from the respondents during the time of interview.

3.6 Specification and Measurement of the Variables

In survey research the specification and measurement of the variables constitute an important task. A research hypothesis contains at least two elements, an independent variable and a dependent variable. The researcher keeping all those in mind took adequate care in selecting the variables of the study. Before the onset of the study, the researcher visited the study area several times and talked to the farmers intimately. Moreover, by staying in the study area for some time, he was able to observe the personal, socio-economic, socio-cultural and psychological factors of the farming community which the researcher assumed might have influenced on the behavior pattern of the farmers. Based on this practical knowledge, side by side an extensive literature review and discussions with relevant experts and academicians, the researcher selected twelve out of thirteen characteristics of the respondent as independent variables and extent of adoption of saline tolerant HYV rice varieties as dependent variable for this study. On the basis of definition of the terms presented in earlier sections (chapter I) operationalization of the variables was done which are presented below:

3.6.1 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 statement. A score of one (1) was assigned for each year of his age. It appears in item no. 1 in the interview schedule (Appendix I).

3.6.2 Profession/ Occupation

The profession of every respondent was written specifically in item No. 2 of the interview schedule (Appendix I). A respondent might be involved more than one

profession such as farming, service, business or others. In such case the respondents indicated his primary/major profession and then subsidiary occupation.

3.6.3 Level of education of respondents/Educational qualification

The level of education of a respondent was measured by the years of schooling. If a respondent did not know how to read and write, his education score was taken as zero (0). A score of one was given to that respondent who could sign his name only. Besides, the respondent got actual score for his every year of schooling, i.e. 1 for class one, 2 for class two and so on. Thus the level of education score of a respondent was determined from response to item no.3 in the interview schedule (Appendix I).

3.6.4 Farming experience

The farming experience of a respondent was measured by the length covered from his starting year in farming to the time of interview on the basis of his statement. A score of one (1) was assigned for each year of his experience. It appears in item no.4 in the interview schedule (Appendix I).

3.6.5. Family size

Family size of a respondent was measured in terms of number of members of his/her family who live under same roof and share same kitchen. It appears in item no.5 in the interview schedule (Appendix I).

3.6.6 Number of family member involved in agriculture

Number of family member involved in agriculture was measured in terms of how many family members are involved in agriculture. A score of one (1) was assigned for each member involvent in agriculture. It appears in item no.6 in the interview schedule (Appendix I).

3.6.7. Farm size

The farm size of the respondents was computed in hectares using the following formula:

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

Where, FS= Farm size

A_1 = Homestead area including yard

A_2 = Own land under own cultivation

A₃=Land given to others on borga

A₄= Land taken from others on borga

A₅= Land taken from others as lease

Farm size is shown in item no.7 in the interview schedule (Appendix I).

3.6.8. Annual income

Annual income of a respondent was measured in Bangladeshi taka (BDT) on the basis of his total yearly earnings from agriculture and non-agriculture sources including earning of members of respondent's family. The yields of all the crops in the preceding year were noted. Then all the yields were converted into cash income according to the prevailing market price. The price of other enterprises (i.e. cows, goats, poultry, fishes etc.) was also added to the price. Earnings of each respondent himself and other members of their family from different sources (like service, business, and labour) were also included in calculating the income. Yearly earnings of all family members from farming and non-agriculture sources were added together to obtain total family income. Data obtained in response to item no. 8 in the interview schedule (Appendix I) were used to determine the income of the respondents.

3.6.9. Organizational participation

Organizational participation of a respondent was measured on the basis of the nature of his involvement in different organizations found operating in the study area. The researcher identified 10 organizations in the study area as shown in item no. 9 in the interview schedule (Appendix I).

Organizational participation scores were assigned in the following manner for activities of individual respondents in each group or organization:

Nature of participation	Scores assigned
Not participated	0
Ordinary Member	1
Executive Member	2
Secretary / president	3

A respondent could be attached to a number of such organizations, and thus his score was determined by adding up the weighted scores for his participation in all the organizations.

3.6.10. Extension contact

In this study, the extension contact score was computed for each respondent on the basis of the extent of his contact with selected media as ascertained from his responses to question no. 10 in the interview schedule (Appendix I). A number of 11 sources were included in the interview schedule. Each respondent was asked to indicate the extent of which is correct his contact with each of the sources. The frequency of contact put in a 4 point rating scale such as regularly, occasionally, rarely and not at all and a weight of 3, 2, 1 and 0 was assigned to these categories, respectively.

3.6.11. Training exposure

Training exposure of a respondent was determined in terms of actual numbers of training he has participated in his life. A score of '1' was assigned for each number of training he received. Thus the score for training exposure was determined by summing up all the scores. Training exposure of the respondents is shown in item no. 11 in the interview schedule (Appendix I).

3.6.12. Agricultural knowledge

To measure the agricultural knowledge of respondent 20 questions were included in the interview schedule (item no. 12 in the interview schedule, Appendix I). Each of the respondents was asked to answer the 20 questions. Among them each of 5 questions (Q.no. 2, 4, 7, 8 & 9) was assigned a score of two and other 15 question was assigned a score of one based on their hardness or difficulties to answer by respondents. Thus the whole questions comprised of 30 marks. Each respondent was given a particular number depending on the percentage of appropriateness of answer to the question. The total score obtained by a respondent was calculated by summing up the scores against each of the 20 questions. The score on agricultural knowledge obtained by respondents could range from 0-25 where '0' means no knowledge and 25 means high knowledge.

The cosmopolitaness score of a respondent was calculated by adding together the scores obtained for his visits to each of the ten types of places as shown in item no. 13 in the interview schedule (Appendix I). The scores of a respondent could range from 0 to 30 where '0' indicating no cosmopolitaness and 30 indicating highest cosmopolitaness.

3.6.14. Identification of BRRI developed saline tolerant rice varieties

The farmers of the study area were directly asked to mention the name of the BRRI developed saline tolerant rice varieties as adopted by them in the last year (2011-2012). Based on their citation the varieties were identified and ranked.

3.6.15. Extent of Adoption

The extent of Adoption of BRRI developed saline tolerant rice varieties was determined by the following formula.

$$EA = \frac{AA}{PA} \times 100$$

Where,

EA = Extent of Adoption (spatial dimension).

AA = Actual area under cultivation of BRRI developed saline tolerant rice varieties.

PA = Potential area for cultivation of BRRI developed saline tolerant rice varieties.

For example, a farmer has an area of land of 2 ha; potential for BRRI developed saline tolerant rice varieties. But he cultivated BRRI developed saline tolerant varieties in an area of 1 ha.

$$\begin{aligned} \text{The EA} &= \frac{AA}{PA} \times 100 \\ &= \frac{1}{2} \times 100 \end{aligned}$$

$$= 50\% \text{ or } 0.5$$

3.6.16. Performance of varieties

The performance of the identified varieties was evaluated in the terms of

- Yield/ha
- Net return
- Quality: Quality was observed based on following parameters as perceived by the farmers.
 - Fineness
 - Aroma
 - Length and
 - Taste of those varieties.

3.7 Data processing and analysis

Collected data were compiled, coded, tabulated for processing and analysis in accordance with the objectives of the study for arriving at a meaningful conclusion, tabular presentation of data was intensively used. The SPSS 11.5 computer package program was used to analysis the data. Descriptive statistics like number, percentage, range, rank order, mean and standard deviation were used in describing the selected independent and dependent variables of the study. Coefficient of correlation 'r' was employed to test relationship between any two 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 identification and adoption of selected saline tolerant HYV rice. The third section deals with the performance of the identified BRRI innovated saline tolerant varieties. The final section deals with the relationships between the extent of adoption of selected saline tolerant HYV rice and the selected characteristics of farmers.

4.1 Characteristics of the Respondents

The characteristics included in the present study were age, profession, education of the respondents, farming experience, family size, number of family member involved in agriculture, farm size, annual income, organizational participation, extension contact, training exposure agricultural knowledge and cosmopolitaness. These characteristics of the farmers are described in this section.

4.1.1 Age

The age of the respondents in the study area ranged from 20 to 80 years, the average being 41.87 years with a standard deviation of 10.22. Based on the observed age score, the respondents were classified according to Ahmed (2003) into three categories as it appears in Table 4.1.

Table 4.1 Distribution of respondents according to their age

Categories	Score (years)	Respondents (N=100)		Mean	Standard deviation
		Number	Percent (%)		
Young aged	Up to 35	32	32	41.87	10.22
Middle aged	36-50	53	53		
Old aged	Above50	15	15		
Total		100	100	Min 20	Max 80

Data furnished in the Table 4.1 reveal that the most (85%) of the respondents were in young to middle-age group as compared to 15 percent being old. This leads to the understanding that the young to middle age group would reflect the phenomena concerning the cultivation of rice and also the extent of adoption of BRRI developed

saline tolerant rice varieties. Bashar (1993) and Hussien (2001) also found the similar findings in their study.

The findings indicate that a large proportion (85 percent) of the farmers were young to 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 BRRI developed saline tolerant rice varieties. The extension agents can make use of these views and opinions in designing their extension activities.

4.1.2 Profession

The professional status of the respondents has been presented in Table 4.2. It was found that the most of the respondents (80%) were exclusively involved in agriculture followed by agriculture with business (18%) and agriculture with service (2%). It means that people of these areas feel more comfort in farming than other occupation.

Table 4.2 Distribution of the respondents according to their profession

Name of the profession	Respondents (N=100)	Percentage
Agriculture	80	80
Agriculture + Service	2	2
Agriculture + Business	18	18
Total	100	100

4.1.3 Level of education of the respondents

Scores of level of education of the respondents ranged from 3 to 17 with the mean and standard deviation being 8.97 and 2.76, respectively. On the basis of education, the respondents were classified into five categories as shown in Table 4.3.

Table 4.3 Distribution of respondents according to their level of education

Categories	Score (Years of schooling)	Respondents (N=100)		Mean	Standard deviation
		Number	Percent (%)		
Primary	1-5	18	18	8.97	2.76
Secondary	6-10	67	67		
Higher secondary	11-12	09	09		
Above higher secondary	>12	06	06		
Total		100	100	Min 03	Max 17

Data presented in Table 4.3 demonstrate that the most of the respondents had primary to secondary level of education followed by higher secondary level and above higher secondary level of education. As it is found that all of the respondents are literate and having primary to above higher secondary level of education. It could be assumed that they are able to take risks to cultivate saline tolerant HYV rice varieties.

4.1.4. Farming experience

A remarkable variation (5-70 years) of experience in farming of the respondents was observed having an average and standard deviation of 20.01 and 10.11 respectively. On the basis of experience in farming the respondents were classified into three categories as shown in Table 4.4.

Table 4.4 Distribution of respondents according to their experience in farming

Categories	Score (Years)	Respondents (N=100)		Mean	Standard deviation
		Number	Percent (%)		
Low experience	<10	06	06	20.01	10.11
Medium experience	10-35	88	88		
High experience	>35	06	06		
Total		100	100	Min 05	Max 70

Most (88 %) of the respondents had medium level of experience followed by low (06 %) and high (06 %) experience (Table 4.4).

4.1.5. Family size

The family size of the respondents ranged from 2 to 10 with an average 4.18 and standard deviation was 1.25. On the basis of their family size the respondents were classified into three categories, which are shown in Table 4.5.

Table 4.5 Distribution of respondents according to their family size

Categories	Score (Number)	Respondents (N=100)		Mean	Standard deviation
		Number	Percent (%)		
Small sized family	1-4	77	77	4.18	1.25
Medium sized family	5-6	18	18		
Large sized family	>6	05	05		
Total		100	100	Min 02	Max 10

It is revealed that the most (77 %) of the respondents' maintained small sized family compared to 18 percent being medium and 05 percent large sized family. The average family size (4.18) of the respondents was lower than the national average of 5.6 (BBS, 1999). It means that the people in the study area are more conscious about their family size and population growth.

4.1.6. Family member involved in agriculture

The family member involved in agriculture of the study area ranged from 1 to 5 with an average 1.58 and standard deviation was 0.76. On the basis of the family member involved in agriculture, the respondents were classified into three categories, which are shown in Table 4.6.

Table 4.6 Distribution of respondents according to family member involved in agriculture

Categories	Score (Number)	Respondents (N=100)		Mean	Standard deviation
		Number	Percent (%)		
Low involvement	1	53	53	1.58	0.76
Medium involvement	2-3	43	43		
High involvement	≥4	4	4		
Total		100	100	Min 1	Max 5

Low involvement (one member) of the family member in agriculture was observed in case of majority (53%) of the respondents' family followed by medium and high involvement (Table 4.6).

4.1.7 Farm size

Farm size of the respondents in the study area varied from 0.13 to 7.50 hectares with an average of 1.47 and standard deviation of 1.23. According to BBS (1999) the farms were classified into five categories as presented in the Table 4.7.

Table 4.7 Distribution of respondents according to their farm size

Categories	Score (Hectares)	Respondents (N=100)		Mean	Standard deviation
		Number	Percent (%)		
Land less	<0.20	1	1	1.47	1.23
Marginal	0.20-0.40	3	3		
Small	0.41-1.0	47	47		
Medium	1.01-3.03	42	42		
Large	>3.03	7	7		
Total		100	100	Min 0.13	Max 7.50

Data presented in Table 4.7 show that the highest proportion (47 %) of the respondents had small farm as compared to 1, 3, 42 and 7 percent landless, marginal,

medium, large farm respectively. Since most (96%) of the respondents had small, medium and large farm, it is logical to assume that they had an ample scope for cultivation of saline tolerant HYV rice varieties.

4.1.8. Annual income

The annual income (from agricultural and non-agricultural sources) of the respondents ranged from 34,000 to 5,30,000 (BDT) with the mean and standard deviation of 144570 and 98639.25 respectively. On the basis of their annual income, the respondents were classified into three categories as shown in Table 4.8.

Table 4.8 Distribution of respondents according to their annual income

Categories	Score (000, Tk.)	Respondents(N=100)		Mean	Standards deviation
		Number	Percentage		
Low income	<50	5	5	144570	98639.25
Medium income	50-1,50	62	62		
High income	>150	33	33		
Total		100	100	Min	Max
				34,000	5,30,000

Data furnished in Table 4.8 reveal that the majority (62 %) of the respondents belonged to medium income group, while (33 %) of the respondent belong to high income category and a few 5% low income category. Since the most (95 %) of the respondents had medium to high income, it is logical to assume that they had a vast scope for saline tolerant HYV rice cultivation.

4.1.9. Organizational participation

The scores of organizational participation of the respondents ranged from 0 to 8 with an average of 2.37 and standard deviation of 2.16. Depending on the individual participation scores, the respondents were grouped into the following categories as shown in Table 4.9.

Table 4.9 Distribution of respondents according to their score of organizational Participation

Category	Score (Frequency)	Respondents (N=100)		Mean	Standard deviation
		Number	Percent (%)		
No participation	0	23	23	2.37	2.16
Low	1-5	67	67		
Medium	5-8	10	10		
High	>8	0	0		
Total		100	100	Min 0	Max 8

Analysis of data presented in Table 4.9 shows that majority (67 %) of the respondents had low organizational participation followed by no (23%) and medium participation (10%) respectively. Organizational participation enhances the confidence of the farmers. Therefore, farmer can take decision immediately.

4.1.10. Extension media Contact

Farmers use various information sources and media to a different extent in order to receive agricultural information. Extension media contact scores of the respondents ranged from 10 to 28, with an average of 18.16 and standard deviation 3.46. Based on the computed extension contact score, the respondents were classified into four categories as shown in Table 4.10.

It was observed that most of the respondents (78%) had low training followed by medium and high (8%) and (6%) respectively (Table 4.11). It means that most of the people in the study area got low level of training.

4.1.12. Agricultural knowledge

Agricultural knowledge scores of the respondents ranged from 18-25 with mean and standard deviation of 22 and 1.99 respectively. Based on agricultural knowledge scores, the respondents were classified into different categories as shown in Table 4.12.

Table 4.12 Distribution of respondents according to their score of agricultural Knowledge

Categories	Score (Years)	Respondents (N=100)		Mean (Years)	Standard deviation
		Number	Percent (%)		
Low knowledge	<10	0	0	22	1.99
Medium knowledge	10-20	23	23		
High knowledge	>20	77	77		
Total		100	100	Min Max 18	25

Data presented in Table 12 indicate that most (77%) of the respondents had high agricultural knowledge followed by medium knowledge (23%).

4.1.13. Cosmopolitaness

The computed cosmopolitaness scores of the respondents ranged from 10 to 24, with an average score of 17.02 and standard deviation being 3.29. Based on the calculated scores, the respondents were categorized into four groups as shown in Table 4.13.

Table 4.13 Distribution of respondents according to their score of Cosmopoliteness

Categories	Score (Frequency)	Respondents (N=100)		Mean	Standard deviation
		Number	Percent (%)		
No cosmopoliteness	0	0	0	17.02	3.29
Low	1-10	1	1		
Medium	10-20	81	81		
High	>20	18	18		
Total		100	100	Min Max 10	24

The information presented in Table 4.13 indicate that most (81%) of the respondents had medium cosmopoliteness as compared to high (18%) and low (1%) cosmopoliteness respectively. It means that most of the respondents have an orientation to out of their own social system which may help them to change their attitude towards saline tolerant HYV rice production. Cosmopoliteness enhances the opportunity for an individual to have himself to contact with outside information sources. It is, therefore, possible that an individual with substantial cosmopoliteness would have an augmented possession of accumulated knowledge, experience and problem-solving means.

4.2.1 Identification of BRRI developed saline tolerant rice varieties

The identified BRRI developed saline tolerant rice varieties have been presented in Table 4.14. It was found that the majority of the respondents (64%) practiced BRRI dhan 47 followed by BRRI dhan 41 (32%), very few (4%) of the respondents practiced both BRRI dhan 41& 47. It means that people of those areas were found familiar with saline tolerant rice varieties.

Table 4.14 Distribution of the respondents according to practicing BRRI developed saline tolerant rice varieties

Name of the variety	Respondents (N=100)	Percentage
BRRI dhan 47	64	64
BRRI dhan 41	32	32
Both BRRI dhan 47 & 41	4	4
Total	100	100

4.2.2 Extent of adoption of BRRI developed saline tolerant rice varieties

The extent of adoption score of BRRI developed saline tolerant rice varieties varied from 16 percent to 100 percent with an average and standard deviation of 49.85 and 17.84 respectively. Based on the extent of adoption score, the respondents were classified into the following categories as shown in the Table 4.15.

Table 4.15 Distribution of respondents according to their score of adoption of saline tolerant rice varieties

Categories	Score (Number)	Respondents (N=100)		Mean	Standard deviation
		Number	Percent (%)		
Low adoption	0-.30	3	3	49.85	17.84
Medium adoption	.31-.50	75	75		
High adoption	>.50	22	22		
Total		100	100	Min 16	Max 100

Most of the respondents (97%) had medium to high adoption of saline tolerant rice varieties followed by (3%) low adoption (Table 4.15 and Figure 3).

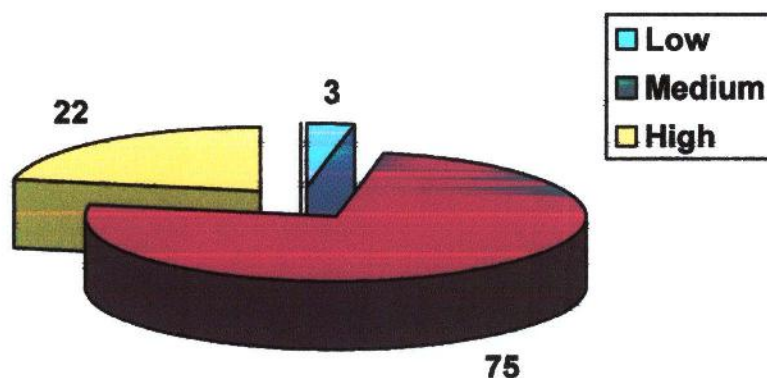


Figure 3. Extent of adoption of BRRI developed saline tolerant rice varieties

4.3 Performance of the BRRI developed saline tolerant rice varieties

The performance of the identified saline tolerant rice varieties was evaluated in the terms of

- Yield (t/ha)
- Net return
- Quality: Quality was observed based on following parameter as perceived by the farmers.
 - Fineness
 - Smell
 - Length and
 - Taste

4.3.1. Yield for BRRI dhan 47

The observed yield for BRRI dhan 47 has been shown in Table 4.16.

The computed scores of the yield of BRRI dhan 47 ranged from 3.20 to 7.40 (t/ha), with an average score of 5.87 and standard deviation being 0.876.

Table 4.16 Distribution of respondents according to their getting yield in BRRI dhan 47

Categories	Yield (t/ha)	Respondents (N=68)		Mean	Standard deviation
		Number	Percent (%)		
Low	0-3.5	3	4.4	5.87	0.876
Medium	3.51-5.50	15	22.1		
High	>5.50	50	73.50		
Total		68	100	Min 3.20	Max 7.40

It was observed that most (73.5%) of the respondents got high yield followed by medium yield (22.1%) and low yield (4.4%). Based on yield, the performance of BRRI dhan 47 is excellent. The average yield of BRRI dhan 47 at farmers' field (5.87t/ha) is lower than that of BRRI's research yield (6.0t/ha). (www.knowledgebank-brrri.org 2012).

4.3.2 Yield for BRRI dhan 41

The observed yield for BRRI dhan 41 has been shown in Table 4.17. The computed scores of the yield of BRRI dhan 41 ranged from 3.90 to 6.0 (t/ha), with an average score of 4.34 and standard deviation being 0.489.

Table 4.17 Distribution of respondents according to their getting yield in BRRI dhan 41

Categories	Yield (t/ha)	Respondents (N=36)		Mean	Standard deviation
		Number	Percent (%)		
Low	0-3.5	0	0	4.34	0.489
Medium	3.51-4.50	26	72.2		
High	>4.50	10	27.8		
Total		36	100	Min 3.90	Max 6.0

It was observed that most (72.2%) of the respondents got medium yield followed by high yield (27.8%). None of the respondents got low yield (Table 4.17). So, the

performance of BRRI dhan 41 is very good. The average yield of BRRI dhan 41 at farmers' field (4.34t/ha) is lower than that of BRRI's research yield (4.5t/ha). www.knowledgebank-brrri.org 2012.

4.3.2.1. Comparison of yield between BRRI dhan 47 and BRRI dhan 41.

The comparison of yield between BRRI dhan 47 and BRRI dhan 41 has shown in the Table 4.18.

Table 4.18 Comparison of yield between BRRI dhan 47 and BRRI dhan 41.

Selected varieties	Average yield(t/ha)	Yield difference between BRRI dhan 47 and BRRI dhan 41(t/ha)
BRRI dhan 47	5.87	1.52
BRRI dhan 41	4.34	

From the yield in farmer's field, it could be concluded that both BRRI dhan 41 and BRRI dhan 47 are good. But BRRI dhan 47 showed better performance over BRRI dhan 41.

4.3.3. Net return

Net return of the BRRI developed saline tolerant HYV rice varieties have been shown in Table 4.19. The computed scores of the net return of BRRI developed saline tolerant varieties ranged from Tk. 2,000 to Tk. 55,000, with an average score of Tk. 29450 and standard deviation being 10591.



Table 4.19 Distribution of respondents according to net return of BRRI developed saline tolerant rice varieties

Categories	Net return (Tk./ha)	Respondents (N=100)		Mean	Standard deviation
		Number	Percent (%)		
Low	Upto10,000	6	6	29450	10591
Medium	10,001-30,000	61	61		
High	>30,000	33	33		
Total		100	100	Min 2000	Max 55000

Data presented in Table 4.19 show that majority (61 percent) of the farmers were found to have medium net return and one-third (33 percent) of them had high return. Only a negligible proportion (6 percent) of the farmers had low return from BRRI developed saline tolerant rice varieties.

4.3.3.1. Comparison of net return between BRRI dhan 47 and BRRI dhan 41

The comparison of net return between BRRI dhan 47 and 41 has shown in the Table 4.20.

Table 4.20 Comparison of net return between BRRI dhan 47 and BRRI dhan 41.

Selected varieties	Average net return (Tk./ha)	Net return difference between BRRI dhan 47 and BRRI dhan 41(Tk./ha)
BRRI dhan 47	29009	543
BRRI dhan 41	28466	

Regarding net return from farmer's statement, it could be concluded that both BRRI dhan 41 and BRRI dhan 47 BRRI dhan are good (Table 4.20). But BRRI dhan 47 showed its better performance over BRRI dhan 41.

4.3.4 Quality of the identified BRRI developed saline tolerant varieties

The quality of the BRRI developed saline tolerant varieties were evaluated based on their Fineness, Aroma, Length and Taste.

4.3.4.1 Fineness of the saline tolerant HYV rice

The fineness of the BRRI developed saline tolerant rice varieties have been shown in Table 4.21. An overwhelming majority (94.12%) of the respondents said that BRRI dhan 47 is very fine followed by medium fine (5.88%). Again, majority (83.33%) of the respondents said that BRRI dhan 41 is very fine followed by medium fine (16.67%). None of the respondents addressed BRRI dhan 41 and BRRI dhan 47 as low or coarse. It could be concluded that BRRI dhan 47 is finer than BRRI dhan 41.

Table 4.21 Fineness of the BRRI developed saline tolerant HYV rice varieties according to the respondents

Fine Variety	Respondents (N=100);[BRRI-47, N=68, BRRI-41, N=36]							
	Very fine		Medium fine		Low		Coarse	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)
BRRI dhan 47	64	94.12	4	5.88	0	0	0	0
BRRI dhan 41	30	83.33	6	16.67	0	0	0	0

4.3.4.2 Aroma of the saline tolerant HYV rice

The aroma of the BRRI developed saline tolerant HYV rice varieties have been shown in Table 4.22. About three-fourth (73.53%) of the respondents said that BRRI Dhan 47 is not aromatic while 19.12% and 7.35% of the respondents addressed as low aromatic and medium aromatic respectively. Again, majority (83.33%) of the respondents said that BRRI dhan 41 is not aromatic while 16.67% addressed it as low aromatic. None of the respondents addressed it as medium or very aromatic. From the findings it could be concluded that mostly BRRI dhan 47 and 41 is not aromatic. But BRRI dhan 47 is little bit aromatic than BRRI dhan 41 from farmers perception point of view.

Table 4.22. The aroma of the BRRI innovated saline tolerant HYV rice varieties according to the respondents

Aromatic Variety	Respondents (N=100);[BRRI-47, N=68, BRRI-41, N=36]							
	Very		Medium		Low		Not aromatic	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)
BRRI dhan 47	0	0	5	7.35	13	19.12	50	73.53
BRRI dhan 41	0	0	0	0	6	16.67	30	83.33

4.3.4.3 Length of the saline tolerant HYV rice varieties

The length of the BRRI developed saline tolerant HYV rice varieties have been shown in Table 4.23. Majority (64.71%) of the respondents said that BRRI dhan 47 is small sized followed by medium sized (35.29%) while most (86.11%) of the respondents said that BRRI dhan 41 is large sized followed by medium sized (13.89%). From the findings it could be concluded that BRRI dhan 41 is larger in size than that of BRRI dhan 47.

Table 4.23 The length of the BRRI developed saline tolerant HYV rice varieties according to the statement of the respondents

Largeness Of grain Variety	Respondents (N=100);[BRRI dhan-47, N=68, BRRI dhan-41, N=36]							
	Very large		Medium large		Small		Very small	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)
BRRI Dhan 47	0	0	24	35.29	44	64.71	0	0
BRRI Dhan 41	31	86.11	5	13.89	0	0	0	0

4.3.4.3 Taste of the saline tolerant HYV rice

The taste of the BRRI developed saline tolerant HYV rice varieties have been shown in Table 4.24. Most (88.24%) of the respondents said BRRI dhan 47 is very good in taste followed by medium (11.76%), while most (86.11%) of the respondents said that BRRI dhan 41 is absolutely very good in taste followed by medium (13.89%). None of the respondents said low or bad (Table 4.24). From the findings it could be concluded that both BRRI dhan 47 and 41 are very good in taste.

Table 4.24 Taste of the BRRI developed saline tolerant HYV rice varieties according to the statement of the respondents

Tasteness of variety Variety	Respondents (N=100);[BRRI dhan-47, N=68, BRRI dhan-41, N=36]							
	Very		Medium		Low		Bad	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)
BRRI dhan 47	60	88.24	8	11.76	0	0	0	0
BRRI dhan 41	31	86.11	5	13.89	0	0	0	0

4.4 Relationships between independent and dependent variables

In this study the selected characteristics of the farmers and their extent of adoption of BRRI innovated saline tolerant varieties were treated as independent and dependent variables respectively.

The purpose of this section is to examine and describe the relationship between the dependent variable- extent of adoption of identified BRRI developed saline tolerant rice varieties and the independent variables (the selected characteristics of the respondents). To explore the relationship between the selected characteristics (12 out of 13) of the farmers and their **extent of adoption of BRRI developed saline tolerant rice varieties**, "Pearson's Product – Moment Correlation Co-efficient 'r' was used which has been shown in the Table 4.25.

Table 4.25 Relationship between the selected characteristics of farmers and their extent of adoption of BRRI developed saline tolerant varieties

Dependent Variable	Independent variable (Selected characteristics)	r-value	Table value of "r" at 99 degree of freedom	
			0.05%	0.01%
Extent of adoption of BRRI developed saline tolerant HYV rice varieties.	Age	0.120 ^{NS}	0.197	0.276
	Level of educational	0.237*		
	Farming experience	0.027 ^{NS}		
	Family size	0.027 ^{NS}		
	Family member involved in agriculture	0.063 ^{NS}		
	Farm size	.035 ^{NS}		
	Annual income	0.001 ^{NS}		
	Organizational participation	0.137 ^{NS}		
	Extension media contact	0.238*		
	Training exposure	-0.218*		
	Agricultural knowledge	0.347**		
	Cosmopolitaness	-0.034 ^{NS}		

NS= Not significance

** Correlation is significant at the 0.01 level

* Correlation is significant at the 0.05 level

4.4.1. Relationship between age of the farmers and their extent of adoption of BRRI developed saline tolerant rice varieties

The relationship between age of the farmers and their extent of adoption of BRRI developed saline tolerant rice varieties were examined by testing the following null hypothesis:

"There is no relationship between age of the farmers and their extent of adoption of BRRI developed saline tolerant rice varieties."

Data show in the Table 4.25 the co-efficient of correlation between the concerned variables was computed and found to be 'r' = 0.120 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' (0.120) was smaller than the table value ($r = 0.197$) with 99 degrees of freedom at 0.05 level of probability.

On the basis of above findings, the null hypothesis could not be rejected. Hence, the researcher concluded that age of the farmers had insignificant relationship with their extent of adoption of BRRI developed saline tolerant rice varieties. Similar findings were also observed by Rahman (2001), Hossain (2003), and Abdullah-Al-Mamun (2008).

4.4.2. Relationship between level of education of the farmers and their extent of adoption of BRRI developed saline tolerant rice varieties

The relationship between the level of education of the farmers and their extent of adoption of selected saline tolerant rice varieties were examined by testing the following null hypothesis:

“There is no relationship between level of education of the farmers and their extent of adoption of BRRI developed saline tolerant rice varieties.”

The co-efficient of correlation between the concerned variables was found to be ' $r = 0.237$ ' as shown in Table 4.25. 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 computed value of 'r' (0.237) was grater then the table value ($r = 0.197$) with 99 degrees of freedom at 0.05 level of probability.
- The concerned null hypothesis was rejected.

The findings indicate that the level of education of the farmers had a significant and positive relationship with their extent of adoption of BRRI developed saline tolerant rice varieties. It means that the higher is the level of education, the higher is the extent of adoption. 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.

4.4.3. Relationship between experience of the farmers and their extent of adoption of BRRI developed saline tolerant rice varieties

The relationship between farming experience of the farmers and their extent of adoption of BRRI developed saline tolerant rice varieties were examined by testing the following null hypothesis:

“There is no relationship between farming experience of the farmers and their extent of adoption of BRRI developed saline tolerant rice varieties.”

As show in the Table 4.25 the co-efficient of correlation between the concerned variables was computed and found to be ' r ' = 0.027 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 ' (0.027) was smaller than the table value ($r = 0.197$) with 99 degrees of freedom at 0.05 level of probability.

On the basis of above findings, the null hypothesis could not be rejected. Hence, the researcher concluded that farming experience of the farmers had insignificant relationship with their extent of adoption of BRRI developed saline tolerant rice varieties. Similar findings were also observed by Rahman (2001), Hossain (2003), and Abdullah-Al-Mamun (2008).

4.4.4. Relationship between family size of the farmers and their extent of adoption of BRRI developed saline tolerant rice varieties

The relationship between farming family size and their adoption of selected saline tolerant HYV rice varieties were examined by testing the following null hypothesis:

“There is no relationship between family size of the farmers and their extent of adoption of BRRI developed saline tolerant rice varieties.”

Data show in the Table 4.25 the co-efficient of correlation between the concerned variables was computed and found to be ' r ' = 0.027 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 ' (0.027) was smaller than the table value ($r = 0.197$) with 99 degrees of freedom at 0.05 level of probability.

On the basis of above findings, the null hypothesis could not be rejected. Hence, the researcher concluded that family size of the farmers had insignificant relationship with their extent of adoption of BRRI developed saline tolerant rice varieties. Similar findings were also observed by Rahman (2001), Hossain (2003), Abdullah-Al-Mamun (2008) and Iftekhar (2010).

4.4.5. Relationship between family members involved in agriculture and their extent of adoption of BRRI developed saline tolerant rice varieties

The relationship between farming family members involved in agriculture and their extent of adoption of BRRI developed saline tolerant rice varieties were examined by testing the following null hypothesis:

“There is no relationship between family member involved in agriculture and their extent of adoption of BRRI developed saline tolerant rice varieties.”

Data show in the Table 4.25 the co-efficient of correlation between the concerned variables was computed and found to be ' r ' = 0.063 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 ' (0.063) was smaller than the table value ($r = 0.197$) with 99 degrees of freedom at 0.05 level of probability.



On the basis of above findings, the null hypothesis could not be rejected. Hence, the researcher concluded that family member involved in agriculture had insignificant relationship with their extent of adoption of BRRI developed saline tolerant rice varieties. Similar findings were also observed by Iftekhhar (2010).

4.4.6. Relationship between farm size of the farmers and their extent of adoption of BRRI developed saline tolerant rice varieties

The relationship between farm size of the farmers and their extent of adoption of BRRI developed saline tolerant rice varieties were examined by testing the following null hypothesis:

“There is no relationship between farm size of the farmers and their extent of adoption of BRRI developed saline tolerant rice varieties.”

Computed value of the co-efficient of correlation between farm size of the farmers and their adoption of selected saline tolerant HYV rice varieties was found to be ' r ' = 0.035 as shown in Table 4.25. 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 ' (0.035) was found to be smaller than the table value ($r = 0.197$) with 99 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 an insignificant relationship with their extent of adoption of BRRI developed saline tolerant rice varieties.

4.4.7. Relationship between annual income of the farmers and their extent of adoption of BRRI developed saline tolerant rice varieties

The relationship between annual income of the farmers and their extent of adoption of BRRI developed saline tolerant rice varieties was examined by testing the following null hypothesis

“There is no relationship between annual income and their extent of adoption of BRRI developed saline tolerant rice varieties.”

4.4.9. Relationship between extension contact of the farmers and their extent of adoption of BRRI developed saline tolerant rice varieties

The relationship between the extension contact of the farmers and their extent of adoption of BRRI developed saline tolerant rice varieties was examined by testing the following null hypothesis:

“There is no relationship between extension contact of the farmers and their extent of adoption of BRRI developed saline tolerant rice varieties.”

The co-efficient of correlation between the concerned variables was found to be ' r ' = 0.238 as shown in Table 4.25. 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 computed value of ' r ' (0.238) was grater then the table value ($r = 0.197$) with 99 degrees of freedom at 0.05 level of probability.
- The concerned null hypothesis was rejected.

The findings indicate that the extension media contact of the farmers had a significant and positive relationship with their extent of adoption of BRRI developed saline tolerant rice varieties. It means that higher is the extension media contact; the higher is the extent of adoption of BRRI developed saline tolerant varieties. Similar findings were also observed by Kashem *et al.* (1990), Bashar (1993), Sarker (1997), Pal (1995), Chowdhury (1997), Hossain (2001).

4.4.10. Relationship between training exposure of the farmers and their extent of adoption of BRRI developed saline tolerant rice varieties

The relationship between training exposure of the farmers and their extent of adoption of BRRI developed saline tolerant rice varieties were examined by testing the following null hypothesis:

“There is no relationship between training exposure of the farmers and their extent of adoption of BRRI developed saline tolerant rice varieties.”

The co-efficient of correlation between the concerned variables was found to be ' r ' = -0.218 as shown in Table 4.25. This led to the following observations regarding the relationship between the two variables under consideration:

- The relationship showed a tendency in the negative direction between the concern variables.
- The computed value of 'r' (-0.218) was greater than the table value ($r = 0.197$) with 99 degrees of freedom at 0.05 level of probability.
- The concerned null hypothesis was rejected.

The findings indicate that the training exposure of the farmers had a significant but negative relationship with their extent of adoption of BRRI developed saline tolerant rice varieties.

4.4.11 Relationship between agricultural knowledge of the farmers and their extent of adoption of BRRI developed saline tolerant rice varieties

The relationship between agricultural knowledge of the farmers and their extent of adoption of BRRI developed saline tolerant rice varieties were examined to the following null hypothesis:

“There is no relationship between agricultural knowledge of the farmers and their extent of adoption of BRRI developed saline tolerant rice varieties.”

The co-efficient of correlation between the concerned variables was found to be 'r' = 0.347 as shown in Table 4.25. This led to the following observations were recorded regarding the relationship between the two variables under consideration:

- The relationship showed a positive trend.
- A high relationship was found between the concerned variables.
- The computed value of 'r' (0.347) was greater than the table value ($r = 0.276$) with 99 degrees of freedom at 0.01 level of probability.
- The concerned null hypothesis was rejected.

Thus, the researcher concluded that the agricultural knowledge of the farmers had positive significant relationship with their extent of adoption of BRRI developed saline tolerant rice varieties. It means that the higher is the agricultural knowledge, the higher is the extent of adoption of BRRI developed saline tolerant rice varieties.

4.4.12. Relationship between cosmopolitaness of the farmers and their extent of adoption of BRRI developed saline tolerant rice varieties

The relationship between cosmopolitaness of the farmers and their extent of adoption of BRRI developed saline tolerant rice varieties were examined by testing the following null hypothesis

“There is no relationship between cosmopolitaness and their extent of adoption of BRRI developed saline tolerant rice varieties.”

Co-efficient of correlation between the conceded variables was found to be ' r '= (0.034) as shown in Table 4.25. This led to the following observations regarding the relation between the two variables under consideration:

- The relationship showed a negative trend.
- The computed value of ' r ' (0.034) was smaller than the tabulated value ($r=0.197$) with 99 degrees of freedom at 0.05 level of probability.

On the basis of above findings, the null hypothesis could not be rejected. Hence, the researcher concluded that cosmopolitaness of the farmers had no significant relationship with their extent of adoption of BRRI developed saline tolerant rice varieties.



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

The major findings of the study are summarized below-

5.1.1. Selected characteristics of the respondents/ farmers

Age

Age of the farmers ranged from 20-80 years. The average 41.87 years with a standard deviation 10.22. The highest proportions (53 percent) of the farmers were middle aged, while 32 percent were young and 15 percent old.

Profession

It was found that most of the respondents (80%) were exclusively involved in agriculture followed by agriculture with business (18%) and agriculture with service (2%).

Level of Education

Education of the farmers ranged from 3 to 17 years of schooling. The average score being 8.97 and the standard deviation was 2.76. Most of the respondents had primary to secondary level of education followed by higher secondary level and above higher secondary level of education.

Farming experience

A remarkable variation (5-70 years) of experience in farming of the respondents was observed having an average and standard deviation of 20.01 and 10.11 respectively. Most (88 percent) of the respondents had medium experience compared to 06% low and 06% high farming experience.

Family size

The family size of the farmers ranges from 2-10 with an average of 4.18 of and the standard deviation was 1.25. Most (77 percent) of the respondents were found to have small family compared to 18 percent medium family and 05 percent large size family.

Family member involved in agriculture

The family member involved in agriculture of the study area ranged from 1 to 5 with an average 1.58 and standard deviation was 0.76. Low involvement (one member) of

5.2.3.1. Fineness of the BRRI developed saline tolerant rice varieties

Most (94.12%) of the respondents said that BRRI dhan 47 is very fine followed by medium (5.88%). Again, most (83.33%) of the respondents said that BRRI dhan 41 is very fine followed by medium (16.67%). None of the respondents addressed BRRI dhan 41 and BRRI dhan 47 as low or coarse.

5.2.3.2. Aroma of the saline tolerant HYV rice

About three-fourth (73.53%) of the respondents said that BRRI dhan 47 is not aromatic followed by low aromatic (19.12%) and medium aromatic (7.35%). Most (83.33%) of the respondents said that BRRI dhan 41 is not aromatic followed by low (16.67%) and no respondent said medium or very.

5.2.3.3. Length of the saline tolerant HYV rice

Majority (64.71%) of the respondents said that BRRI dhan 47 is small sized followed by medium sized (35.29%) while most (86.11%) of the respondents said that BRRI dhan 41 is large sized followed by medium size (13.89%).

5.2.3.4. Taste of the saline tolerant HYV rice

Most (88.24%) of the respondents said BRRI dhan 47 is very good in taste followed by medium (11.76%) while most (86.11%) of the respondents said that BRRI dhan 41 is also very good in taste followed by 13.89% medium and no respondent said low or bad.

5.3. Relationship between the selected characteristics of the farmers and with their extent of adoption of BRRI developed saline tolerant rice varieties

To explore the relationship of the 12 (out of 13) selected characteristics of the respondents with their extent of adoption of BRRI developed saline tolerant rice varieties Pearson's product moment co-efficient of correlation (r) was computed.

Correlation analysis indicate that among the 12 selected characteristics of the respondents, educational qualification, extension media contact and knowledge about BRRI innovated saline tolerant varieties showed a positive significant relationship. On the other hand training exposure showed a negative significant relationship with their extent of adoption of BRRI developed saline tolerant varieties. Rest of the characteristics of the respondents showed non-significant relationship with the extent of adoption BRRI developed saline tolerant rice varieties.

5.4. 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:

5.1. The extent of adoption of BRRI developed saline tolerant rice varieties by the farmers was more or less satisfactory. Most (97%) of the farmers had medium to high adoption. However, to meet the ever growing demand of food, there is a need to further enhance the rate and extent of adoption of selected saline tolerant HYV rice cultivation among the farmers.

5.2.1. Both BRRI dhan 41 and BRRI dhan 47 were good from yield point of view but 47 shows its better performance over 41.

5.2.2. Most (94%) of the respondents got medium to high return by cultivating BRRI innovated saline tolerant varieties (BRRI dhan 41 & BRRI dhan 47).

5.2.3. Though most (94%) of the respondents said both BRRI dhan 41 and 47 are very fine but apparently BRRI dhan 47 is better than that of BRRI dhan 41.

5.2.4. Though both BRRI dhan 41 and BRRI dhan 47 was not aromatic. But from farmer's points of view BRRI dhan 47 is apparently little bit aromatic than BRRI dhan 41.

5.2.5. BRRI dhan 41 is longer in size than that of BRRI dhan 47.

5.2.6. Both BRRI dhan 41 and BRRI dhan 47 are very good in taste.

5.5. RECOMMENDATIONS FOR POLICY IMPLICATIONS

Based on the findings and the conclusions of the study following recommendation is made:

An increased rate and extent of adoption of selected saline tolerant HYV rice are vitally important for increasing the HYV rice production in coastal saline region in Bangladesh. It is therefore, recommended that an effective step should be taken by the Department of Agricultural Extension (DAE) and Non-Government Organizations (NGOS) for strengthening extension services in order to change adoption behavior of the saline tolerant HYV rice growers.

RECOMMENDATIONS FOR FURTHER STUDY

A small piece of study has been conducted cannot provide all information for the proper understanding of the farmers towards the saline tolerant HYV rice adoption. Therefore, the following recommendations are made for further study.

1. The present study was conducted in Tala Upazila under Satkhira district. It is recommended that similar studies should be conducted in other areas of similar characteristics in Bangladesh.
2. This study investigated the relationship twelve (out of thirteen) characteristics of the farmer with their extent of adoption of BRRI developed saline tolerant rice varieties. Therefore, it is recommended that further study should be conducted with other characteristics of the farmers.
3. Research should also be undertaken to identify the factors causing hindrance to the high adoption of saline tolerant HYV rice.
4. Studies need to be undertaken to ascertain the physicochemical characteristics of the saline tolerant HYV rice and their other performance.

REFERENCES

- Abdullah-Al-Mamun, (2008). Farmers' attitude towards fruit production and nutrition And problems confronted by team at Tala Upazila of Satkhira District. *B.Sc. Thesis*, Agrotechnology Discipline, Khulna University, Khulna.
- Ahmed, M.B. (2003). Impact of shrimp farming on socio economic, agriculture and environmental condition in Paikgasa Upazila under Khulna district. *Ph.D. Thesis*. Dept. of Agricultural Extension and Rural Development. Bangabandhu Sheik Mujibur Rahman Agricultural University, Gagipur, Bangladesh.
- Alam, M. S. (1997). Use of Improved Farm Practices in Rice Cultivation by the Farmers. *M. S. (Ag. Ext. Ed.) Thesis*, Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.
- Ali, M. K., and. Chowhdury, S. A . Kader, M. A and Gani, M. O. (1986). Factors Influencing Adoption of Improved Sugarcane Production Technologies Among the Growers of Sugar Mills Zone. *Bangladesh Journal of Extension Education*, 1 (2): 25-31.
- Anonymous, (2008). *Statistical Year Book of Bangladesh*. Bangladesh Bureau of Statistics. Statistics Division, Ministry of Planning, Government of the People's Republic of Bangladesh.
- Aurangozeb, M. K. (2002). Adoption of Integrated Homestead Farming Technologies by the Rural Women in RDRS. *M. S. (Ag. Ext. Ed.) Thesis*, Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.
- Balasudramanian, S. and Kaul, P. N. (1985). Adoption of improved practices by Fish Trawler owners in Kerala. *Indian Journal of Extension Education*, 20 (3&4): 35-42.
- Bashar, M. K. (1993). Adoption of Intercropping in Sugarcane cultivation. *M. Sc. (Ag. Ext. Ed.) Thesis*, Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.
- BBS, (2003). *Statistical Year Book of Bangladesh*. Bangladesh Bureau of Statistics. Statistics Division, Ministry of Planning, Government of the People's Republic of Bangladesh.



- BBS, (2004). *Statistical Year Book of Bangladesh*. Bangladesh Bureau of Statistics. Statistics Division, Ministry of Planning, Government of the People's Republic of Bangladesh.
- Bezbor, S. N. (1980). Factors Affecting Adoption of Improved Agricultural Technologies for Paddy Cultivation by the Farmers of Assam. Summary of Extension Research Department of Extension Education, Punjab Agricultural University, Ludhiana.
- Chowdhury, M. S. A. (1997). Adoption of Selected BINA Technologies by the Farmers of Boyra Union in Mymensingh District. *M. S. (Ag. Ext. Ed.) Thesis*, Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.
- Goode, W.J. and Hatt, P.K. (1945). *Methods of Social Research*. New York: McGraw-Hill Book Company, Inc.
- Haider, M. R. Halim, A. and Kashem, M. A. (2001). Adoption of Improved Package of practices for Trans-planting Aman Rice Cultivation. *Bangladesh Journal of Nuclear Agricultural*, Vol. (16 & 17): 77-84.
- Hamid, M.A. (1995). Farmers Awareness on Environmental Pollution Caused by the Use of Agro-Chemical in two Selected Villages of Bangladesh Agricultural University Extension Centre. *M. Sc. (Ag. Ext. Ed.) Thesis*, Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.
- Haque, M. M. (2003). Farmers Adoption of Modern Maize Cultivation Technologies. *M. S. (Ag. Ext. Ed.) Thesis*, Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.
- Hasan, M. Z. (1996). Adoption of some Selected Agricultural Technologies among the Farmers as Perceived by the Frontline GO and NGO Workers. *M. S. (Ag. Ext. Ed.) Thesis*, Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.
- Heong, K. L. (1990). Technology Development in Rice-Integrated Pest Management Proceedings on the International Conference on Plant Protection in the Tropics Kuala Lumpur, Malaysia, Malaysian Plant Protection Society, 5: 80-84.
- Hoque, M. M. (1993). Adoption of Improved Practices in Sugarcane Cultivation by the Sugarcane Growers of Sreepur Upazila Under Gazipur District. *M. Sc.*

- (*Ag. Ext. Ed.*) Thesis, Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.
- Hossain, M. A. (1991). Adoption Behaviour of Contact Wheat Growers in Sadar Upazila of Jamalpur District. *M. Sc. (Ag. Ext. Ed.) Thesis*, Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.
- Hossain, M. A. (1983). Relationship of Farmers Characteristics with Their Adoption of HYV as T. Aman and other Related Aspects in Bhabakhali Union of Mymensingh District. *M. Sc. (Ag. Ext. Ed.) Thesis*, Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.
- Hossain, M. D. (1981). Relationship of Selected Characteristics of the Jute Growers with their Adoption of Improved Practices of Jute Cultivation. *M. S. (Ag. Ext. Ed.) Thesis*, Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.
- Hossain, M. M. (2003). Farmers knowledge and Adoption of Modern HYV Cultivation Practices. *M. S. (Ag. Ext. Ed.) Thesis*, Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.
- Hossain, K. (2006). Adoption of selected high yielding varieties of rice by the farmers of Rajpat union under Kasiani Upazila in Gopalgong District. *MSc Thesis* Faculty of Agriculture, Sher-e-Bangla Agricultural University, Dhaka.
- Hussen, M. A. (2001). Farmers Knowledge and Adoption of Modern Sugarcane Cultivation Practices. *M. S. (Ag. Ext. Ed.) Thesis*, Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.
- Islam, M. M. (1996). Farmers use of Indigenous Technical knowledge (ITK.) in the Context of Sustainable Agricultural Development. *M. S. (Ag. Ext. Ed.) Thesis*, Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.
- Iftekhar (2010). Adoption of selected recommended agronomic practices by the Boro rice growers of Jalma union under Khulna District. *M.Sc. Thesis*, Agrotechnology Discipline, Khulna University, Khulna.
- Islam, M. M. (1993). Adoption of Improved Practices on Potato Cultivation by the Potato Farmers of Sonatola Union Under Bogra district. *M. Sc. (Ag. Ext. Ed.) Thesis*, Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.

- Karim, et. Al (1990). Farmers Characteristics and other Factors Associated with Adoption of HYV Wheat in Kushtia Union of Mymensingh District. *Bangladesh Journal of Extension Education*. 1 (1): 17-24.
- Kashem, M. A. and Islam, M. M. (1987). Comparative Analysis of Knowledge, Attitude and Adoption of Agricultural Practices between the Contact and Non-contact Farmers Under the T & V System. *Bangladesh Journal of Extension Education*. 5 (1&2): 1-7.
- Kashem, M. A. (1991). Small Farmers Constraints to the Adoption of Modern Rice Technology. *The Bangladesh Developmental Studies*. XV (4): 118-130.
- Kaur, M.R. (1988). An Evaluation Study of Women Development Programme Under Indo-German-Dhauhadhar Project Palampur District Kumgra, H. P. Harayana Agricultural University. Thesis Abstract. 16 (4): 258.
- Khan, M. A. H. (1993). Adoption of Insecticides and Related Issues in the Villages of Pachon Union, Madaripur District. . *M. Sc. (Ag. Ext. Ed.) Thesis*, Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.
- Kher, S. K. (1992). Adoption of Wheat Cultivation Practices. *Indian Journal of Extension Education*. 22 (1 & 2): 97-99.
- Koch, B. H. (1985). The Role of Knowledge in the Adoption of Agricultural Development Practices. *South African Journal of Agricultural Extension*, XXVI (374): 86-91.
- Mohammad, A. (1974). A study on the Farmers Adoption of Insect Control Measures and Related Aspects. *M. Sc. (Ag. Ext. Ed.) Thesis*, Department of Agricultural Extension Teachers Training, Bangladesh Agricultural University, Mymensingh.
- Narwal, R. S., Dixit, V. B. and Dahiya, S. S. (1991). Correlation of Farmers Attitude towards Buffalo Management Practices. *Indian Journal of Extension Education*. 27 (1 & 2): 97-100.
- Okoro, F. U. and Obibuaka, L. U. (1992). Factors Influencing the Adoption of Improved Oil Palm Management Practices Among Small Holders in IMO States, Nigeria. *Bangladesh Journal of Extension Education*. 7 (1 & 2): 45-52.
- Osunloogun, A., Ademoyo, R. and Anyanwu, E. (1986). The Adoption of Innovations by Co-operative Farmers in Nigeria. *Tropical Agriculture*. 63 (2): 158-160.

- Pal, S. K. (1995). Adoption of Recommended Sugarcane Cultivation Practices by the Farmers of Two Selected Centres of North Bengal Sugar Mills. *M. Sc. (Ag. Ext. Ed.) Thesis*, Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.
- Pathak, S. and Sasmal, B. C. (1992). Adoption of Jute Technologies. *Indian Journal of Extension Education*. 27 (1 & 2): 77-80.
- Podder, S. K. and Kashem, M. A. (2000). Use of Extension Contract Media by the Farmers in the Adoption of Mehersagar banana. *Bangladesh Journal of Extension Education*. Vol. 11 & 12. No. 1 & 2: 89-94.
- Rahman, M. H. (2003). Adoption of Year round Homestead Fruit Cultivation Practices in Selected Area of Meherpur District. *M. S. (Ag. Ext. Ed.) Thesis*, Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.
- Rahman, M. M. (1999). Adoption of Balanced Fertilizer by the HYV Farmers of Ishwarganj Thana. *M. S. (Ag. Ext. Ed.) Thesis*, Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.
- Rahman, M. M. (1986). Correlates of Adoption of Improved Practices in Transplanted Aman Rice. *Bangladesh Journal of Extension Education*. 1 (2): 71-77.
- Rahman, M. S. (2001). Knowledge, Attitude and Adoption of the Farmers Regarding Aalok 6201 Hybrid Rice in Sadar Upazila of Mymensingh District. *M. S. (Ag. Ext. Ed.) Thesis*, Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.
- Ray, G. L. (1991). Extension Communication and Management. Naya Prokash : Kolkata.
- Razzaque, M. A. (1977). Relationship of Selected Characteristics of the Farmers with Adoption of High Yielding Varieties of Rice in Three Villages of Agricultural University Project Area. *M. Sc. (Ag. Ext. Ed.) Thesis*, Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.
- Reddy, P. R.; Reddy, M. M. and Reddy, D. R. (1987). Impact of National Demonstration on Knowledge level Attitude and Adoption Behaviour of Farmers in Ranaga Reddy District of Andhra Pradesh state. *Journal of Research APAU*. 15 (1): 35-38.
- Rogers, E. M. (1995). Diffusion of innovations, 4th Edn. New York: The Free Press.

- Rogers, E. M. and Shoemaker, F. (1971). *Communication of Innovation: A Cross Cultural Approach*. New York: The Free Press.
- Sardar, M. H. U. (2002). Adoption of IPM Practices by the Farmers under PETRA Project of RDRS. *M. S. (Ag. Ext. Ed.) Thesis*, Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.
- Sarker, M. R. A. (2002). Farmer's Knowledge of and Attitude Towards BRRI Dhan 29 variety of Rice. *M. Sc. (Ag. Ext. Ed.) Thesis*, Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.
- Singh, S. P. and Rajendra (1990). A study on Adoption of Sugarcane Variety. *Indian Journal of Extension Education*. 26 (1 & 2): 110-111.
- Sobhan, M. A. (1975). Adoption of Winter Vegetable Cultivation by the Farmers in Boilor Union of Mymensingh District. *M. Sc. (Ag. Ext. Ed.) Thesis*, Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.
- Quazi et.al. (1996). Factors Affecting the Knowledge of Adopter and Non-adopter Small Farmers. *Indian Journal of Extension Education*, 14: 30-34.

APPENDIX-A

**AGROTECHNOLOGY DISCIPLINE
KHULNA UNIVERSITY
KHULNA**

**IDENTIFICATION AND EVALUATION OF BRRI DEVELOPED SALINE TOLERANT RICE
VARIETIES AS ADOPTED BY THE FARMERS OF SOUTH-WESTERN COASTAL REGION OF
BANGLADESH**

Sample no: -----

Date...

Personal information:

Name: -----

Fathers name: -----

Village: -----

Union: -----

Upazila: -----

District: -----

1. Age of the respondents: -----years.

2. Profession/ Occupation: Main..... Subsidiary

3. Educational qualification/Level of education:

Please mention your educational qualification/status:

a) Don't know to read and write

b) I have passed ----- class.

4. Farming experience: -----years.

5. Family size/Family members: ----- persons.

Sl. No.	Family members name	Age	Relation with you	Highest educational qualification

6. No. of family members involved in agriculture: -----persons.

7. Farm size

Please furnish information about your lands according to use

Sl. No	Use of land	Area of land		
		Local unit	Hectare or acre	
1.	Homestead			
2.	Own land under own cultivation			
3.	Land given to others on barga			
4.	Land taken from others on barga			
5.	Land given to others lease			
6.	Land taken from others on lease			
7.	Others			
Total				

8. Annual income

Please furnish information about your annual income from different sources.

Sl. No	Sources of income	Amount(Tk)
1	Rice	
2	Fish	
3	Poultry	
4	Service	
5	Business	
6	Daily labor	
7.	Others	
Total		

9. Organization participation

Are you involved in any organization?

Yes-----

No-----

If yes, please mention the nature and duration of your participation in the following organization:

Sl. No	Name of Organization	Nature of participation(with duration)		
		Ordinary member	Executive committee member	Executive committee officer
1.	Farmers cooperative committee			
2.	School committee			
3.	Mosque/mondir committee			
4.	Madrashah committee			
5.	N.G.O committee			
6	Union parishad			
7	Youth club			
8	Bazar committee			
9	Cultural of sports club			
10	Others			

10. Extension media contact

Please mention the extent of contact with the following media in respect of various information related to your crops cultivation:

Sl. No	Communication media	Regularly (3)	Occasionally (2)	Rarely (1)	Not at all (0)
1	Sub Assistant Agriculture Officer (SAAO)				
2	Farmers Field School(FFS)				
3	Neighbor				
4	Relative				
5	Friends				
6	Radio(Farm radio program)				
7	Television (Farm TV program)				
8	Upazila Agriculture Officer				
9	Additional Agriculture Officer/Agriculture Extension Officer.				
10	Agricultural related magazine/Newspaper.				
11	Others				

11. Training exposure

Please mention your participation in different training activities:

Sl. No	Title of the training	Duration of training	Name of the training organization	Venue of the training
1.				
2.				
3.				
4.				

12. Agricultural knowledge

Please answer the following questions

Sl. No	Question	Total Marks	Mark Obtained
1.	What do you know about Boro rice?	1	
2.	Mention three season of rice cultivation.	2	
3.	When Boro rice is cultivated?	1	
4.	How many times are you ploughing for Boro rice cultivation?	2	
5.	Mention at least 4 HYV cultivar of Boro rice?	1	
6.	Mention the names of the fertilizers used in Boro rice cultivation?	1	
7.	When do you apply urea fertilizer in Boro rice cultivation and how much?	2	
8.	How much seed rate do you generally use for per bigha?	2	
9.	From where do you collect the seeds?	2	
10.	Mention the age of seedling which is used for transplanting?	1	
11.	What is the spacing of the seedling?	1	
12.	How many seedlings is used per hill?	1	
13.	What is the particular showing time of Boro rice?	1	
14.	When the weeding is needed?	1	
15.	When the irrigation is needed?	1	
16.	When the top dressing of urea fertilizer is needed?	1	
17.	What are the maturity symptoms of Boro rice to harvest?	1	
18.	What is the process of threshing?	1	
19.	Mention two saline tolerant rice varieties?	1	
20.	How can you measure salinity?	1	



13. Cosmopolitaness

Please indicate the extent of your visit to the following places

Sl. No	Visiting place	Visiting dimension			
		Often (3)	After few days(2)	Seldom (1)	Never (0)
01	Relatives and friend house	8 times or more in a month	6-7 times in a month	1-5 times in a month	
02	Other village	6 times or more in a month	4-5 times in a month	1-3 times in a month	
03	Own union	5times or more in a month	3-4 times in a month	1-2 times in a month	
04	Others union	4 times or more in a month	2-3 times in a month	1 times in a month	
05	Own Upazila	3 times or more in a month	1-2 times in a month	1-2 times in a year	
06	Others Upazila	2 times or more in a month	3-5 times in a year	1-2 times in a year	
07	Own Zilla	5times or more in a year	3-4 times in a year	1-2 times in a year	
08	Others zilla	3 times or more in a year	2 times in a year	1 times in a year	
09	Capital	3 times or more in a year	2 times in a year	1 times in a year	
10	Abroad	1times per year	1times per 5 year	1times per 10 year	