

**ATTRIBUTES INFLUENCING THE ADOPTION OF HARIDHAN  
BY THE FARMERS OF JHINAIDAH DISTRICT**

**BY**

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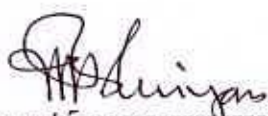
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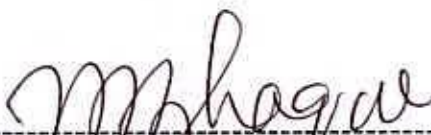
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## CERTIFICATE

This is to certify that the thesis entitled **"ATTRIBUTES INFLUENCING THE ADOPTION OF HARJIDHAN BY THE FARMERS OF JHENAIIDAH DISTRICT"** submitted to faculty of Agriculture Sher-e-Bangla Agricultural University, Dhaka, in a partial fulfillment of the requirements for the degree of **MASTER OF SCIENCE IN AGRICULTURAL EXTENSION AND INFORMATION SYSTEM**, embodies the result of a piece of bonafide research work carried out by **Shaihi Fazul Huque Moni**, Registration No. 01017 under my supervision and guidance. No part of the thesis has been submitted for any other degree or diploma.

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

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\_\_\_\_\_  
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*Dedicated to*  
*My*  
*Beloved Parents*



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## ABSTRACT

The main purpose of the study was to determine the adoption of Haridhan and to explore the relationships between the selected attributes of Haridhan and its adoption by the farmers. Attempts were also made to describe the selected attributes namely yield, insect resistance, disease resistance, drought resistance, taste, straw yield, fertilizer requirement of Haridhan and their adoption by the farmers. Data were obtained from 87 randomly selected Haridhan growers of two unions in Jhenaidah district namely Sadhuhati and Ganna with the help of interview schedule. Data were collected during 15 February to 28 February, 2008. Basic statistics like mean, standard deviation, range and percentage were used to interpret the data. The findings revealed that majority (49.5%) of Haridhan growers had medium adoption compared to 17.2% having low adoption and 33.3 having high adoption. Spearman rank Correlation was used to ascertain the relationship between the concerned variables of the study. Out of seven independent variables pest resistance and drought resistance had highly significant positive relationship with the adoption of Haridhan. On the other hand yield, disease resistance, taste, straw yield and fertilizer requirement had no significant relationship with the adoption of Haridhan by the farmers.





**Chapter 1**

**Introduction**



## CHAPTER 1

### INTRODUCTION

#### 1.1 General Background

Rice is the staple food and important source of nutrition occupying 75 percent of the total cultivable land (BBS, 2007) and constitutes 95 percent of the food grains production in Bangladesh (Julfiquar et al., 1988). Currently the average yield of rice in Bangladesh is around 4.2 t/ha (Anonymous, 2004) which is much below than those of Korea, Japan and China (Anonymous, 2004). Aman rice area shows a slow increasing trend and shares about 52.75 percent of total rice production (BBS, 2003). Cultivable area is being decreasing at the rate of eighty thousands hectare per year due to non crop and rapid urbanization activities (Alam et. al., 2004, Modal, 2005). Bangladesh has to produce more food from the decreasing land and other natural resources to feed the growing population. Adoption of improved technologies by the farmers may play vital role for increasing rice production in Bangladesh. Among technologies, modern rice varieties play major role for achieving higher yield. In aman season many varieties are cultivated in Bangladesh such as Br-3(Biplob), BR-4(Brrishail),BR-5(Dulavog), BR-10(Progoti),BR-11(Mukta),BR-22(Kiron)BR-23(Dishari BRRIDhan), -30,

About 10 years ago a new variety of T. Aman named Haridhan was evolved from a farmers field in Jhenaidah district. The name of the farmer was Haripad Kapali. The rice variety evolved from his field was named after his name. Haripad Kapali as a farmer grows HYV of T. Aman evolved by Bangladesh Rice Research

Institute. In 1998 he cultivated BRRIdhan 11. One day he saw in his field that same rice plants flowered about one one month earlier than normal time of flowerings. He observed it and timely harvestd it separately. He kept those rice as 'seed' to grow next year. The next Amon season. In next Amon season, he sowed that unknown rice variety in a small fragment of his land. Even though he sowed it in a small piece of land the yield was comparatively very high. That year he also cooked and tasted the miracle rice variety. It tasted really good even though the grains were not that fine. The next year Haripad sowed this variety on a 10 katha plot. He received a bumper production. He was overwhelmed with the joy of his miracle discovery and success of the harvest.

Soon the popularity and demand of this unknown rice variety discovered by Haripad kapali spread across neighboring villages. In the last six Amon seasons the cultivation of this unknown variety has been spread out from. 04 hectare of land to 4000 hectare of land all over Jhinaidah district, a southy-western district of Bangladesh. According to farmers there are several reasons behind the unbeaten popularity and demand of this unknown rice variety.

The grateful farmers of Jhinaidah rightly named this unknown variety of high yielding rice after its discoverer Haripad Kapali. It is now known as Haripad dhan across the nation .This is how a short story of discovering a new variety of rice by a small farmer becomes an epic of continuous success for many farmers .Channel-i.e. Bangla satellite TV channel awarded Haripad Kapali, "Channel-i Krishi Padak 2006" on March25,2006 for his discovery and spread of this particular variety among the farmers of Jhenaidah district on his own initiative. The farmers of



draught prone areas of Bangladesh i.e. North-Western part of Bangladesh and especially the Barind Tracts will find Haridhan a good choice for its draught resistance capability since water is scarce in those areas even in the wet season.

We have to act promptly and efficiently if we want to get benefits from this great destiny and agriculture .It might hold the potentiality to ensure food security for millions of our food insecure people and meeting our growing demand of rice in future .We make international (Millennium Development Goals (MDGs) and national(Poverty Reduction Strategy Paper (PRSP) commitment to reduce poverty and hunger. Many ongoing projects on food and livelihood security and agriculture by different government organizations and local and international NGOs, which consider increase of rice production as one of the important factors to ensure food security, are results of that international and national commitment.

Introduction of Haridhan, HYV rice to farmers can be a very rewarding input for project participants. There is no doubt that it is high time to recognize this new HYV, Haridhan by the concerned government agricultural departments for its widespread access, availability and cultivation among the farmers of other parts of the country .Different food security projects especially those projects that are working to increase rice yield can also consider introducing and spreading this rice variety among its beneficiaries or participant farmers .Despite our problems and limitations ,at the advent of this new millennium we have promised to work for a world where hunger and poverty will be history and where people will live in peace ,hope and dignity.

The present study of adoption is the only one piece of a complex puzzle, but the findings of this study can be a key in extending the adoption of selected modern rice cultivation technologies in the country. This will be helpful for planning adoptive research, formulating extension messages and production plans. These will help to understand the modern rice cultivation technologies adopted by the modern rice growers.

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

The success of any technology depends on its dissemination among the potential users which ultimately is measured by the level of adoption of that technology. It is assumed that notable improvements can take place in Bangladesh agriculture, if the available technologies are accepted and adopted by the growers. For wider adoption of Haridhan, it is necessary to have a clear understanding of the present status of adoption of Haridhan by the growers. It is also necessary to have an understanding of the attributes which influenced farmers to adopt Haridhan. An understanding of the relationship at the growers' adoption behaviour with the selected attributes of Haridhan will be helpful to the planners and extension workers.

In view of the foregoing discussion, the researcher undertook a study entitled "Attributes Influencing the Adoption of Haridhan among the Farmers in two selected unions of Jhenaidah district" The main purpose of the study was to have answers to the following research questions:

1. To what extent Haridhan was adopted by the farmers in two unions of Jhenaidah?



2. What are the attributes of Haridhan and how they influence farmers to adopt it?
3. What is the relationship between the attributes of Haridhan and the extent of adoption of Haridhan by the growers?

### **1.3 Objectives of the Study**

The following specific objectives were undertaken for the present study:

1. To determine the extent of adoption of Haridhan by the farmers in two unions of Jhenaidah district.
2. To determine and describe selected attributes of the Haridhan as perceived by the farmers. The attributes are:
  - i. Yield
  - ii. Pest resistance
  - iii. Disease resistance
  - iv. Drought resistance
  - v. Taste
  - vi. Straw yield
  - vii. Fertilizer requirement
3. To explore the relationships between each of selected attributes of Haridhan and its adoption by the farmers

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

The major focus of the study was to assess the extent of adoption of Haridhan by the farmers of Jhenaidah district. Haridhan is a locally developed improved rice variety. Still it is not sure to call Haridhan a HYV of T. Aman. Bangladesh Rice research Institute and other research institutes did not give importance upon it except electronic and mass media. Before facing any danger in rice production farmers of Jhenaidah district began to cultivate it leaving aside nationally

recognized HYV of Amon rice. There is a need to study the attributes of Haridhan and to publish the results for the awareness of rice growers.

It was obviously true that growers were the key elements of adoption of selected modern rice cultivation technologies. At present, there is a lack of adequate information to influence their adoption of Haridhan. These facts indicate the need for an investigation to ascertain the relationships of the attributes of Haridhan with its adoption by the farmers. Findings of this study, therefore, be helpful to the planners and extension workers in planning and execution of programmes for enhancing the yield of rice production. 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 adopting of HYV rice such as Haridhan.

The findings are expected to be useful to the planners for preparation of programmes for rapid adoption of modern rice cultivation technologies. The findings may also be helpful to the extension workers of different organizations to improve their technique and strategy of action for effective working method with the rural people to generate rural employment and to improve rural economy. Finally, there is a great scope for investigation on farmers' adoption of Haridhan cultivation technologies, because little study has been conducted on this so far in Bangladesh.

### **1.5. Assumptions of the study**

An assumption is the supposition that an apparent fact or principles is true in the light of the available evidence (Goode and Hatt, 1952). An assumption is taken as a fact or belief to be true. While undertaking in this study, the researcher had 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.
3. The responses furnished by the respondents were reliable and they truly expressed their opinion on adoption of Haridhan.
4. The sample size was representative of the whole population of the study area.
5. The findings of the study would be useful for planning and execution of the programmes in connection with diffusion of Haridhan variety of rice.
6. The measures of the adoption of Haridhan are independently distributed with their respective means and standard deviation.

### **1.6. Limitations of the study**

The present study was undertaken with a view to having an understanding on the level of adoption of Haridhan by the growers in two selected unions of Sadar Upazila under Jhinaidah district. To make the study manageable, it became necessary to impose some limitations in regard to certain aspects. Considering time,



money and other necessary resources available to the researcher, the following limitations have been observed throughout the study:

1. Reluctance of the farmers to provide information was overcome by establishing rapport
1. The study was confined to two selected unions of Sadar upazila under Jhinaidah district.
2. The major area of investigation was mostly confined to growers' adoption of Haridhan.
3. Only the general growers who cultivated Haridhan were selected for this study.
4. There are many attributes or characteristics of Haridhan which always vary but only seven (7) attributes were selected for investigation in this study as stated in the objectives. This was done to complete the study within limited resources and time.
5. The researcher relied on the data furnished by the Haridhan growers from their memory during interview.



## 1.6 Definition of the Terms

In order to avoid confusion and misunderstanding, certain terms used throughout the study are defined as follows:

**Haridhan:** Haripad Kapali(70), a small farmer of Asannagar of Jhenaidah district in Bangladesh has selected a miraculous High yielding Variety of rice from his rice field in 1998. This rice variety seemed to be competitive with existing HYV aman rice. However, no empirical research was conducted about this variety.

**Haridhan Growers:** It refers to those who cultivate Haridhan by the influence of its attributes such as high yielding, pest and disease resistance, drought resistance , taste, straw yield and low fertilizer requirement etc. in fact, adoption of Haridhan only spread among the farmers of Jhenaidah district.

**Attributes of Haridhan:** It refers to good characteristics of Haridhan such as high yielding, pest resistance, disease resistance, drought resistance, taste, straw yield and low fertilizer requirement etc.

**Respondents:** People who have answered questions asked by the an researcher for a social survey. They are the people from whom a social research worker usually gets most data required for his research.

**Variable:** A general indication in statistical research that occurs in a number of individuals, objects, groups etc. and that can take on various values, for example the age of an individual.

**Adoption:** Adoption is the implementation of a decision to continue the use of an innovation. According to Rogers (1995), "Adoption is a decision to make full use

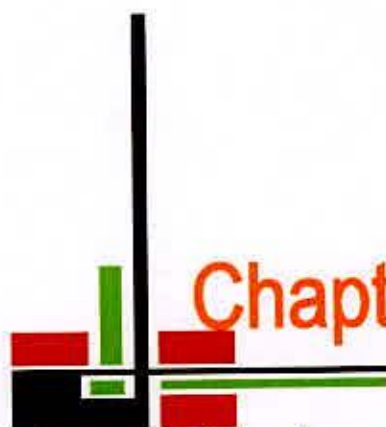
of an innovation as the best course of action available". When an individual takes up a new idea as the best course of action and practices it, the phenomenon is known as adoption (Ray, 1991). In this study adoption means extent of use of Haridhan by the farmers of Jhenaidah district.

**Pest Resistance of Haridhan:** It refers to the quality of Haridhan which is capable to avoid, tolerate or recover from the attacks of insect. The variety is less damaged or less infested by the pest than other varieties in the field under comparable environmental conditions and stage of growth.

**Disease resistance:** It refers to the ability of plants to tolerate the attack of a pathogen without causing much damage and showing symptoms. So, we can say the disease resistance power of Haridhan can resist attack of pathogens and their invasion.

**Drought resistance:** Drought resistance is a rare attributes of rice which is contained in Haridhan. In presence of that type of attribute, Haridhan can be grown with a very little effect on total yield in drought condition.

**Taste of Haridhan:** Taste is an important influencing factor for adoption of rice. It depends on chemical constituents of rice grain. Generally, fine grain rice taste is delicious. But the Haridhan grain is coarse, but its taste is delicious.



**Chapter 2**

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**Review of literature**



## CHAPTER 2

### REVIEW OF LITERATURE

The purpose of this Chapter is to review the literature having relevance to the present study. The researcher made an elaborate search of available literature for the above purpose. The researcher attempted to search the literatures on a number of studies that were conducted on the adoption of innovations by the growers. Therefore, the findings of such studies related to the extent of adoption of selected modern rice by the growers and other relevant 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 attributes of Haridhan and the adoption of Haridhan and the third section deals with the conceptual framework of the study.

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

Hossain (1983) studied the extent of adoption of HYV rice as transplanted Aman and other related aspect in Bhabalhali union of Mymensingh district. He observed that among the respondent farmers, 54 percent had high adoption of HYV rice and 46 percent had medium adoption interestingly no low adoption was found.

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

district. It revealed that 22 percent of the farmers adopted all the four practices compared to 49 percent adopted three practices, 22 percent adopted two practices, 5 percent adopted one practices.

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

Gogoi and Gogoi (1989) conducted a study on adoption of recommended plant protection practices in rice in Zorhat district of Assam state in India. The study revealed that among the respondents, 50 percent had low level of adoption, 35.36 percent medium level of adoption and 13.64 percent had high level of adoption of recommended plant protection practices.

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

Singh *et al.* (1992) undertook a research study in India on factors affecting the adoption of improved sugarcane production technology. They observed that



majority of sugarcane growers had the medium level of adoption and were partial adopters of scientific recommendations of sugarcane production technology.

Kashem *et al.* (1992) conducted a study on adoption behaviour of sugarcane growers of Zilbangla Sugar Mill, Dewanganj, Jamalpur, Bangladesh. They found among the sugarcane growers, 89 percent had high level of adoption of recommended practices of sugarcane.

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

Nikhade *et al.* (1995) found that the adoption gap about the use of recommended technology of cotton among cotton growers was found to be about 30 percent which was quite high.

Siddaramaiha *et al.* (1995) studied adoption of improved seri-cultural practices among big and small farmers. They indicated that there was cent percent adoption in following the recommended system of planting by both big and small farmers. Other practices adoption by a large percentage of farmers was: optimum time of planting (95%), adoption of recommended irrigation schedule (93.75%), recommended spacing (91.25%) and the use of improved variety of mulberry crop



(87.50%). Nearly half of the respondents used the recommended quantity of farmyard manure and plant protection chemicals in mulberry cultivation.

Hasan (1996) found in his study that the highest proportion (44 percent) of the respondents perceived the existence of medium adoption, compared to 26 percent low adoption and 3 percent high adoption in respect of selected agricultural technologies.

Islam (1996) carried out a study on farmer's use of indigenous technical knowledge (ITK) in the context of sustainable agricultural development. He found the extent use of ITK by individual farmers that, the highest proportion (42.73 percent) of the respondents belonged to the lower user category as compared to 41.82 percent in the moderate user category and 15.45 percent in the higher user category, respectively.

Muttaleb *et al.* (1998) found that over all adoption of plant protection practices was medium. Among the plant protection practices high adoption were observed in fungicides, insecticide and soil treatment and low adoption were found in suberization of cut tuber hand picking of cutworm and rouging of diseased plant.

Mostafa (1999) studied the adoption of recommended mango cultivation practices by the mango growers of Nawabganj Sadar thana. He found that about half (49 percent) of the mango growers had "low adoption" 31 percent "very low" adoption and 20 percent had "medium" adoption of fertilizers.

Rahman (1999) studied the adoption of balanced fertilizer by the boro rice farmers of Ishwarganj thana. He found that the extent of use of balanced nitrogenous fertilizer, 48.57 percent of the farmers had optimum adoption and above optimum respectively. In respect of extent of use of balanced phosphoric fertilizer, 79.05 percent of the farmers had below optimum adoption compared to 20.95 percent having optimum adoption. Regarding the extent of use of balanced potassic fertilizer, 80.95 percent of the farmers had below optimum adoption compare to 18.10 and 0.95 percent having optimum and above optimum adoption, respectively.

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

Squire (2000) studied on factors influencing traditional farmers to adopt improved food crop production technologies in BO district of Southern Sierra Leone. He found that agricultural technology communication media (other farmers (54%)); characteristics of the arable crops (good to excellent eating quality of the improved crop varieties (53%)); artificial fertilizers (55%); mechanical technology (65%); draught animal technology (59%); pest and disease control technologies (increase in crop yield (61%)); and row planting technologies (easy to weed(53%)).

Haider *et al.* (2001) studied the adoption level of improved Package of practices 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 adoption and 8.5 percent high adoption. Vast majority (95 percent) of the farmers adopted MV programme of T. aman rice.

Haider *et al.* (2001) observed that one-third (37 percent) of the farmers fell in low adopter category compared to 32.5 percent falling in optimum adopter 23.5 percent above optimum adopter and only 7 percent had non-adopter on Nitrogenous fertilizer. In respect of extent of phosphoric fertilizer two thirds (68 percent) of the farmers had non adopter category compared to 23 percent having above optimum adopter, 5 percent optimum adopter and only 4 percent had below optimum adopter of phosphoric (P) fertilizer. In respect of extent of potassic fertilizer three quarters categories compared to 10 percent falling bellow optimum adopter, 8 percent optimum adopter and only 3 percent above optimum adopter of potassic (K) fertilizer.

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

Sardar (2002) studied on “adoption of IPM practices by the farmers under PETRRA Project of RDRS. He observed that majority (45.9 percent) of the farmers had medium, 38.3 percent had low and 15.8 percent had high adoption of IPM practices.



Swinkels *et al.* (2002) studied assessing the adoption potential of hedgerow intercropping for improving soil fertility, in western Kenya. They conduct that the average cost of hedgerow intercropping was 10.5% (SD = 5.5) when based on returns to land and 17.5% (SD = 6.5) based on returns to labour. Fifth planted additional hedges and only 14% did so to improve soil fertility. It thus appears that the potential for its adoption as a soil fertility practices. Hedgerow intercropping appears to have greater adopter potential if its aim is to provide feed for an intensive dairy operation or for curbing soil erosion.

Alexznder and Goodhue (2002) conducted the study on pricing of innovations. They evaluate the producer's returns to planting patented seed innovation, using a calibrated optimization model of a south-central maize producer's adoption decision in Iowa, USA. Their results suggested that patented seed innovations did not increase the market power of biotechnology firm in the relevant market for production system.

Gebre (2002) conducted a study on Maize technology adoption in Ethiopia. This study presents the results of the Sasakawa-Global 2000 Agriculture program in Ethiopia and its influence on agricultural research and maize production in the region. The Sasakawa-Global 2000 is an international non-government organization initiated in 1986 because of the 1984-85 famine in Ethiopia, with the aim of empowering Africa to produce its own food through the adoption of improved agricultural technologies.

Zegeye *et al.* (2002) studied the determinants of adoption of improved maize technologies in major maize growing region of Ethiopia. He found that the rate of adoption of improved maize varieties and chemical fertilizer, factors affecting the adoption of improved maize varieties and the determinant factors affecting adoption of chemical fertilizers are also highlighted.

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

Hasan (2003) found that majority (60 percent) of the farmers had medium adoption while 33 percent had low adoption and 7 percent had high adoption of recommended potato cultivation practices.

Hassain (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.

Salam (2003) found that an overwhelming majority (94 percent) of the respondents were found having high constraints in adopting environmentally friendly farming practices while 6 percent had medium constraints. No farmer was found having low constraint.

Rahman (2003) found that ninety seven percent of the pineapple growers adopted 2-4 intercrops viz, Zinger, turmeric, sweet ground and arid in pineapple cultivation.



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

## **2.2. Attributes influencing the adoption of Haridhan by the farmers**

Haripad kapali sowed that unknown rice variety in a small fragment of his land. Even though he sowed it in a small piece of land the yield was comparatively very high. That year he also cooked and tasted the miracle rice variety. It tasted really good even though the grains were not that fine. The next year Haripad sowed this variety on a 10 katha plot. He received a bumper production. He was overwhelmed with the joy of his miracle discovery and success of the harvest.

Soon the popularity and demand of this variety discovered by Haripad kapali spread across neighboring villages. In the last six Amon seasons the cultivation of this variety has been spread out from .04 hectare of land to 4000 hectare of land all over Jhinaidah district, a southy-western district of Bangladesh. According to farmers there are several reasons behind the unbeaten popularity and demand of this unknown rice variety. The per bigha yield (18 to 20 Maund per Bigha) for one thing is higher than any other known and existing rice varieties that are cultivated in that area. The rice from this grain is tastier than any other known varieties. It makes stronger stalks and hay and is resistant to insect and bug attacks as it has a strong stem and stalk. Further more, it needs comparatively less fertilizer and irrigation and no insecticide, there- fore, highly cost effective. It is draught resistant. According to a Prothom Alo report, in the last Amon season (2005)



farmers of Jhinaidah faced draught, but they received bumper yield from the variety.

### 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, the researcher constructed a conceptual framework of the study which is self explanatory and is presented in Fig. 2.1.

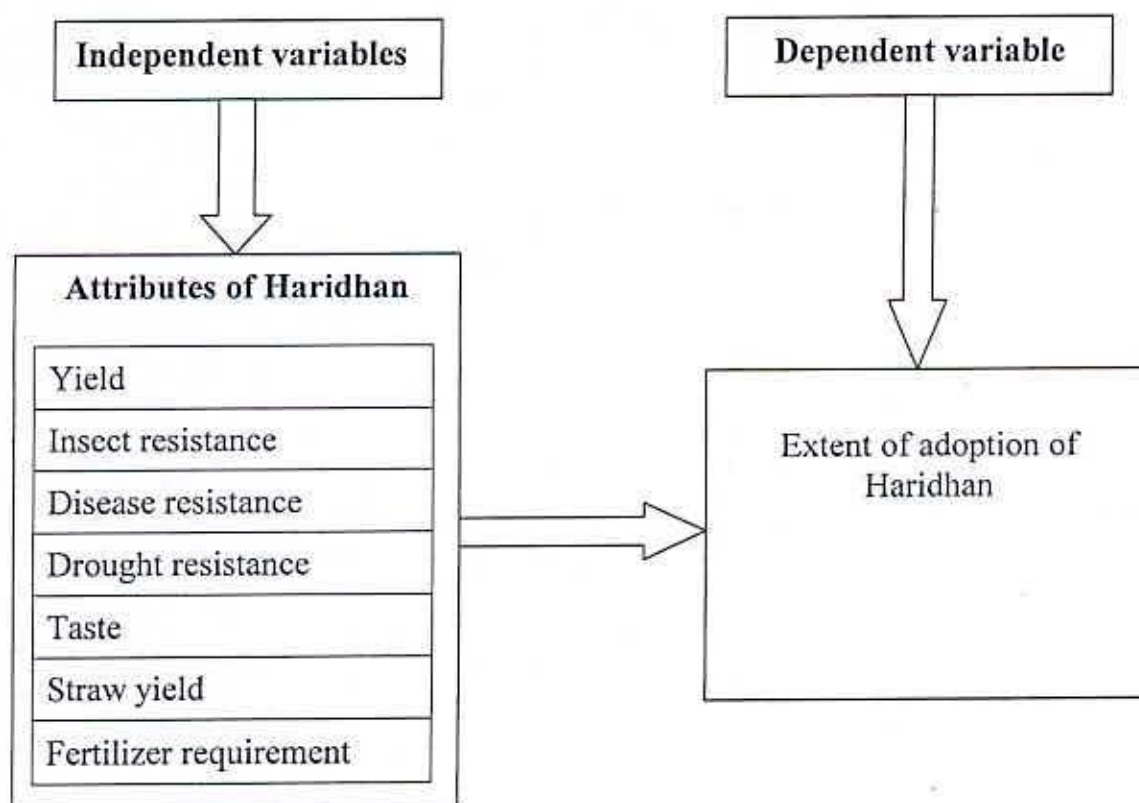
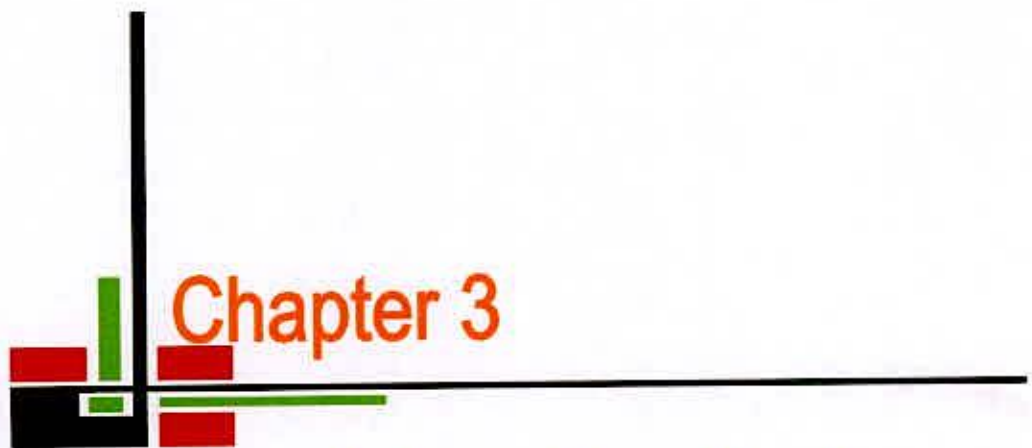


Fig. 2.3 Conceptual Framework of the study



## Chapter 3

# Materials and methods

## CHAPTER-3

### METHODOLOGY

Methodology refers to the methods and procedure of any scientific research. This is very important for empirical investigation. So, it requires very careful consideration in setting objectives of the research and selection of variables to be studied. The main aspects of methodology considered here are: (i) selection of locale of the study (ii) population and sampling design (iii) the research instrument and its preparation (iv) data collection (v) variables of the study and their measurement (vi) data coding and tabulation

#### **3.1. Locale of the Study**

Two unions namely Sadhuhati and Ganna of Jhinaidah sadar under Jhinaidah district were purposively selected as locale of the study. Sadhuhati had twelve villages and Ganna had thirteen villages. Three villages of each union namely Asannagar, Burai, Bankira of Sadhuhati and Durgapur, Gopinathpur, and Raghunathpur from Ganna were randomly selected. A map of Jhenaidah sadar upazilla showing the study area is presented in figure 3.1

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

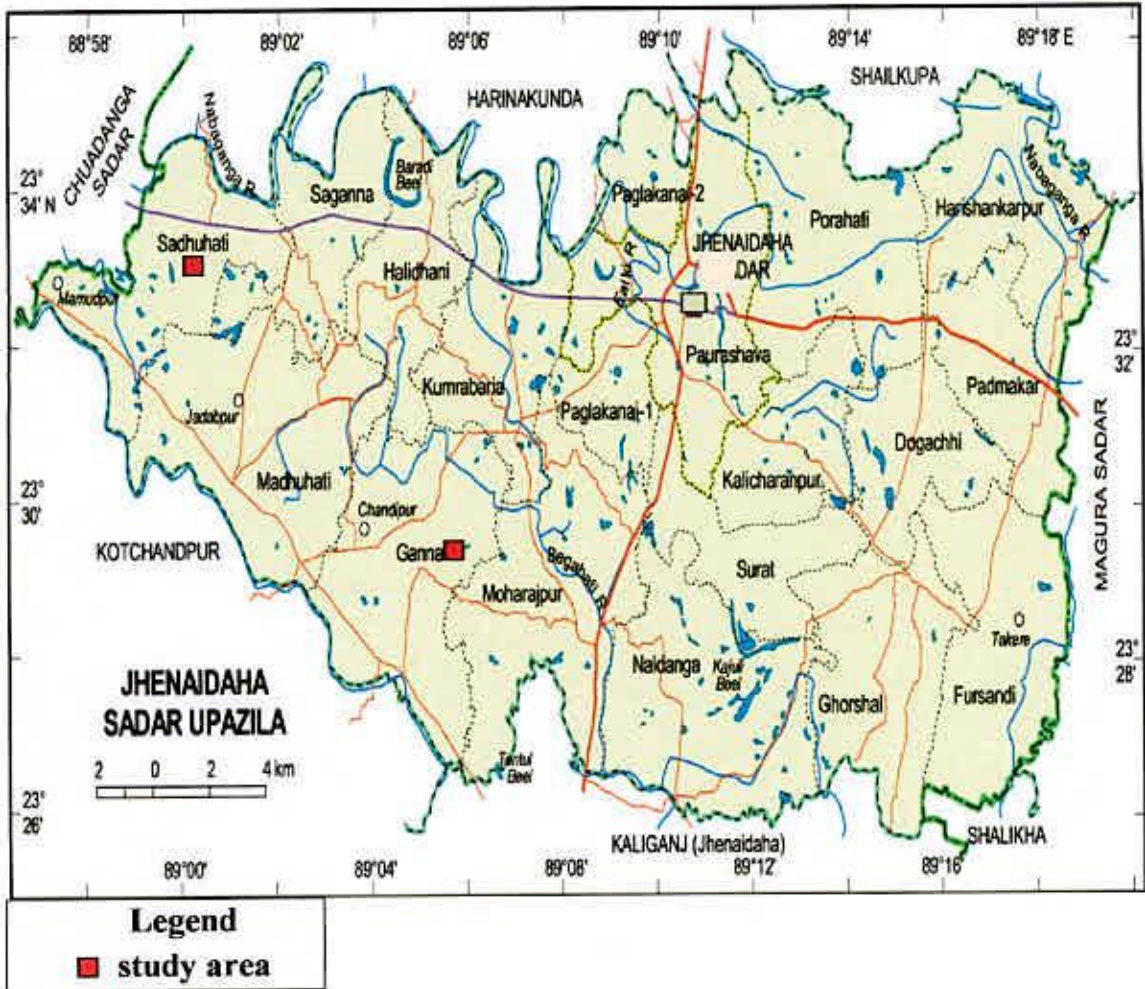
Farmers who were cultivating Haridhan of these two unions consisting of six villages were the population of the study. An up to date list of all farm family heads of the selected villages were prepared with the help of Sub-Assistant Agriculture



Officer. The list comprised a total of 435 farmers in the study area. There were 230 Haridhan growers in Sadhuhati union and 205 Haridhan growers in Ganna union. Twenty (20) percent of the population from each selected village was randomly selected as representative sample by using random number (Kerlinger, 1973). Thus the sample size for Sadhuhati was 46 and that of Ganna was 41 making the total sample size of 87 Haridhan growers. In addition to that, two (2) percent of the population was selected randomly and proportionately from each of selected villages to make a reserve list. Thus the additional sample, so drawn stood 8 farmers, which were included in the reserve list. In case, the individuals included in the original samples were not available or not found suitable at the time of data collection, the growers of the reserve list were used for the purpose. The distribution of the Haridhan growers included in the population, sample and reserve list has been shown in table 3.1

**Table 3.1. Distribution of population and sample of respondents in six selected villages of the two unions of Jhinaidah sadar**

Union	Village	Population	Sample size	Reserve list
Sadhuhati	Ashanogar	90	18	2
	Burai	70	14	1
	Bongkira	70	14	1
Ganna	Durgapur	75	15	2
	Gopinathpur	60	12	1
	Raghunathpur	70	14	1
Total		435	87	8



**Fig 3.1** A map of Jhenaidaha sadar upazilla showing Sadhuhati and Ganna unions of the study area





### **3.3. The Research Instrument and its Preparation**

An interview schedule was prepared for collection of data from the respondents keeping the objectives of the study in mind. The questions and statements contained in the schedule were simple, direct and easily understandable by the farmers. Simple and direct questions, different scales, closed and open form questions were included in the interview schedule to obtain necessary information. Appropriate scales were also developed to operationalize the reasons of adoption of Haridhan growers. The draft interview schedule was prepared both in Bangla and English version and was pre-tested with 20 Haridhan growers. This pre-tested schedule facilitated the researcher to examine the suitability of different questions and statements in general.

On the basis of pretest result, corrections, modifications and adjustment were done in the interview schedule. The interview schedule may be seen at *Appendix-1*

### **3.4. Data Collection**

Data were collected personally by the researcher himself by interviewing the sample of 87 Haridhan growers with the help of an interview schedule. The researcher made all possible efforts to explain the purpose of the study to the farmers. Rapport was established with the farmers prior to interview and the objectives were clearly explained by using local language as far as possible. As a result, the respondents did not hesitate to furnish proper responses to the questions and statements, which were collected during the period from February 15 to 28feb, 2008. The researcher sought the help from the local leaders and Sub-Assistant Agriculture Officers for this purpose. Excellent co-operation was obtained from the



respondents, the concerned local leaders and the Sub-Assistant Agriculture Officers.

### 3.5 Variables of the Study and their Measurement

In a descriptive social research, selection and measurement of the variable is an important task. A variable is any characteristic which can assume varying or different values in successive individual cases (Ezekiel and Fox, 1953). An organized research usually contains at least two identical elements viz. independent and dependent 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 this study attributes of Haridhan namely yield, insect and pest resistance, disease resistance, drought resistance, taste straw yield and fertilizer requirement were considered as independent variable. A dependent variable varies as the experimenter introduces, removes or varies the independent variables (Townsend, 1953). In this study adoption of Haridhan by the farmers in two unions of Jhinaidah district was the dependent variable.

#### 3.5.1. Measurement of independent variables

The independent variables of this study were seven attributes of Haridhan. These were high rice yield, less insect infestation, less disease infestation, good taste, less requirement of fertilizer, reasonable straw yield and drought resistance. Procedure for measuring independent variables has been discussed in the following:

## **Yield**

Yield of Haridhan was considered as one of the influencing factors for its adoption by the farmers. This attributes can bring about sudden change in the behavior of farmers. The yield of Haridhan was measured by four (4) point rating scale. The responses perceived by Haridhan growers regarding yield were recorded as very high, high, medium and all most same. It was also categorized in the same manner. The score assigned were 4,3,2 and 1 for very high, high, medium, and all most same respectively. The score of yield of Haridhan ranged from 1-4. One denoted as yield of the score of Haridhan remain almost same as other variety and four denoted the highest yield.

## **Insect resistance**

Insect resistance was the another influencing attributes for the adoption of Haridhan. Rice field is infested by many insects. At least 10 percent crops are damaged by insect infestation. So, whether Haridhan was insect resistant or not. And to what extent the researcher was interested to know the extent of insect resistant of Haridhan by using four point rating scale was. The perceived responses of insect resistant were categorized as very high, high, medium and low and each category was assigned score as 4, 3, 2 and 1 respectively. The score could range from 1-4. One indicated low insect resistance and four indicated very high resistance.

## **Disease resistance**

Diseases also damage rice production to a great extent. Generally viral, fungal and bacterial diseases are the common diseases of rice. So, disease resistance was



considered as one of the important attributes of Haridhan. Disease resistance power of Haridhan was measured by four (4) point Likert scale. The perceived responses of insect resistant were categorized as very high, high, medium and low and each category was assigned score as 4, 3, 2 and 1 respectively. The score could range from 1-4. One indicated low disease resistance and four indicated very high resistance.

### **Drought resistance**

Drought resistant is a rare quality of rice. So it is an important influencing factor of adoption of Haridhan. At Drought stage rice needs supplement irrigation but most of the farmers cannot afford supplement irrigation. In this case drought resistance variety like Haridhan is very essential. Extent of drought resistant power of Haridhan was measured by four (4) point rating scale. The perceived responses of drought resistance were categorized as very high, high, medium and low and each category was assigned score as 4, 3, 2 and 1 respectively. The score could range from 1-4. One indicated low resistance and four indicated very high resistance.

### **Taste**

Good taste is one of the indicators of high market price and demand that naturally encourages farmers to adopt this variety. Extent of taste of Haridhan was measured by four (4) point rating scale. The perceived responses of taste were categorized as very good taste, medium and poor taste and each category was assigned score as 4, 3, 2 and 1 respectively. The score could range from 1-4. One indicated poor taste and 4 indicated very good taste.



### **Straw yield**

The straw is the bi-product of rice production. Agronomically it is known as biomass. It is used for many purposes. The straw yield of Haridhan was measured by four (4) point rating scale. The responses perceived by Haridhan growers regarding straw yield were recorded as very high, high, medium and almost same. It was also categorized in the same manner. The score assigned for very high, high, medium, and almost same as 4, 3, 2, and 1 respectively. The score of straw yield of Haridhan ranged from 1-4. One denoted as straw yield of Haridhan remain almost same as other variety and four denoted the highest straw yield.

### **Fertilizer requirement**

Fertilizer requirement surely an important factor for the rice cultivation. Because low requirement of fertilizer may be decreased its production cost. Generally HYV of rice requires high doses of fertilizers. It was known that Haridhan required low dose of fertilizers. Fertilizer requirement for Haridhan was measured by four (4) point rating scale. The response of farmers was perceived as low dose, medium dose, high dose and very high dose. Farmers' perceived response was scored as 4, 3, 2 and 1 for low, medium low, high and very high respectively.

### **3.5.2. Measurement of dependent variable**

Adoption of Haridhan was the dependent variable, which was measured by computing an adoption score by using the formula of (a) area sub score (b) time sub score. To determine the adoption score, area sub score was multiplied by time sub score. The formula of area sub- score and weights assigned for each category of area sub score and weights of time sub-score have been presented below:

### I) Area sub score (A)

$$\text{Area sub score \%} = \frac{\text{Area coverage by Haridhan}}{\text{Area suitable for Haridhan}} \times 100$$

<u>Area coverage percent</u>	<u>Weights</u>
No coverage	0
1-25	1
26-50	2
51-75	3
76-100	4

### II) Time sub score (T)

The weights of time sub-score was assigned as follows:

<u>Length of time of use</u>	<u>weights</u>
No use	0
Up to 1 year	1
2-3 years	2
4-5 years	3
More than 5 years	4

If a farmer practices Haridhan in 20 decimal lands out of his 30 decimal potential land and being practiced for a period of 5 years. The computed value for adoption score against his particular rice varieties would be as follows:

$$\text{Adoption Score} = A \times T$$

$$A = \frac{20}{30} \times 100$$

$$= 66.67 \text{ percent}$$

The weight for 66.67 percent is 3.

Area sub score would be multiplied by time sub score as follows

Adoption score = Area sub score × Time sub score

Therefore, the adoption score of the farmers of Haridhan would be  $3 \times 3 = 9$ .

The possible highest range of adoption score is 16 and the lowest is 0

The observed adoption score are divided into following three categories.

Adoption categories	Adoption score
High adoption	11-16
Medium adoption	6-10
Low adoption ion	1-5

### 3.6. Data Coding and Tabulation

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

### 3.7. Statistical Analysis

The statistical measures such as number and percentage distribution, mean, standard deviation and rank order were used for describing the variables of the study. In order to explore the relationships between the adoption of Haridhan rice with the selected characteristics of the farmers, the Spearman rank correlation (r) was Computed. Correlation matrix was also computed to determine the



interrelationships among the variables. Five percent (0.05) level of significance was used as the basis of rejection acceptance of any null hypothesis. If the computed value of co-efficient of correlation 'r' was equal to or greater than table value at designated level of significance for the relevant degrees of freedom, the null hypothesis was rejected and it was concluded that there was significant relationship between the concerned variables. However, when the computed value of co-efficient of correlation (r) was found to be smaller than the tabulated value at the designated level of significance for the relevant degrees of freedom, it was concluded that the null hypothesis could not be rejected and hence there was no relationship between the concerned variables.



**Chapter 4**

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**Results and Discussion**

## CHAPTER 4

### FINDINGS AND DISCUSSION

The findings of the study and interpretation of the results have been presented in this chapter. These are presented in three sections according to the objectives of the study. The first section deals with the selected perceived attributes of Haridhan, while second section deals with the adoption of Haridhan by the farmers. Relationship between the selected perceived attributes of Haridhan and the adoption of Haridhan by the farmers has been discussed in the third section.

#### 4.1 Selected attributes of Haridhan

In this section the results of the attributes of Haridhan as perceived by the farmers have been discussed. The selected attributes of Haridhan included yield, insect resistance, disease resistance, drought resistance, taste, straw yield and fertilizer requirement. The findings on the selected attributes are discussed below:

##### 4.1.1 Yield

Yield of Haridhan was determined by the degree of perception of Haridhan growers as very high yield, high yield, medium yield and all most same yield and scored 4, 3, 2 and 1 accordingly. The observed score ranged from 1 to 2, the average being 1.09 with standard deviation 0.291 against the possible range 1-4. According to the perception of Haridhan growers the yield score of Haridhan was classified into three categories such as low medium and high. The distribution of respondents according to their yield perception is shown in Table 4.1



**Table 4.1 Number and percentage distribution of the respondents according to yield perception**

Yield Categories	Number	Percent	Mean	SD
Low yield (score 1)	80	91.8	1.09	0.291
Medium yield(score 2)	7	8.2		
High yield (score 3-4)	-	-		
Total	87	100		

Data presented in Table 4.1 reveal that an overwhelming majority (90.8) of respondents Haridhan growers perceived Haridhan as low yield category, compared to only 9.2 percent fell as medium yield category. No Haridhan growers perceived Haridhan as a high yield cultivar.

Yield is the most important factor of relative advantage of rice cultivation. Yield of rice is very much attractive to rice growers. It is reasonable to say that more yield more adoption. But according to the perception of Haridhan growers the yield of Haridhan is not encouraging. Scientists of rice research institute, teachers of universities and scientists of Bangladesh Institute of Nuclear Agriculture give their utmost effort to bring smile in the Farmers' face. So, long BBRI evolved 47 rice varieties, BINA evolved some varieties such as Eratom-24, BINAshail, BINA dhan-4, BINAdhan-5 etc. and BAU evolved two varieties such as Bau-2, BAU-63(Vorosha). Only Haridhan was evolved in farmer's field. It has no scientific proof to be claimed as one of the HYV of rice. However, media took part in its publicity. Haripad Kapali developer got national award. But it is to be remembered

that innovation generation consists of basic research, applied research, multiplications testing and a number of trials. So, it could be concluded that Haridhan needs more research in the research station.

#### 4.1.2 Insect resistance

Insect resistance quality of Haridhan was determined by the degree of perception of Haridhan growers as very high resistant, high resistant, medium resistant and low resistant and scored as 4, 3, 2 and 1 accordingly. The observed insect resistant score ranged from 1 to 4 having an average of 2.55 with a standard deviation .678 against the possible range of 1 to 4. According to the perception of Haridhan growers the insect resistance scores were classified into three categories low resistance (1), medium resistance (2), and high resistance (3-4). The distribution of number and percentage of Haridhan growers according to insect resistant perception is shown in Table 4.2

**Table 4.2 Number and percentage distribution of Haridhan growers according to insect resistance perception**

Insect resistance perception Categories	Number	Percent	Mean	SD
Low (score 1)	6	6.9	2.55	0.678
Medium (score 2)	30	34.5		
High (score 3-4)	51	58.6		
Total	87	100		

Data presented in the table 4.2 reveal that majority (58.6) of the respondents perceived Haridhan as High insect resistant compared to 34.5 percent perceived as

medium resistant and 6.9 percent perceived as low resistant. It is very important to note that an overwhelming majority (93.1%) of the respondents perceived Haridhan as generally rice is susceptible to a number of insects such as rice hispa, stem borer, rice bug, caterpillar etc. Due to its short duration (95-110 days) characteristics insect have to chance to infest Haridhan field. Although in yield respect Haridhan is not primitives but in respect of insect resistance farmers of Jhenaidah preferred to adopt it. Haridhan growers could save money to be spent for use of insecticides.

#### **4.1.3 Disease resistance**

Disease resistance quality was determined by degree of perception of Haridhan growers as very high resistant, high resistant, medium resistant and low resistant and score as 4, 3, 2, 1 accordingly. The observed disease resistance score ranged from 2 to 4 having an average of 3.59 with a standard deviation 0.561 against the possible range of 1 to 4. According to the perception of Haridhan growers the disease resistance score was categorized into three such as low resistant (score up to 2), medium resistant (score 3) and high resistant (score 4). The distribution of number and percentage of respondents according to disease resistant perception is shown in Table 4.3



**Table 4.3 Number and percentage distribution of Haridhan growers according to disease resistance perception**

Disease resistance perception Categories	Number	Percent	Mean	SD
Low (score up to 2)	3	3.4	3.59	0.561
Medium (score 3)	30	34.5		
High (score 4)	54	62.1		
Total	87	100		

Data presented in the table 4.3 reveal that about two-third (62.1%) respondents perceived Haridhan as high disease resistant compared to 34.5 percent as medium resistant and only 3.4 percent as low resistant .That is about cent percent of the respondent had perception regarding Haridhan that it was very highly disease resistant .It is to be remembered that many insects spread viral and bacterial diseases. As the Haridhan was found to be insect resistant it would not be exaggeration to think that it was also disease resistant. Disease resistance variety of rice is rare in Bangladesh. It is a most crucial influencing factor for adoption of Haridhan. Every year rice production is damaged by disease infestation. As the Haridhan was found to be disease resistance its diffusion should occur in other parts of the country.

#### **4.1.4 Drought Tolerance**

Drought resistance quality was determined by degree of perception of Haridhan growers as very high tolerance, high tolerant, medium tolerance and low tolerance and score as 4, 3, 2, 1 accordingly. The observed drought tolerance score ranged

from 2 to 4 having an average of 2.80 with a standard deviation 0.626 against the possible range of 1 to 4. According to the perception of Haridhan growers the drought tolerance score was categorized into three such as low tolerance (score up to 2), medium tolerance (score 3) and high tolerance (score 4). The distribution of number and percentage of respondents according to drought tolerance perception is shown in Table 4.4

**Table 4.4 Number and percentage distribution of Haridhan growers according to drought tolerance perception**

<b>Disease tolerance perception Categories</b>	<b>Number</b>	<b>Percent</b>	<b>Mean</b>	<b>SD</b>
Low (score up to 2)	27	31	2.80	0.626
Medium (score 3)	50	57.5		
High (score 4)	10	11.5		
Total	87	100		

Data presented in the table 4.4 reveal that majority (57.5) of the respondents perceived Haridhan as medium tolerant compared to 31 percent perceived as low tolerant and 11.5 percent perceived as high tolerant. Drought tolerant variety of rice is rare in Bangladesh. It is a most crucial influencing factor for adoption of Haridhan. Every year rice production is damaged by the bad effect of drought in same regions specially in Barind tracts. According to Prothom Alo report, in the last Aman season (2005) farmers of Jhinaidah faced drought problem but they received bumper yield from the Haridhan variety. From the above findings we can say, the growers were encouraged to adopt Haridhan for its drought tolerance



capability As the Haridhan was found to be drought tolerance its diffusion should occur in other parts of the country.

#### 4.1.5 Taste

Taste quality of Haridhan was determined by degree of perception of Haridhan growers as very high delicious, high delicious, medium delicious and low delicious and scored as 4, 3, 2, 1 respectively. The observed taste score ranged from 1 to 3 having an average of 2.43 with a standard deviation 0.520 against the possible range of 1 to 4. According to the perception of Haridhan growers the taste score was categorized into three such as low (score 1), medium (score 2) and high (score 3). The distribution of number and percentage of respondents according to taste perception is shown in Table 4.5

**Table 4.5 Number and percentage distribution of Haridhan growers according to taste perception**

Taste perception Categories	Number	Percent	Mean	SD
Low (score 1)	1	1.1	2.43	0.520
Medium (score 2)	48	55.2		
High (score 3)	38	43.7		
Total	87	100		

Data presented in the table 4.5 reveal that majority (55.2) of the respondents perceived Haridhan as medium delicious compared to 43.7 percent perceived as high delicious and 1.1 percent perceived as low delicious. Good taste is one of the indicators of high market price and demand that naturally encourages farmers to



adopt this variety. In spite of its grain is coarse, its taste is very fine. So, it is a most crucial influencing factor for adoption of Haridhan.

#### 4.1.6 Straw Yield

Straw yield of Haridhan was determined by the degree of perception of Haridhan growers as very high yield, high yield, medium yield and all most same yield and scored 4, 3, 2 and 1 accordingly. The observed score ranged from 3 to 4, the average being 3.92 with standard deviation 0.274 against the possible range 1-4. According to the perception of Haridhan growers the straw yield score of Haridhan was classified into three categories low (score 1-2), medium (score-3) and high (score 4). The distribution of respondents according to their straw yield perception is shown in Table 4.6

**Table 4.6 Number and percentage distribution of the respondents according to straw yield perception**

Straw yield perception Categories	Number	Percent	Mean	SD
Low (score 1- 2)	-	-	3.92	0.274
Medium (score 3)	7	8.0		
High (score 4)	80	92.0		
Total	87	100		

Data presented in Table 4.6 reveal that an overwhelming majority (92%) of respondents perceived Haridhan as high straw yield category, compared to only 8 percent fell as medium yield category. No Haridhan growers perceived Haridhan as a low straw yield cultivar. It revealed from the findings that 100% Haridhan

Growers Perceived Haridhan given straw yield range from medium (8%) to high (92%) generally if straw yield is high grain yield is supposed to be lower to same extent. However, Haridhan growers were seen happy with the straw yield although they had a bit lower production. In fact in Bangladesh straw of rice is used for many fold purposes. According to the perception of Haridhan growers it can be said that the straw yield of Haridhan may be encouraged the growers to adopt it.

#### **4.1.7. Fertilizer requirement**

Fertilizer application is a major of rice cultivation practices. More yield of demands high dose of fertilizer application but Bangladesh cannot produce required amount of fertilizer internationally price of fertilizer is going up everyday .In the situation farmers if avail any rice variety that requires low dose of fertilizers will be adopted with no hesitation. Haridhan is that kind of rice .Observing its requirement of low dose of fertilizers farmers adopted Haridhan spontaneously

Fertilizer requirement was determined by degree of perception of Haridhan growers with regard to low dose, medium dose, high dose and very high dose, medium and high. Farmers' perceived response was scored as 4, 3, 2 and 1 for low, medium, high and very high respectively. The observed score ranged from 1 to 4 having an average of 2.59 with a standard deviation 0.540 against the possible range of 1 to 4. According to the perception of Haridhan growers the fertilizer requirement score was categorized into three such as low dose (score 1-2), medium dose (score 3) and high dose (score 4). The distribution of number and percentage of respondents according to fertilizer requirement perception is shown in Table 4.7



**Table 4.7 Number and percentage distribution of Haridhan growers according to fertilizer requirement perception**

Fertilizer requirement perception Categories	Number	Percent	Mean	SD
Low dose(score 1- 2)	36	41.4	2.59	0.540
Medium dose(score 3)	50	57.5		
High dose (score 4)	1	1.1		
Total	87	100		

Data presented in the table 4.7 reveal that majority (57.5) of the respondents perceived Haridhan required as medium dose of fertilizer less than high dose compared to 41.4 percent perceived as low dose and 1.1 percent perceived as high dose requirement. Fertilizer requirement being an important factor for the rice cultivation practices farmers have to spend much money for this purpose. Data from the table 4.7 ensure that almost all the (98.9%) Haridhan growers revealed that it required low to medium dose of fertilizer so reasonably Haridhan became popular in the local area in a short period of time.

#### **4.2 Extent of Adoption of Haridhan**

Adoption is the decision to use the innovation according to the capacity of its potential adopters. After completion of a lengthy process and with the intervention of diffusion agency a particular innovation spreads in a particular region. Adoption itself associated with the pre-planned development communication process which is determined by the diffusion agency. In diffusion of Haridhan no diffusion agency came to intervene, no scientist came to justify its potentiality. However, Haridhan



spread among the farmers of Jhenaidah district as a natural phenomenon. So, its rate of adoption might be slow. Still now no adoption research was carried out except this study.

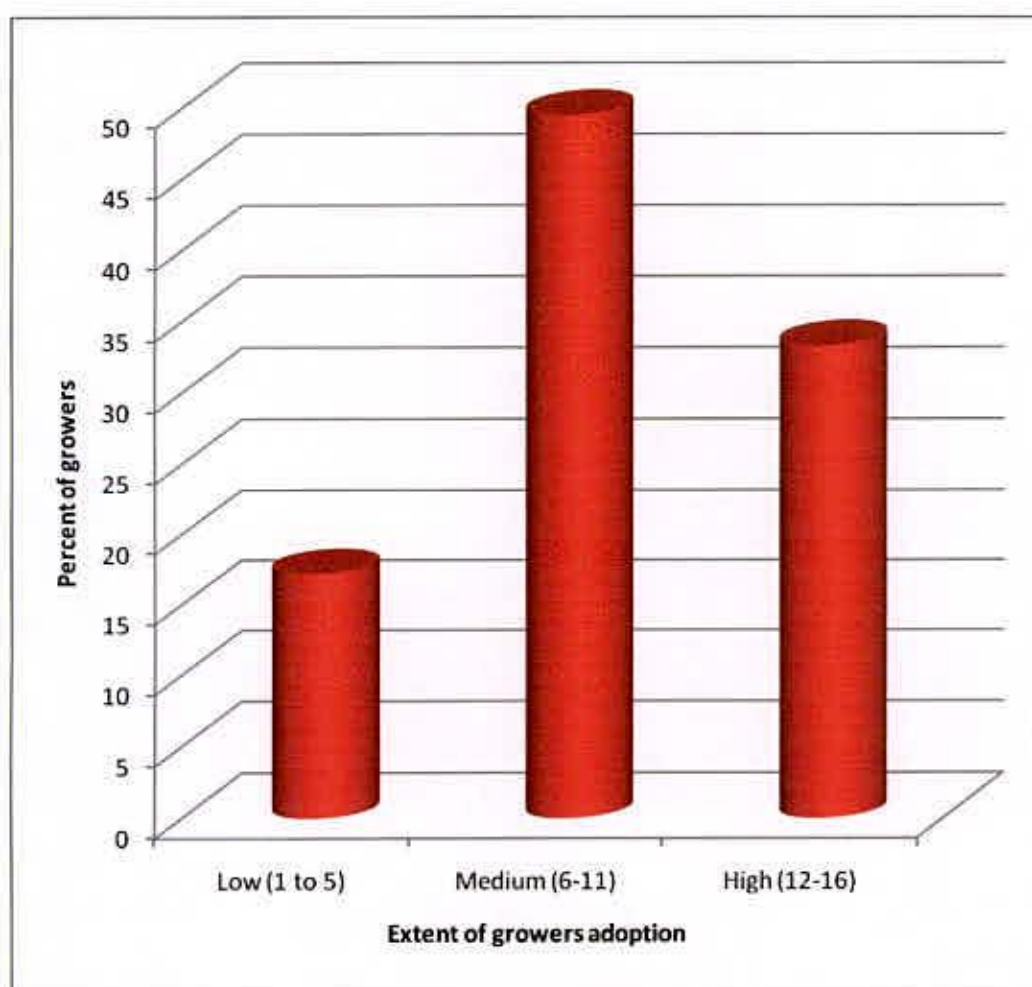
Adoption of Haridhan was measured by using the formula of area sub score and time sub score. To calculate the extent of adoption of Haridhan the weightage of area sub score was multiplied by time sub score (already mentioned in methodology). The extent of adoption score of Haridhan ranged from 2 to 16 against the possible range 0 to 16. The average being 8.83 with a standard deviation of 3.904. Based on the adoption scores, the respondents were classified into three categories namely low adoption that scored 1-5, medium adoption that scored 6-11 and high adoption that scored 12-16. The distribution of number and percentage of Haridhan adopters is shown in Table 4.8.

**Table 4.8 Number and percentage distribution of adopters of Haridhan according to their extent of adoption**

Adoption Categories	Number	Percent	Mean	SD
Low adoption (score 1- 5)	15	17.2	8.33	3.904
Medium adoption (score 6-11)	43	49.5		
High adoption (score 12-16)	29	33.3		
Total	87	100		

Data contained in Table 4.8 revealed that almost one half (49.5%) of the respondents had medium adoption compared to 17.2 per cent had low adoption and 33.3 per cent high adoption. However an overwhelming majority (82.8) had medium to high adoption.

The rate of adoption within a short adoption period is a good signal for Haridhan cultivation in Jhenaidah district. Question may arise why farmers adopted Haridhan so quickly? There are many assumptions such as (i) Haridhan developed by local farmers. With due honour to local innovator farmers adopted it, (ii) Haridhan has some comprehensive relative advantages such as insect resistance, disease resistance, drought resistance etc. So, keeping in view prestige and dignity and justifying the relative advantages local farmers adopted Haridhan and as a result it spread so quickly. For clarity of understanding a bar diagram has been presented in Figure 4.1



**Figure 4.1** Extent of adoption of Haridhan by the growers

### 4.3 Relationships between the selected attributes of Haridhan and its adoption by the farmers

This section deals with the relationship of the seven selected attributes of Haridhan and its adoption by the farmers. The selected attributes of Haridhan constituted independent variables and the dependent variable is its adoption by the growers. The purpose of this section is examining the relationships of each of the independent variables with dependent variable.

The level of measurement of some variables was in ordinal level. Therefore, it was decided to run Spearman rank correlation 'r' has been used to test the hypothesis concerning the relationship between two variables. Five percent level of significance was used as the basis for rejection of null hypothesis. The summary of the results of the correlation co-efficient between the selected attributes of Haridhan and its adoption by the growers have been presented in Table 4.9. The correlation matrix has been presented in *Appendix-C*

**Table 4.9 Correlation co-efficient between the selected attributes of Haridhan and its adoption by the growers**

Dependent variable	Independent variable	Computed value of 'r'	Table value of 'r' at 100 degree of Freedom	
			0.05	0.01
Adoption of Haridhan	Yield	0.194 <sup>NS</sup>	0.210	0.276
	Insect resistance	0.376**		
	Disease resistance	0.060 <sup>NS</sup>		
	Drought resistance	0.379**		
	Taste	-0.060 <sup>NS</sup>		
	Straw yield	0.067 <sup>NS</sup>		
	Fertilizer requirement	0.184 <sup>NS</sup>		

NS = Non significant

\* = Significant at 5 percent (0.05) level

\*\* = Significant at 1 percent (0.01) level



#### **4.3.1 Relationship between the yield of Haridhan and its adoption by the growers**

The relationship between the yield of Haridhan and its adoption was measured by testing the null hypothesis; "there is no relationship between the yield of Haridhan and its adoption." The computed value of correlation was 0.194 as shown in Table 4.9. Following observations were made regarding the relationship between two variables under consideration.

- a. The relationship showed a positive trend
- b. The computed value of 'r' (0.194) was found to be smaller than the tabulated value ( $r = 0.210$ ) with 85 degrees of freedom at 0.05 level of probability.

Based on the above finding, the null hypothesis could not be rejected and hence, the researcher concluded that yield of Haridhan had no significant relationship with its adoption by the growers.

#### **4.3.2 Relationship between The pest resistance power of Haridhan and its adoption by the growers**

The relationship between the pest resistance power of Haridhan and its adoption was measured by testing the null hypothesis, "There is no relationship between the pest resistance power of Haridhan and its adoption." The computed value of correlation was to be found 0.376 as shown in Table 4.13. Following observations were made regarding the relationship between these two variables under consideration.

- a. The relationship showed a positive trend.

- b. The computed value of 'r' (0.376) was found to be greater than the tabulated value ( $r = 0.276$ ) with 85 degrees of freedom at 0.01 level of probability.

Based on the above finding, the null hypothesis was rejected and hence the researcher concluded that the pest resistant power of Haridhan had positive significant relationship with its adoption by the growers. This finding indicates that pest resistance power of Haridhan promotes adoption among growers due to high market price of insecticides.

#### **4.3.3 Relationship between the disease resistance power of Haridhan and its adoption by the growers**

The relationship between the disease resistant power of Haridhan and its adoption was measured by testing the null hypothesis; "there is no relationship between the disease resistance power of Haridhan and its adoption." The computed value of correlation was 0.060 as shown in Table 4.9. Following observations were made regarding the relationship between two variables under consideration.

- a. The relationship showed a positive trend
- b. The computed value of 'r' (0.060) was found to be smaller than the tabulated value ( $r = 0.210$ ) with 85 degrees of freedom at 0.05 level of probability.

Based on the above finding, the null hypothesis could not be rejected and hence, the researcher concluded that the disease resistance power of Haridhan had no significant relationship with its adoption by the growers. Muttaieb et al (2007) also found the similar findings.

#### **4.3.4 Relationship between the drought resistance power of Haridhan and its adoption by the growers**

The relationship between the drought resistance power of Haridhan and its adoption was measured by testing the null hypothesis, 'There is no relationship between the drought resistance power of Haridhan and its adoption.' The computed value of correlation was to be found 0.204 as shown in Table 4.9. Following observations was made regarding the relationship between these two variables under consideration.

- a. The relationship showed a positive trend.
- b. The computed value of 'r' (0.379) was found to be greater than the tabulated value ('r' = 0.276) with 98 degrees of freedom at 0.01 level of probability.

Based on the above finding the null hypothesis was rejected and hence the researcher concluded that the drought resistance power of Haridhan had positive significant relationship with its adoption by the growers. According to Prothom Alo report, in the last Aman season (2005) Farmers of Jhinaidah faced drought but they received bumper yield from the variety. From above this findings we can say, the growers encourage adopting Haridhan for its drought resistance capability.

#### **4.3.5 Relationship between the taste of Haridhan and its adoption by the growers**

The relationship between the taste of the Haridhan and its adoption was measured by testing the null hypothesis, 'There is no relationship between the taste of Haridhan and its adoption.' The computed value of correlation was to be found -



0.060 as shown in Table 4.9. Following observations was made regarding the relationship between these two variables under consideration.

- a. The relationship showed a negative trend.
- b. The computed value of 'r' (-0.060) was found to be smaller than the tabulated value ('r' = 0.210) with 85 degrees of freedom at 0.05 level of probability.

Based on the above finding the null hypothesis could not be rejected and hence the researcher concluded that the taste of the Haridhan had no significant relationship with its adoption by the growers.

#### **4.3.6 Relationship between the straw yield of Haridhan and its adoption by the growers**

The relationship between the straw yield of Haridhan and its adoption was measured by testing the null hypothesis, 'There is no relationship between the straw yield of Haridhan and its adoption.' The computed value of correlation was to be found 0.067 as shown in Table 4.9. Following observations was made regarding the relationship between these two variables under consideration.

- a. The relationship showed a positive trend.
- b. The computed value of 'r' (0.067) was found to be smaller than the tabulated value ('r' = 0.210) with 85 degrees of freedom at 0.05 level of probability.

Based on the above finding the null hypothesis could not be rejected and hence the researcher concluded that the straw yield of Haridhan had no significant relationship with its adoption by the growers. Though there is no significant

relationship between the straw yield of Haridhan and its adoption but majority of the growers said that the straw of Haridhan is very high. So It may be significant for other area.

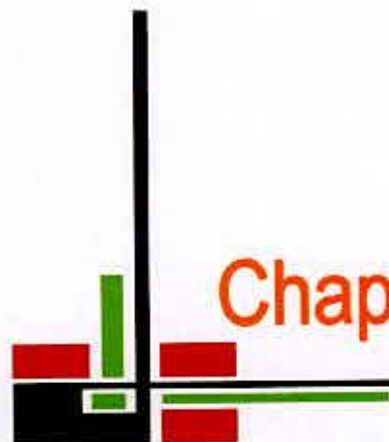
#### **4.3.7 Relationship between the fertilizer requirement of Haridhan cultivation and the adoption of Haridhan by the growers**

The relationship between the fertilizer requirement of Haridhan cultivation and the adoption of Haridhan was measured by testing the null hypothesis, 'There is no relationship between the fertilizer requirement of Haridhan cultivation and the adoption of Haridhan.' The computed value of correlation was to be found 0.184 as shown in Table 4.9. Following observations was made regarding the relationship between these two variables under consideration.

- a. The relationship showed a positive trend.
- b. The computed value of 'r' (0.184) was found to be smaller than the tabulated value ('r' = 0.210) with 85 degrees of freedom at 0.05 level of probability.

Based on the above finding the null hypothesis could not be rejected and hence the researcher concluded that fertilizer requirement of the respondents had no significant relationship with its adoption by the growers.





**Chapter 5**

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**Summary and conclusion**



## CHAPTER 5

### SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

This Chapter deals with the summary of findings, conclusion and recommendations of the study.

#### 5.1 Summary of findings

The summary of the major findings are presented in the following three sub-sections:

##### 5.1.1. Selected attributes of Haridhan

###### **Yield**

The observed score of yield ranged from 1 to 2 against the possible range 1 to 4. The mean and standard deviation of data distribution were found 1.09 and .291. The large proportion (90.8 Percent) of the respondents fell in low category and 9.2 percent fell in medium category while there is no proportion under high category.

###### **Pest resistance**

The observed pest resistance score ranged from 1 to 4 having an average of 2.55 with a standard deviation .678 against the possible range of 1 to 4. The highest percent (58.6) of the responses of the respondents fell in high category while compared to 34.5 percent fell in medium and 6.9 percent fell in low category.

###### **Disease resistance**

The observed pest resistance score ranged from 2 to 4 having an average of 3.59 with a standard deviation .561 against the possible range of 1 to 4. The highest percent (62.1) of the responses of respondents fell in high category while compared to 34.5 percent fell in medium and 3.4 percent fell in low category.

### **Drought resistance**

The observed pest resistance score ranged from 2 to 4 having an average of 2.80 with a standard deviation .626 against the possible range of 1 to 4. The highest percent (57.5) of the responses of respondents fell in medium category while compared to 31 percent fell in low and 11.5 percent fell in high category.

### **Taste**

The observed pest resistance score ranged from 1 to 3 having an average of 2.43 with a standard deviation .520 against the possible range of 1 to 4. The highest percent (55.2) of the responses of the respondents fell in medium category while compared to 43.2 percent fell in high and 1.1 percent fell in low category.

### **Straw Yield**

The observed pest resistance score ranged from 3 to 4 having an average of 3.92 with a standard deviation .274 against the possible range of 1 to 4. The highest percent (92) of the responses of respondents fell in high category while compared to 8 percent fell in medium and there is no proportion fell in low category.

### **Fertilizer Requirement**

The observed pest resistance score ranged from 1 to 4 having an average of 2.59 with a standard deviation .540 against the possible range of 1 to 4. The highest percent (57.5) of the responses of the respondents fell in medium category while compared to 41.4 percent fell in low and 1.1 percent fell in high category.

### **5.1.2 Adoption of Haridhan by the growers**

The observed adoption score ranged from 2 to 16 against the possible range 0 to 16. Based on their adoption scores, the respondents were classified into three categories: 'low adoption' (1-5), 'medium adoption' (6-11) and 'high adoption' (12-16). Data indicates that the majority (49.5 percent) of respondents had medium adoption while 17.2 percent had low adoption and 33.3 percent had high adoption. The mean and standard deviation of data distribution were found 8.33 and 3.904 respectively.

### **5.1.3 Relationship of the selected attributes of Haridhan with its adoption by the growers**

The adoption of Haridhan was the dependent variables of the study. And seven selected attributes of Haridhan were the independent variables of the study. To explore the relationship between dependent and independent variables, Spearman rank correlation ( $r$ ) was computed. The correlation analyses showed that the pest resistance power and drought resistance power of Haridhan had significant positive relationship with its adoption by the growers. The other characteristics are such as yield, disease resistance, taste, straw yield and fertilizer requirement of Haridhan had no significant relationship with its adoption.



## 5.2 Conclusions

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

1. The adoption of Haridhan by the growers was moderate as nearly 49.5 percent of the growers had medium adoption. However to meet the ever demand of food shortage, there is an urgent need to enhance the extent of adoption of Haridhan among the farmers. Particularly both the Government Organization (GO) and Non-Government Organization (NGO) should provide appropriate technical and management related information to the farmers through continued extension and other support services to reap full benefit of this variety.
2. There was highly significant and positive relationship of pest resistance power of Haridhan with its adoption. Therefore, it may be concluded that the pest resistance power of Haridhan influence the growers and enhance its adoption. So, it is an important factor for increasing the adoption of Haridhan by the growers. As the Haridhan was found to be pest resistance its diffusion should occur in other parts of the country.
3. The drought resistance showed a significant positive relationship with its adoption. It is one of the indicators that naturally encourage farmers to adopt this variety. So, the growers became more interested to Haridhan and adopted it.

4. In spite of the highest proportion of the responses of respondents fell in high category; the disease resistance power of Haridhan had no significant relationship with its adoption. So, it may be an important factor for improving the adoption of Haridhan.
5. Yield, taste, fertilizer requirement and straw yield had no significant relationship with its adoption. But any of these are important factor to increase the adoption of Haridhan in other study area because some of the growers are highly influenced to adopt Haridhan by some of these attributes.

### **5.3 Recommendations**

#### **5.3.1 Recommendations for policy implications**

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

1. Bangladesh Rice Research Institute, Agricultural Universities and Extension agencies should accept and recognize new crop variety like Haridhan as well as the technology of farming and crop management from the farmer's field. We hope these agencies will put aside all hesitation and bureaucratic hurdles in the process of accepting and recognizing this rice variety for its wide distribution and mass application among farmers to boost up rice production. It is recommended that DAE and BRRI should come forward to do necessary research and all formalities and take proactive initiatives for the wide spread of this variety.

2. Still now Haridhan is considered as HYV rice only by a handful of farmers of Jhenaidah. But now its benefits can be spread across the country. The farmers of draught prone areas of Bangladesh i.e. North-Western part of Bangladesh and specially the Barind Tracts will find Haridhan a good choice for its drought resistance capability since water is scarce in those areas even in the wet season.
3. In view of the absence of any relationship between the selected attributes Haridhan and its adoption by the farmers, it may be recommended that arrangements should be made by the relevant authorities to increase the adoption of Haridhan through extension contact, training program and so on.
4. To form favourable attitude of farmers toward Haridhan its multilocation trial of different modern rice varieties may be conducted for assessing practical field performance. In this connection multi-location regional field trial can easily be conducted through regional stations of Bangladesh Rice Research Institute (BRRI).
5. Support services for cultivation of Haridhan should be provided by the Department of Agricultural Extension (DAE) as the concerned NGOs are selling Haridhan seeds to farmers so that they confront fewer problems in cultivation. The services may include subsidized rate of Haridhan seed.

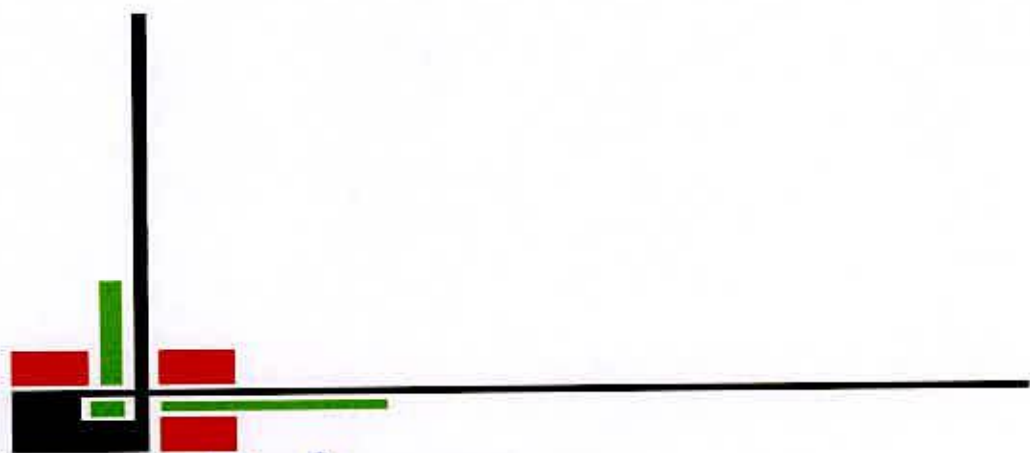




### 5.3.2 Recommendations for further study

A small piece of study as had been conducted can not provide all information for the proper understanding of the farmers towards the Haridhan. Future studies should be undertaken covering more dimensions of adoption of Haridhan. Therefore, the following recommendations were made for further study:

1. This study investigated the relationship of seven attributes of Haridhan (yield, pest resistance, disease resistance, drought resistance, taste, straw yield and fertilizer requirement) with its adoption as the dependent variable. Therefore, it is recommended that further study should be conducted with other independent and dependent variables.
2. In the present study yield, taste, straw yield, fertilizer requirement had no significant relationship with adoption of Haridhan by the growers. In this connection, further verification is necessary.
3. Research should also be undertaken to identify the factors causing hindrance to the high adoption of Haridhan.



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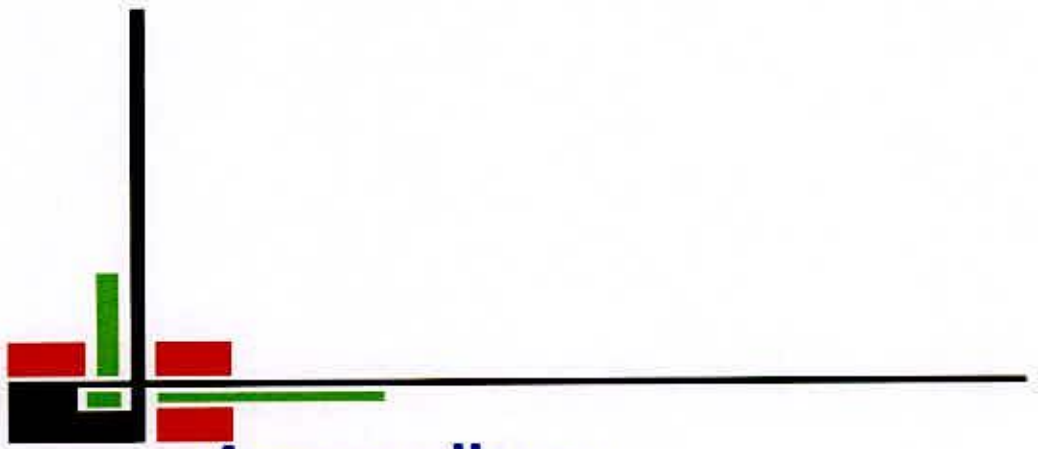
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# Appendices

## APPENDIX- A

English version of the interview schedule  
Department of Agricultural Extension & Information System  
Sher-e -Bangla Agricultural University  
Dhaka -1207

### AN INTERVIEW SCHEDULE FOR COLLECTING DATA FOR A STUDY ENTITLED "ATTRIBUTES INFLUENCING THE ADOPTION OF HARI DHAN BY THE FARMERS OF JHINAIDAH DISTRICT"

Name of the Respondent:.....

Sample No.

Village:.....

Union:.....

Please answer the following questions  
(Provided information will be kept confidential)

1. Please describe your Rice cultivation

Name of the variety	Amount of Land	
	Local unit (Bigha)	Hectare
Cultivate to Haridhan		
Cultivate to others		
Total		

2. How many years you have cultivated Haridhan?

.....Years



3. Do you think the yield of Haridhan compare with traditional variety?

Level of Yield			
Very High(4)	High(3)	Medium High(2)	Almost Same(1)

4. Haridhan's insect infestation compare with traditional variety

Level of Insect Infestation			
Very Low (4)	Low (3)	Medium Low (2)	Almost Same (1)

5. Haridhan's disease infection compare with traditional variety

Level of Disease Infection			
Very Low (4)	Low (3)	Medium Low (2)	Almost Same (1)

6. What do you think about the drought Resistance Power of Haridhan compare with traditional variety?

Level of Drought Resistance			
Very High(4)	High(3)	Medium High(2)	Almost Same(1)

7. What do you think about the taste of Haridhan compared with traditional variety?

Level of taste			
Very High delicious(4)	High delicious(3)	Medium delicious(2)	Low delicious(1)

8. What the amount of Straw yield (per Bigha) do you get from Haridhan compare with traditional variety

Level of straw Yield			
Very High(4)	High(3)	Medium High(2)	Almost Same(1)

9. What the amount of Fertilizer do you use in your rice field (per Bigha) compare with traditional variety?

Level of Fertilizer Requirement			
Low dose (4)	Medium dose (3)	High dose (2)	Very high dose (1)

Thanks For your kind cooperaion

Signature and Date of  
Interviewee

**APPENDIX- B**

Bangla version of the interview schedule

কৃষি সম্প্রসারণ ও ইনফরমেশন সিস্টেম বিভাগ  
শেরেবাংলা কৃষি বিশ্ববিদ্যালয়  
শেরেবাংলা নগর  
ঢাকা-১২০৭।

**ATTRIBUTES INFLUENCING THE ADOPTION OF HARIDHAN BY THE  
FARMERS OF JHINAIDAH DISTRICT**

গবেষণা সম্পর্কিত সাক্ষাৎকার অনুসূচি  
অনুগ্রহ পূর্বক নিচের প্রশ্নগুলির উত্তর দিন

উত্তর দাতার নামঃ

গ্রাম :

ইউনিয়ন :

ক্রমিক নংঃ

১. আপনার ধান চাষের বিবরণ দিনঃ

জাতের নাম	জমির পরিমাণ	
	স্থানীয় একক(বিঘা)	হেক্টর
হরিধান		
অন্যান্য		
মোট		

২. আপনি কত বৎসর ধরে হরিধান চাষ করছেন ?

..... বৎসর



(୧) ଇକକ ହୁକ୍ତ ସାତ	(୨) ଛାତ୍ର ଗ୍ରାହଣଗ୍ରାହୀ	(୩) ଛାତ୍ର	(୪) ଛାତ୍ର କଲୋଚ
ଆମ ଛାତ୍ରମାନଙ୍କ			

୭. ଉପରୋକ୍ତ ସୂଚୀରେ ଉଲ୍ଲେଖ କରାଯାଇଥିବା ଛାତ୍ରମାନଙ୍କର ନାମ ଓ ପଠାଯାଉଥିବା ବିଭାଗର ନାମ ଉଲ୍ଲେଖ କରନ୍ତୁ ।

(୧) ଇକକ ହୁକ୍ତ ସାତ	(୨) ଇକ ଗ୍ରାହଣଗ୍ରାହୀ	(୩) ଇକ	(୪) ଇକ କଲୋଚ
ଆମ ଛାତ୍ରମାନଙ୍କର ପଠାଯାଉଥିବା			

୮. ଉପରୋକ୍ତ ସୂଚୀରେ ଉଲ୍ଲେଖ କରାଯାଇଥିବା ଛାତ୍ରମାନଙ୍କର ନାମ ଓ ପଠାଯାଉଥିବା ବିଭାଗର ନାମ ଉଲ୍ଲେଖ କରନ୍ତୁ ।

(୧) ଇକକ ହୁକ୍ତ ସାତ	(୨) ଇକ ଗ୍ରାହଣଗ୍ରାହୀ	(୩) ଇକ	(୪) ଇକ କଲୋଚ
ଆମ ଛାତ୍ରମାନଙ୍କର ପଠାଯାଉଥିବା			

୯. ଉପରୋକ୍ତ ସୂଚୀରେ ଉଲ୍ଲେଖ କରାଯାଇଥିବା ଛାତ୍ରମାନଙ୍କର ନାମ ଓ ପଠାଯାଉଥିବା ବିଭାଗର ନାମ ଉଲ୍ଲେଖ କରନ୍ତୁ ।

(୧) ଇକକ ହୁକ୍ତ ସାତ	(୨) ଛାତ୍ର ଗ୍ରାହଣଗ୍ରାହୀ	(୩) ଛାତ୍ର	(୪) ଛାତ୍ର କଲୋଚ
ଆମ ଛାତ୍ରମାନଙ୍କ			

୧୦. ଉପରୋକ୍ତ ସୂଚୀରେ ଉଲ୍ଲେଖ କରାଯାଇଥିବା ଛାତ୍ରମାନଙ୍କର ନାମ ଓ ପଠାଯାଉଥିବା ବିଭାଗର ନାମ ଉଲ୍ଲେଖ କରନ୍ତୁ ।



### APPENDIX-C

CORRELATION MATRIX AMONG THE VARIABLES OF THE STUDY (N=87)

VARIABLE	X <sub>1</sub>	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>	X <sub>5</sub>	X <sub>6</sub>	X <sub>7</sub>	Y
X <sub>1</sub>	1							
X <sub>2</sub>	.142 <sup>NS</sup>	1						
X <sub>3</sub>	-.067 <sup>NS</sup>	.277(**)	1					
X <sub>4</sub>	.214(*)	.148 <sup>NS</sup>	.044 <sup>NS</sup>	1				
X <sub>5</sub>	-.158 <sup>NS</sup>	.085 <sup>NS</sup>	.022 <sup>NS</sup>	.046 <sup>NS</sup>	1			
X <sub>6</sub>	-.052 <sup>NS</sup>	.224(*)	.104 <sup>NS</sup>	.180 <sup>NS</sup>	.168 <sup>NS</sup>	1		
X <sub>7</sub>	-.244(*)	.100 <sup>NS</sup>	.182 <sup>NS</sup>	.212(*)	.185 <sup>NS</sup>	.093 <sup>NS</sup>	1	
Y	.194 <sup>NS</sup>	.376(**)	.060 <sup>NS</sup>	.379(**)	-.066 <sup>NS</sup>	.067 <sup>NS</sup>	.184 <sup>NS</sup>	1

NS = correlation is not significant

\* = Correlation is significant at the 0.05 level

Table value of 'r' at .01=.276 and .05=.210 with 85 d.f.

\*\*= Correlation is significant at the 0.01 level

X<sub>1</sub> = YIELD

X<sub>5</sub> = TASTE

X<sub>2</sub> = INSECT RESISTANCE

X<sub>6</sub> = STRAW YIELD

X<sub>3</sub> = DISEASE RESISTANCE

X<sub>7</sub> = FERTILIZER REQUIREMENT

X<sub>4</sub> = DROUGHT RESISTANCE

Y = ADOPTION OF HARIDHAN

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