ADOPTION OF BRRI DHAN 74 PRODUCTION TECHNOLOGIES BY THE FARMERS OF BRAHMANPARA UPAZILA UNDER CUMILLA DISTRICT

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CERTIFICATE

This is to certify that the thesis entitled ***"ADOPTION OF BRRI DHAN 74 PRODUCTION TECHNOLOGIES BY THE FARMERS OF BRAHMANPARA UPAZILA UNDER CUMILLA DISTRICT"*** *submitted to the department of Agricultural Extension and Information System, Faculty of Agriculture, Sher-e-Bangla Agricultural University, Sher-e-Bangla Nagar, Dhaka in partial fulfillment of the requirements for the degree of Master of Science (M.S.) in Agricultural Extension, embodies the result of a piece of bona fide research work carried out by* ***SUFIA AKTER, Registration No. 19-10120*** *under my supervision and guidance. No part of the thesis has been submitted for any other degree or diploma.*

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

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DEDICATED
TO
MY BELOVED
PARENTS

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ABBREVIATIONS

β	Multiple Regression
BBS	Bangladesh Bureau of Statistics
GDP	Gross Domestic Product
DAE	Department of Agricultural Extension
Et al.	All Others
USA	United Nations of America
FAO	Food and Agriculture Organization
HYV	High Yielding Varieties
GoB	Government of Bangladesh
MoA	Ministry of Agriculture
UNO	The United Nations
MoYS	Ministry of Youth and Sports
MoP	Muriate of Potash
TSP	Triple Super Phosphate
IPM	Integrated Pest Management
BINA	Bangladesh Institute of Nuclear Agriculture
BADC	Bangladesh Agricultural Development Corporation
STW	Shallow Tube-well
DTW	Deep Tube-well
SAAO	Sub Assistant Agriculture Officer
SAU	Sher-e-Bangla Agricultural University
SPSS	Statistical Package for Social Sciences

ADOPTION OF BRRI DHAN 74 PRODUCTION TECHNOLOGIES BY THE FARMERS OF BRAHMANPARA UPAZILA UNDER CUMILLA DISTRICT

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ABSTRACT

The purposes of the study were to determine the socioeconomic characteristics of the BRRI dhan74 growers; to determine the extent of adoption of BRRI dhan 74 production technologies and to explore the contribution of the factors that significantly influences adoption of BRRI dhan 74 production technologies by the farmers. The study was undertaken purposively in Brahmanpara upazila under Cumilla district. Validated and well-structured interview schedule was used to collect data from 121 BRRI dhan 74 growers during 15th July, 2021 to 20 August, 2021. Descriptive statistics, multiple regressions were used for analysis. Above half (57.02%) of the farmers had medium adoption of BRRI dhan 74 production technologies while 15.70 percent and 27.28 percent of the farmers had high and low adoption of BRRI dhan 74 production, respectively. Among 12 selected characteristics of the farmers five characteristics namely- education, experience in rice farming, annual family income, training on BRRI dhan 74 cultivation and media contact of the respondents had significant positive contribution to their adoption of BRRI dhan74 production technologies. The rest 7 characteristics namely, age, farm size, family size, land under BRRI dhan 74 production, experience in BRRI dhan 74 production, income from BRRI dhan 74 cultivation and organizational participation had no significant contribution with their adoption of BRRI dhan74 production technologies.

CHAPTER I
INTRODUCTION

1.1 General Background of the Study

Bangladesh is an agrarian country; about 76% of the people live in rural areas, and 47.5% of the total manpower is involved in agriculture. In Bangladesh, agriculture contributes 13.10% of the gross domestic product (GDP) of the country in the year of 2020-2021 (BEC, 2021). Bangladesh has a long history of rice cultivation. Rice is grown throughout the country except in the southeastern hilly areas. The agroclimatic conditions of the country are suitable for growing rice year-round. However, the national average of rice yield is much lower (2.94 t/ha) than that of other rice-growing countries (BBS, 2019). Rice is the staple food for about 166 million people of the country. The population growth rate is 1.36 percent per year, and if the population increases at this rate, the total population will reach 238 million by 2050. An increase in total rice production is required to feed this ever-increasing population. At the same time, the total cultivable land is decreasing more than 1% per year owing to the construction of industries, factories, houses, and highways. On the other hand, due to urbanization, food habits tend to be changed demanding the cultivation of new crops that should share land used for rice cultivation. Therefore, the modern varieties of rice have the capacity to contribute to increase the yield per unit area. Among the modern varieties, BRRI dhan74 is tend to have the capacity to increase rice production in a sustainable manner for the food and nutritional security of this highly populated country.

There are three rice-growing seasons in Bangladesh: Aus, Aman, and Boro. Aus is the pre-monsoon upland rice growing season under rain fed conditions. Boro is the dry-season irrigated rice planted from December to early February and harvested between April and June. Earlier, Boro was grown in the very low-lying areas with residual water from the wet season and irrigated manually

using surface water in times of water shortage (Fujita, 2010). Such traditional boro rice was transplanted after the recession of floodwater in November and harvested from April to May. In the mid-1960s, the modern high yielding rice variety IR-8 was introduced in Bangladesh agriculture, primarily for Boro using irrigation. Then, beginning in 1970, another International Rice Research Institute (IRRI) bred variety IR-20 was introduced to farmers for the Aman season. Since 1973, the Bangladesh Rice Research Institute (BRRI), in partnership with IRRI, has been engaged in adaptive research to evaluate elite genetic lines under the IRRI-managed International Network for Genetic Evaluation of Rice (INGER). Under the brand name BR, and later BRRI dhan, it has released varieties that suit the agro-ecological conditions in Bangladesh (Hossain *et al.*, 2013). Many IRRI lines were well suited in Bangladesh for the Boro season, such as BR1, BR3, BR14, BRRI dhan 28, BRRI dhan 29 and BRRI dhan 74.

The development of groundwater irrigation system by tube wells accelerated, the rapid installation of shallow tube wells throughout the 1980s boosted the cropped area and yield of dry-season Boro rice dramatically (Fujita, 2010). With the introduction of ground water irrigation systems and the incorporation of modern high-yielding varieties, dry-season Boro rice gained popularity. The rice cropping pattern of Bangladesh has changed-areas once occupied by the rainfed Aus gradually shifted to Boro cultivation. As a result, the contribution from each season also changed-Aman rice previously contributed a major portion of total rice, but Boro is now the major contributor to total rice production in the country, despite Aman coverage area being greater. Aus, Aman, and Boro rice were recently reported to account for 7%, 38%, and 55%, respectively, of the total rice production in Bangladesh (Risingbd, 2014). In the year 2018-2019, rice production was 43.3 million ton (BBS, 2020). Bangladesh has made notable progress in sustaining commendable growth in rice production, and this growth in production has originated mostly from the shift from low-yielding traditional to high-yielding modern varieties when irrigation

facilities were developed (Hossain, 2006). Another factor contributing to the increase total rice production by irrigation and modern rice varieties such as BRRI dhan74 is the key to change the rural economy.

Although Bangladesh has an agrarian economy, about 89% of total farm-holdings are below 2.49 acres in size (Kashem, 2013). Socioeconomic factors, such as the predominance of small and marginal farmers and tenancy cultivation in agrarian structure, did not impede the adoption of modern rice varieties in Bangladesh (Mandal, 1980). Moreover, the major constraints to the adoption of modern rice varieties were in fact logistic factors (Hossain, 2006).

History proves that the logical development (when rehearsed by expansive number of rice cultivators) decisively affect rice generation in nations like Japan, the Philippines and Indonesia. It is likely that the farmers of Bangladesh will create comparable outcomes on the off chance that they receive modem innovations and utilize sufficient and gainful info on their territories. It is along these lines, vital that the idea and advantages of modem advances ought to be scattered to the farmers in persuading and appealing way, so that agriculturist reaction rapidly to receive those advances. This is without a doubt an educative process and, concerned for the most part with expanding farming generation and enhancing expectations for everyday comforts of farmers. The legislature has taken another rural augmentation strategy to achieve the craved objective. An individual more often doesn't receive another innovation unless he finds the advantage of it by himself. Regardless of the possibility that he is persuaded about its advantage still he may not utilize the same due to absence of money related capacity. Now and again, he may have intended to utilize the innovation however his social standards and conventions does not urge him to utilize the same for prestigious elements. All these identity socio-economy and mental elements take a shot at a person when he is gone up against with another circumstance or with a changed program.

Cumilla locale is considered as surplus rice growing zone of the nation, where BRRI dhan 74 was a noteworthy endeavor. Brahmanpara upazila range, in this manner, considered a most reasonable area to concentrate the marvels of selection of BRRI dhan 74 innovations by the rice cultivators. Contemplates on individual, gathering and society uncovered that acknowledgment of modem innovations is restrictive upon many variables. Some of these are social, individual, practical and situational components. While directing any review on the reception of modem advancements, these elements should be considered. An extremely couple of past research work attempted to discover the above certainties. Subsequently, the present examine felt need to lead an exploration entitled “Adoption of BRRI dhan 74 production technologies by the farmers in Brahmanpara upazila under Cumilla District.”

1.2 Statement of the Problem

The achievement of any innovation relies on its dissemination among the potential clients, which eventually is measured by the level of selection of that innovation. Whenever advancement is acquainted with the farmer, it might be promptly or somewhat or completely acknowledged and it might likewise happen that the reception of advancement is stopped or completely ceased.

These happenings are unquestionably because of various variables. Selection of BRRI dhan 74 innovations are impacted by the farmer's statistic and financial position. A comprehension about a similar will be helpful to the specialists, organizers and augmentation specialists in doing exploration, arranging and execution of expansion projects for upgrading adoption of BRRI dhan 74 production technologies. The motivation behind this review along these lines was to investigate the connections between various qualities of the farmers and their selection of BRRI dhan 74 production. This was finished by looking for answers to the accompanying queries:

i. What are the attributes of BRRI dhan 74 producers?
ii. To what extent the BRRI dhan 74 production technologies were adopted by the farmers?
iii. What personal and socio-economic characteristics influence farmers to adopt BRRI dhan 74 production?
iv. To what extent of the selected characteristics of farmers contribute to the adoption of BRRI dhan74 production technologies?

The above-mentioned questions obviously impel the researcher for conducting the present research entitled "Adoption of BRRI dhan 74 production technologies by the farmers in Brahmanpara upazila under Cumilla District".

1.3 Specific Objectives of the Study

i. To determine the socioeconomic characteristics of the BRRI dhan 74 cultivars;
ii. To determine the extent of adoption of BRRI dhan74 production technologies; and
iii. To explore the contribution of the factors that significantly influences adoption of BRRI dhan 74 production technologies by the farmers.

1.4 Justification of the Study

Cumilla district has a rich heritage of the farmers mostly living in hilly areas, except Brahmanpara upazila. This area is suitable for hybrid rice seed production considering following aspects i) temperature, ii) wind follow, iii) sun light, iv) rain fall and v) low storm. In that areas deficit of food grains is a chronic problem as the pressure of population is massive. Limitation of cultivable land and lack of knowledge and skill about selective hybrid rice seed production are the major problem for the farmers. So, to ensure adequate food supply, it is necessary to give thrust to increase food production using BRRI dhan 74 production technologies. Agricultural intensification, to minimize food

shortage and maximize self-sufficiency in food production is possible only when Adoption of BRRI dhan 74 production technologies and their application skills create positive impact on the behavior of ultimate users.

Several research institutes have developed quite a good number of modern agricultural technologies but the farmers have so far adopted a few of them. Technical, biological, environmental and socio-economic barriers are the main hindrances of technology transfer and adoption of hybrid rice seed production technologies. Selected BRRI dhan 74 production technologies must be simple, demand driven, locally available, economically feasible and socially acceptable to bring desirable changes in attitude of the farmers for their adoption.

It is obviously true that farmers are the key elements of adoption of BRRI dhan 74 technologies. At present, there is a lack of adequate understanding as to how the characteristics of the farmers influence their adoption of hybrid rice seed cultivation technologies. These facts indicate the need for an investigation to ascertain the relationships of the characteristics of the farmers with their adoption of BRRI dhan 74 production technologies. Findings of this study, therefore, would be helpful to the planners and extension personnel in planning and execution of programs for enhancing the rice production yield.

1.5 Assumptions of the Study

In this study, the researcher had the following assumptions in mind while carrying out the study:

1. The farmers included in the sample were competent to furnish proper responses to the items included in the interview schedule.

2. The researcher who also acted as the interviewer was well adjusted to the socio-cultural environment of the study area. The researcher collected data with utmost care and can be treated as reliable.

3. The responses furnished by the respondents were reliable and they truly expressed their opinion on adoption of BRRI dhan 74 production technologies and their selected characteristics.

4. The sample size was representative of the whole families of the study area.

5. The findings of the study would be useful for planning and execution of the programmers in connection with adoption of BRRI dhan 74 production technologies.

6. The measures of the adoption of BRRI dhan74 production technologies by the farmers are normally and independently distributed with their respective means and standard deviation.

7. The adoption of BRRI dhan 74 production technologies by the farmers was linearly related with their selected characteristics.

1.6 Scope of the Study

The findings of the study will particularly be applicable to Brahmanpara upazila under Cumilla district. However, the findings may also be generally applicable to other areas of the district where the social ecosystem is not differing much with those of the study area. Thus, the findings are expected to be useful to the planners for preparation of programmers for rapid adoption of BRRI dhan 74 cultivation technologies by the farmers. The findings may also be helpful to the extension workers of different national building departments / organizations to improve their technique and strategy of action for effective working method with the people to generate rural employment and to improve rural economy. Finally, there is a great scope for investigation on farmers' adoption of BRRI dhan 74 production technologies, because little study was conducted on this so far in greater Cumilla district.

1.7 Limitations of the Study

The present study was undertaken with a view to have an understanding on the level of adoption of BRRI dhan 74 production technologies by the farmers of Brahmanpara upazila under Cumilla district. In order to manage the handle, the research, it became necessary to impose some limitations on certain aspects of the study. Considering time, money and other necessary resources available to the researcher, the following limitations had been observed throughout the study:

1. The study was confined to villages of Brahmanpara upazila under Cumilla district.
2. Eight (8) BRRI dhan 74 production technologies were selected to examine the extent of adoption among the rice growers of farmers of Brahmanpara upazila.
3. Only the farmers who cultivated BRRI dhan 74 were selected for this study.
4. There are many attributers or characteristics of the growers that always vary but only twelve (12) 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 farmers from their memory during interview.
6. Population for the present study was kept confined within the heads of farm families in the study area, because they were the decision makers in their respective rice cultivation technologies.

1.8 Definition of the Terms

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

Age: Age of the respondent was defined as the period of time in actual years from his birth up to the time of interviewing.

Education: Education referred to the development of desirable Knowledge, skill and attitude in the individual through reading, writing and other related activities. It was measured in terms of actual grades or class passed by a respondent.

Farm size: It referred to the total area on which a farmers family carries on farming operation. The area is estimated in terms of full benefit to the farmers family.

Family size: Family size of sugarcane growers refers to the actual number of members in this family.

Experience in rice production: Experience as a general concept comprises knowledge or skill of something or some event gained through involvement in or exposure to that thing or event. Experience refers to the nature of the events someone or something has undergone. Experience is what is happening to use all the time-as long we exist. However, in this study, it was considered as the year of starting from first rice production till the year of data collection.

Annual Family Income: The term annual family income refers to the annual gross income or total earning of a respondent himself and the members of his family from agriculture, service, business and other sources during a year. It was expressed in taka. However, a unit scores of one (1) was assigned for each thousand-taka income.

Training received: It referred to the total number of days that a respondent received training in his entire life from different organization under different training programs.

Extension contact: It refers to the extent of contact with various communication media by the farmers in receiving agricultural information.

Improved Seed: Improved seed means standardized quality seed, which possesses the quality of the varietal purity, germination capacity, physical purity, optimum moisture content, optimum size and shape, healthy and vigorous.

Technology: Technology is a design of instrumental action that reduces the uncertainty in the cause-effect relationship involved in achieving a desired outcome (Rogers, 1995). In other words, technology refers to the combination of knowledge, inputs and managed mental practices, which are used together with productive resources to gain a desired output (ILEIA, 1991: 3).

BRRI dhan 74 production technologies: BRRI dhan 74 production technologies referred to the different kind of technologies which were used for BRRI dhan74 cultivation. In this study, technology was defined as the combination of four practices (i.e. variety, intercropping, recommended dose of urea and use of Sheller) used for BRRI dhan cultivation.

Variable: A general indication in statistical research of characteristic 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).

CHAPTER II
REVIEW OF LITERTURE

Review of literature gives the clear and concise direction to the researcher for conducting the experiment. In this Chapter, review of literatures relevant to the objectives of this study was presented. This was mainly concerned with "adoption of modern technology". There was dearth of literature with respect to research studies on this aspect. So, the directly related literatures were not readily available for this study. Some researchers addressed various aspects of the adoption of technology and its effect on client group and suggesting strategies for their emancipation from socio-economic deprivations. A few of these studies relevant to this research are briefly discussed in this chapter under the following three sections:

Section 1: Concept of Adoption and Agricultural Innovation
Section 2: Factors Related to the Adoption of Agriculture Technology
Section 3: Review of the Studies Concerning the Relationship between Farmers' Characteristics and Their Adoption
Section 4: Conceptual Framework of the Study

2.1 Concept of Adoption and Agricultural Innovation

2.1.1 The concept of adoption

According to Feder *et al.* (1985), adoption is "the degree of use of new innovation in long run equilibrium when a farmer has full information about the new technology and its potential". However, the equilibrium level of adoption will not be achieved if the technology is still being experimented by the farmers. Rogers (1995) defines innovation as an idea, practice, or object that is perceived as new by an individual or other unit of adoption. This wide definition captures any idea or process that is perceived to have utility. Lionberger (1968) and Van den Ban and Hawkins (1996) contended that, adoption is a process, which the decision to adopt usually takes time. People do

not adopt new practice or idea as soon as they hear about it; they may wait several years before trying it. Therefore, the adoption and diffusion of innovation process has been characterized as the acceptance overtime of some specific items by individuals (or adoption unit) linked to specific channels of communication. In this study the word innovation, technology and recommended practices will be used interchangeably.

2.1.2 Technology adoption

The term technology „has been defined in different ways by various authors. Rogers (1995) defined technology as, the design for instrumental action that reduces the uncertainty in the cause-effect relationship involved in achieving a desired outcome. According to Guerin and Guerin (1994), and Rogers (1995), technology is usually comprised of hardware (the object component) and software (idea component) but it can also be made up entirely of information, which is the software component. In contrast, however, Ison and Rusell (2002) defined technology as the application of scientific knowledge to practical tasks. Abara and Singh (1993) in their work on the ethics and biases of technology adoption supported this view. They argued that it is the actual application of knowledge that is termed - technology. According to Phiri (2011), this definition by Ison and Rusell (2002), and Abara and Singh (1993) can be best used to describe those technologies that are comprised of entirely new ideas or information. Feder and Just (1985) on the other hand, described technology as an agricultural practice that is considered new to an area. These agricultural practices (technology) may take the form of new machinery, a high yielding crop, a recommendation for a new method of fertilizer use, or new methods of controlling pests and diseases (Guerin and Guerin, 1994). The word technology and innovation are used synonymously (Rogers, 2003). Various definitions are used in the literature to refer to the ideas, practices or objects perceived to be new by a potential adopter. Guerin and Guerin (1994) support Rogers (2003) definition of innovation as an-idea, practice or object perceived as new by an individual or other unit of adoption. They defined innovation in terms of how it

is viewed by farmers whilst making a decision to adopt or reject it. Therefore, a technology can be a new idea, technique or object. For this study, the term technology will be used from this point onward to also mean innovation. In the following section, the adoption process is reviewed.

2.1.3 Adoption process

Rogers (2003) described adoption as the decision by an individual to use the introduced technology as the best available alternative. Feder *et al.,* (1985) on the other hand defined adoption as-the degree of use of a new technology in the long-run equilibrium when farmers have the full information about the new technology. According to Spence (1994), adoption is not a one-off decision but a process in which the individual finally decides to use the introduced ideas or techniques, after a thorough assessment has been carried out. On the other hand, Guerin and Guerin (1994) defined technology adoption as - the implementation of the already transferred knowledge about a technological innovation and is the end product of the technology transfer is the process. According to Rogers (2003), technology adoption involves a mental process that individual goes through when he or she becomes aware of information regarding the idea that is perceived to be new. The adoption process continues until decisions are made to use or reject the new idea (Rogers, 2003). The five steps in the adoption decision process are conceptualized as knowledge, persuasion, decision, implementation, and confirmation (Rogers, 2003). Spence (1994) on the other hand, indicated awareness, interest, evaluation, trial and adoption, as the stages involved in the adoption process. Although these authors term the adoption process differently, the steps described by them although have some minor differences, are very similar. These two models are compared in the following paragraphs.

The knowledge stage of the model is when an individual becomes aware of the existence of a technology as he/she receives information about it and

understands how it works (Rogers, 2003). However, Spence (1994) described this stage as the awareness stage. Spence further pointed out that the individual may obtain the information through mass media, or from written, spoken or visual material which the individual farmer can access.

The second stage of Rogers (2003) model is persuasion. At this stage, an individual may change his/her attitude towards the technology being introduced. Spence (1994) described this as the interest stage, whilst Pannell *et al.*, (2006) referred to it as the non-trial evaluation phase. During the interest stage, an individual will typically attempt to gain more factual data in order to enable an examination of the innovation at a closer level and to explore it in the context of personal circumstances, past experiences, and prevailing beliefs (Spence, 1994).

The third stage of Rogers (2003) model is decision. During this stage, the individual farmer engages in the activities that will consequently lead to the adoption (or rejection) of the new idea or technique. Spence (1994) considered this to be the evaluation of an innovation. Furthermore, during this process, an individual is attempting to assess whether the advantages will outweigh any perceived disadvantages. Pannell *et al.*, (2006) however, described this stage as the trial evaluation. They stressed that trials contribute substantially to both the decision-making and skill development aspects of the learning process. If small-scale trials are not possible (or not enlightening) for some reason, the opportunities for widespread adoption are greatly diminished. Farmers will be cautious about leaping into full-scale adoption due to the risk that the innovation may prove to be a full-scale failure. Practices which are not trial able may still be adopted, but generally the adoption occurs only after substantial information-seeking, discussion, analysis, and reflection (Pannell *et al.*, 2006).

The fourth stage of Rogers (2003) model is implementation. At this stage, the individual begins to completely apply or use the new idea (Rogers, 1995, 2003). Also, at this stage, farmers often look for more information to find out whether they have made the correct decision by adopting the technology (Van den Ban and Hawkins, 1996). Spence (1994) considered this stage as a trial stage, since the implementation of the new idea is undertaken on a smaller scale. Duncan (1969) confirmed Spence's argument by stating that adoption is not an all-or-nothing decision. He suggested that there is a grey area between small-scale trialing and the eventual scale of adoption. Adoption is often a continuous process and it may occur within a gradual or stepwise manner, which sometimes results in only a partial adoption (Wilkinson, 2011). Farmers often change and modify their practices or technology, in order to adapt it to their own circumstances. However, Rogers (1995, 2003) argued that this is a full implementation stage, since the decision has already been made.

The fifth stage of Rogers (2003) model is confirmation. This stage is reached when the individual seeks more information towards supporting and reinforcing the decision he or she has made or when he or she discontinues the use of the new idea because of resultant difficulties (Rogers, 2003). Adopters, who are sometimes confronted with conflicting messages from change agents or peers, regarding the new practices, tend to discontinue using the new practice (Van den Ban and Hawkins, 1996). Some adopters may discontinue the use of a new idea or practice after adoption (Rogers, 2003). The discontinuation of a technology may be a result of the individual adopter being dissatisfied with the performance of the new idea or practice. It may also due to the fact that the individual has found a new practice that surpasses the existing one and as such they would like to replace it (Rogers, 2003). Spence (1994) on the other hand indicated that such a rejection could happen immediately after the acceptance of a technology, if there is a better alternative. The adoption of technology is influenced by a range of factors. In the following sections, the factors that influence the adoption decision of a new technology are examined.

2.1.4 Levels of adoption of agricultural innovation

Agriculture is a way of life to many subsistence farmers and other farmers are in constant search of ways in which to improve upon their lives. In agriculture context, adoption is decision made by an individual to start using new agricultural innovations with the aim to increase productivity. This might be a new crop variety or management practices adopted by an individual, family or corporation. Adoption of agricultural technologies is considered as one of the ways that offer opportunities for improved agricultural production and hence improved life (Niyegela, 2007).

The technology must be widely adopted in order to self-sustain. Within the rate of adoption, there is a point at which agricultural technology reaches critical mass. The categories of adopters are: innovators, early adopters, early majority, late majority, and laggard. Innovators (2.5%) - had larger farms, were more educated, more prosperous and more risk-oriented, early adopters (13.5%) - younger, more educated, tended to be community leaders, less prosperous, early majority (34%) - more conservative but open to new ideas, active in community and influence to neighbors, late majority (34%) - older, less educated, fairly conservative and less socially active, laggards (16%) - very conservative, had small farms, oldest and least educated. Level of adoption of technology manifests itself in different ways in various cultures and fields and is highly subject to the type of adopters and innovation-decision process (Rogers, 1983).

2.2 Factors Related to the Adoption of Agriculture Technology

There were a number of factors identified in the literature, which have influenced the adoption of agricultural technology. Drawing on several studies on technology adoption such as Adesina and Zinnah (1992); Aguila-Obra and Melendez (2006); Chau and Tam (1997); Doorman (1991); Feder, Just and Zilberman (1985); Rogers (1985). It can be ascertained that the factors, which influence the farmers‟ decision to either adopt or not to adopt a technology can

be grouped under three major headings: 1) the characteristics of the technology; 2) internal factors; and 3) external factors. These factors are discussed in the following section.

2.2.1 Characteristic of technology

Rogers (1995) identified five characteristics of a technology that influenced adoption. These are: 1) relative advantage; 2) compatibility; 3) complexity; 4) trialability; and 5) observability. Feder *et al.*, (1985) identified three others and classified these technologies in relation to resource use. These characteristics included: 1) capital-saving or capital intensive; 2) land-saving or land-using; and 3) labor-saving or labor using. Feder and Umali (1993), Leathers and Smale (1991), and Pannell *et al.*, (2006) also identified associated risks with a new technology as an important factor that influenced adoption decisions of individuals. The following sections draw on the relevant literature to describe in detail each of these factors and their impacts on the adoption decisions of individuals.

a) Relative advantage

Relative advantage is the degree to which an innovation is perceived to be better than the idea it supersedes (Rogers, 1995). Relative advantage can also be described as the advantage of an innovation to achieve goals better (or at a lower cost) than previously (Van Den Ban and Hawkins, 1996). The degree of relative advantage is commonly expressed as economic profit, social prestige or other benefits (Rogers, 1995). It has been found that agricultural practices, which are believed to be profitable, have an increased likelihood of adoption, whilst those that are believed to provide less return are less likely to be adopted (Barr and Cary, 1992; Webb, 2004).

b) Compatibility

Compatibility refers to the degree to which an innovation is perceived as consistent with existing values, past experience, and the needs of the potential

adopter (Roger, 1995; 2003). The more compatible an innovation is to a potential farmer's life experiences and situation, the more familiar they will be with the innovation and the less uncertain they will be about adopting the innovation (Deressa *et al*., 2009). Ogunlana (2004) also defined compatibility as being the ease by which the farmers can integrate the new practices into their farming system and access other relevant inputs that would help in its adoption.

c) Complexity

The complexity factor is the degree to which a technology is perceived to be difficult to understand and use (Rogers, 2003). The greater the complexity of an innovation the more negatively a new farmer may view the technology. For example, the discontinuation of a system of rice intensification program, which was introduced in Madagascar for rice farmers, was largely due to the difficulties faced by farmers in understanding the application of the new practices and methods (Moser and Barrett, 2002). Gibson (1994) shared a similar view and reported that farmers in Papua New Guinea rejected growing rice because rice cultivation was seen as complex and difficult to manage.

d) Trialability

Trialability is the degree to which the technology can be tested on a small scale (Rogers, 2003). Ogunlana (2004) pointed out that farmers are always keen to adopt technologies which they have first trialed on a limited basis on their farm, compared to one they have to adopt on a larger scale - which might fail. Floyd *et al.*, (2003) and Rogers (2003) added that a technology, which can be gradually implemented without a large capital investment from outside, is important, since it will certainly enhance the farmers‟ decision to adopt the technology.

e) Observability

Observability is the degree to which the results of a technology can be visible to others (Rogers, 1995). *Cary et al.*, (2002) argued that a profitable outcome is

an important factor that influences the adoption decision. A lack of observable profit, as result of adopting a technology would inhibit the adoption of the technology by others. The more observable the outcomes of an innovation offer and is perceived as being suitable by the farmer, the rate of adoption will become more positive (Rogers, 2003). For example, in a study on mangrove swamp rice varieties in Sierra Leone, Adesina and Zinnah (1992) found that farmers adopted a new variety of rice introduced to the area because they observed that the results were highly visible.

2.2.2 Internal factors

Several authors (Bantel and Jackson, 1989; Deressa *et al.*, 2009; Knowler and Bradshar, 2006; Pannell *et al.*, 2006; Staal *et al.*, 2002) suggested that there are four key internal factors that influence the adoption of technology. These factors include: 1) characteristics of the farmer; 2) on-farm factors; 3) cultural factors; and 4) leadership characteristics. The following sections draw on the relevant literature to describe in detail each internal factor that can influence a farmer's adoption decision.

2.3 Review of the Studies Concerning the Relationship between Farmers' Characteristics and Their Adoption

2.3.1 Age and Adoption

Khan (2019) conducted a study on adoption of hybrid rice production technologies by the farmers of Kalai upazila under Joypurhat district. He found that age of the farmers had no significant relationship with their adoption of hybrid rice production technologies.

Jahan (2017) conducted investigation on "Socio-Economic Determinants of Adoption of Sunflower Production by the Farmers of Patuakhali sadar upazila" in Bangladesh. She found that age of the farmers had no significant contribution with their adoption of improved practices of sunflower production.

Islam (2002) conducted a study on adoption of modem agricultural technologies by the farmers of Sandwip. He found that age of the farmers was not related to their adoption of modem agricultural technologies.

Aurangozeb (2002) conducted a study on adoption of integrated homestead farming technologies by the rural women in RDRS. He found that there was a significant negative relationship between age and adoption of integrated homestead farming Technologies.

Sardar (2002) conducted a study on adoption of IPM practices by the farmers under PETRRA project of RDRS. He found that age of the farmers had a negatively significant relationship with their adoption of IPM practices.

Rahman (2001) observed that there was no significant relationship between age and adoption of Aalok-6201 hybrid rice cultivation practices.

Podder (1999) and Hossain (1999) are found similar results in their respective studies.

Hussen (2001) conducted a study, which concluded that age of the sugarcane growers had a significant negative relationship with their adoption of modem sugarcane cultivation practices. Rahman (1999) also found similar result in this study. Chowdhury (1997) observed that the age of the farmers had no significant relationship with their adoption of selected BINA technologies. Sarkar 1997) observed that there was no significant relationship between age of the farmers and their adoption of improved potato cultivation practices. Similar finding were observed by Singh (1989) and Kher (1992) in their respective studies.

Hamid (1995) conducted a study on adoption of recommended sugarcane cultivation practices by the farmers. He found that age had a significant negative relationship with the adoption of recommended sugarcane cultivation practices.

However, researchers cannot come to a unified decision on farmers' age and adoption of BRRI dhan74 production technology relationship, which requires further research.

2.3.2 Education and Adoption

Khan (2019) conducted a study on adoption of hybrid rice production technologies by the farmers of Kalai upazila under Joypurhat district. He found that education of the farmers had a positive significant relationship with their adoption of hybrid rice production technologies.

Jahan (2017) conducted investigation on "Socio-Economic Determinants of Adoption of Sunflower Production by the Farmers of Patuakhali sadar upazila" in Bangladesh. She found that education of the farmers had significant contribution with their adoption of improved practices of sunflower production.

Islam (2002) conducted a study on adoption of modem agricultural technologies by the farmers of Sandwip. He found that education of the farmers had a positive significant relationship with their adoption of modem agricultural technologies.

Sardar (2002) conducted a study on adoption of IPM practices by the farmers under PETRRA project of RDRS. He found that education of the farmers had a positive significant relationship with their adoption of IPM practices.

Aurangozeb (2002) conducted a study on adoption of integrated farming technologies by the rural women in RDRS. He found that there was a positive relationship between education and their adoption on integrated farming technologies.

Hussen (2001) conducted a study on farmers' knowledge and adoption of modem sugarcane cultivation practices. He found that education of the growers had a positive significant relationship with their adoption of modem sugarcane cultivation practices.

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

Chowdhury (1997) found a positive significant relationship between the education of the farmers and their adoption of selected BINA technologies. Similar results were found by Barkatullah (1985), Ali *et al.* (1986), Hoque (1993), Bashar (1993) Khan (1993), Pal (1995) and Sarkar (1997) in their respective studies.

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

Krishna (1969) conducted a research study on the adoption of hybrid maize in Karimnagar, India. He found significant negative relationship between the education of the respondents and their adoption of hybrid maize.

Under above circumstance, we hypothesized that there is positive relation between education and adoption.

2.3.3 Farm size and Adoption

Khan (2019) conducted a study on adoption of hybrid rice production technologies by the farmers of Kalai upazila under Joypurhat district. He found that farm size of the farmers had a positive significant relationship with their adoption of hybrid rice production technologies.

Jahan (2017) conducted investigation on "Socio-Economic Determinants of Adoption of Sunflower Production by the Farmers of Patuakhali sadar upazila" in Bangladesh. She found that farm size of the farmers had no significant contribution with their adoption of improved practices of sunflower production.

Islam (2002) conducted a study on adoption of modem agricultural technologies by the farmers of Sandwip. He observed that farm size of the farmers had a positive significant relationship with their adoption of modem agricultural technologies. Technologies by the farmers under PETRRA project of RDRS. He found that farm size of the farmers had a positive significant relationship with their adoption of IPM practices.

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

Gogoi and Gogoi (1989) in their study observed that size of land holding of farmers had a significant relationship and positive effect on their adoption of plant protection practices.

Rahman (2001) conducted an investigation on knowledge, attitude and adoption of Aalok-6201 hybrid rice by the farmers of sadar upazila in Mymenshigh district. He observed that there was a significant positive relationship between farm size of the farmers and their adoption of Aalok-6201 hybrid rice.

Hussen (2001) conducted an investigation on adoption of modem sugarcane cultivation practices by the farmers' of Dewangonj upazila in Jamalpur district. He observed that there was a significant positive relationship between farm size of the farmers and their adoption of modem sugarcane cultivation practices.

Chowdhury (1997) conducted a research on adoption of selected BINA technologies by the farmers. He indicated that farm size of the farmers had a strongly positive significant relationship with their adoption of selected BINA technologies. Okoro and Obibuak. (1992), Khan (1993). Hoque (1993) and Sarkar (1997) observed similar results in their respective studies.

2.3.4 Family size and Adoption

Jahan (2017) conducted investigation on "Socio-Economic Determinants of Adoption of Sunflower Production by the Farmers of Patuakhali sadar upazila" in Bangladesh. She found that family size of the farmers had no significant contribution with their adoption of improved practices of sunflower production. Hossain (2003) revealed that family size of the farmers had a significant and positive relationship with their adoption of modern Boro rice cultivation practices.

Sardar (2002) found that the family size of the farmers had significant positive relationship with their adoption of IPM practices.

Hossain (1999) conducted a study to determine the farmers' perception of the effects of agro-chemicals on environment. He found no relationship between the farmer's family sizes with their adoption of fertilizer.

Chowdhury (1997) conducted a research study on adoption of selected BINA technologies by the farmers of Boira union in Mymensingh district. He observed that family size of the farmers had positive and significant relationship with the adoption of selected BINA technologies.

Hossain (1991) in his study in sadar thana of Jamalpur observed that family size of the farmers had no significant effect on their adoption of improved farm practices. Similar results were observed by Sobhan (1975), Hoque (1993), Bashar (1993), Hossain (1999) also found that family size of the farmers had positive significant relationship with the adoption of agro-chemical. Similar results were also observed by Pal (1995), Muttalab (1995), Sarker (1997), Chowhdury (1997), Hoque (1993) and Khan (1993).

2.3.5 Annual income and Adoption

Sardar (2002) conducted a study on adoption of IPM practices by the farmers under PETRRA project of RDRS. He found that the annual income of the farmers had no relationship with their adoption of IPM practices.

Aurangozeb (2002) conducted a study on adoption of integrated homestead farming technologies by the rural women in RDRS. He found that there was a positive significant relationship between annual income of the respondents and their adoption of integrated homestead farming Technologies.

Rahman (2001) conducted an investigation on knowledge; attitude and adoption of Alok-6201 hybrid rice fry the farmers of sadar upaziia in

Mymensingh district. He observed that there was a significant positive relationship between annual income of the farmers and their adoption of Alok-6201 hybrid rice.

Hussen (2001) conducted an investigation on adoption of modem sugarcane cultivation practices by the farmers of Dewangonj upazila in Jamalpur district. He observed that there was a significant positive relationship between annual income of the farmers and their adoption of modem sugarcane cultivation practices.

Islam (2002) conducted a study on adoption of modem agricultural technologies by the farmers of Sandwip. He observed that the annual income of the farmers had no relationship with their adoption of modem agricultural technologies.

Chowdhury (1997) found a significant and positive relationship between annual income and adoption of selected BINA technologies. Okoro and obibuak (1992), Khan (1993), Sarker (1997) observed similar result in their respective studies. Tolawar and Hirevenkaragouder (1989) studied on factors of adoption of poultry management practices. They revealed that the farmers having high income tend to own bigger size of poultry unit and possess more knowledge of improved practices leading to higher level of adoption.

2.3.6 Training and Adoption

Rahman (2001) observed in study that training received of the farmers had a significant and positive relationship with their adoption regarding Aalok-6201 hybrid rice.

Islam (2002) conducted a study on farmers‟ knowledge and adoption of ecological agricultural practices under the supervision of Proshika. He found that agricultural training exposure of the farmers had no significant relationship with their adoption of ecological agricultural practices.

2.3.7 Organizational Participation and Adoption

Khan (2019) conducted a study on adoption of hybrid rice production technologies by the farmers of Kalai upazila under Joypurhat district. He found that organizational participation of the farmers had a positive significant relationship with their adoption of hybrid rice production technologies.

Jahan (2017) conducted investigation on “Socio-Economic Determinants of Adoption of Sunflower Production by the Farmers of Patuakhali sadar upazila” in Bangladesh. She found that organizational participation of the farmers had significant contribution with their adoption of improved practices of sunflower production.

Sardar (2002) conducted a study on adoption of IPM practices by the farmers under PETRRA project of RDRS. He observed that organizational participation of the farmers had no significant relationship with their adoption of IPM 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 organizational participation of the farmers had a significant and positive relationship with their adoption regarding Aalok 6201 hybrid rice.

Mostafa (1999) conducted a study on adoption of recommended mango cultivation practices by the mango growers of Nawabganj Sadar thana. He found that organizational participation of mango growers had a significant

positive relationship with their adoption of recommended mango cultivation practices.

Sarker (1997) conducted a study on correlates of selected characteristics of potato growers with their adoption of improved potato cultivation practices in five village of Comilla district. He observed that organizational participation of the potato growers had no relationship with their adoption of improved potato cultivation practices.

Kher (1992) carried out a research study on the adoption of improved wheat cultivation practices by the farmers in selected village Rajouri block, India. He observed that there was no significant relationship between the farmers' social participation and their adoption of improved wheat cultivation practices.

2.2.8 Extension Media Contact and Adoption

Khan (2019) conducted a study on adoption of hybrid rice production technologies by the farmers of Kalai upazila under Joypurhat district. He found that extension media contact of the farmers had a positive significant relationship with their adoption of hybrid rice production technologies.

Jahan (2017) conducted investigation on “Socio-Economic Determinants of Adoption of Sunflower Production by the Farmers of Patuakhali sadar upazila” in Bangladesh. She found that extension media contact of the farmers had significant contribution with their adoption of improved practices of sunflower production.

Islam (2002) conducted a study on adoption of modem agricultural technologies by the farmers of Sandwip. He found that extension media, contact of the farmers had no significant relationship with their adoption of modem agricultural technologies.

Aurangozeb (2002) conducted a study on adoption of integrated homestead farming technologies by the rural women in RDRS. He found that there was a positive significant relationship between contact with extension media of the respondents and their adoption of integrated homestead farming technologies.

Slade *et al*. (1988) studied that adoption rates among farmers receiving one or more view visits per month were generally higher than those farmers who were not visited by view's contact farmers were better adopter of some technologies that non-contact farmers.

Osunloogun *et al*. (1996) studied adoption of improved Agricultural practices by co-operative farmers in Nigeria. The findings of the study indicated a positive relationship between extension contact and adoption improved practices.

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

Rahman (2001) conducted an investigation on knowledge, attitude and adoption of Aalok-6201 hybrid rice by the farmers of sadar upazila in Mymensingh district. He observed that there was a significant positive relationship between extension contact of the farmers and their adoption of Aalok-6201 hybrid rice.

Sardar (2002) conducted a study on adoption of IPM practices by the farmers under PETRRA project of RDRS. He observed that contact with RDRS personnel of the farmers had a positive significant relationship with their adoption of IPM practices.

Hussen (2001) conducted an investigation on adoption of modem sugarcane cultivation practices by the farmers of Dewangonj upazila in Jamalpur district. He observed that there was a positive significant relationship between extension contact of the farmers and their adoption of modem sugarcane cultivation practices. Sarker (1997) observed a positive and significant relationship between extension contact and adoption of improved potato cultivation practices. Kashem and Islam (1990). Kher (1992), Pal (1995), Haque (1984) also found the similar results in their respective studies.

Nahar (1996) found that there was a significant positive relationship in agricultural knowledge on farm women in homestead farming and their level of contact with information sources. Heong (1990) observed that the lack of adoption of IPM technologies in rice was frequently attributed to lack of sufficient extension.

However, researchers can't come to a unified decision on farmers' agricultural extension contact and adoption of BRRI dhan74 production technology relationship, which requires further research.

2.4 The Conceptual Framework of the Study

This study is concerned with the adoption of BRRI dhan74 production technologies by the farmers of Brahmanpara upazila. Thus, the adoption was the main focus of the study and 12 selected characteristics of the farmers were considered as those might have relationship with adoption. It is not possible to deal with all the factors in a single study. Therefore, it was necessary to limit the factors, which included age, education, farm size, family size, experience in rice farming, experience in BRRI dhan74 production, annual family income, annual income from BRRI dhan74 production, training on BRRI dhan74 production technology, organizational participation and extension media contact. The conceptual framework of the study has been presented in Fig. 2.1.

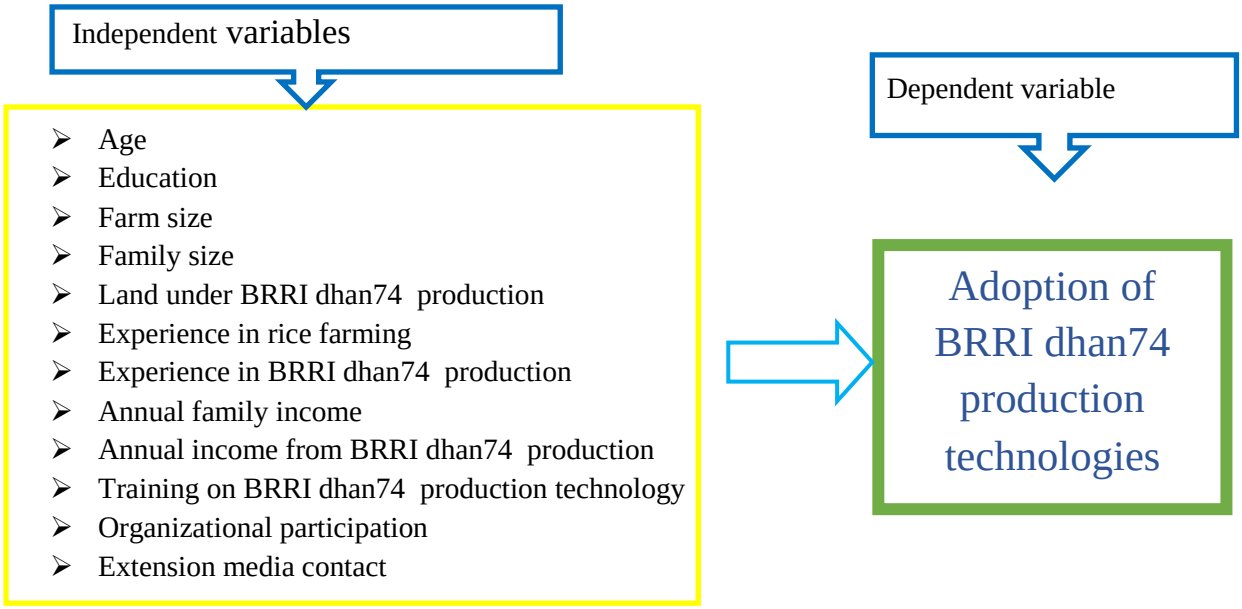

Figure 2.1 The conceptual framework of the study

CHAPTER III
METHODOLOGY

This Chapter deals with the procedures for the collection of valid information as well as procedure of data coding and also data analysis. For conduction, a research work smoothly proper methodology is an obligatory one and it is very difficult to address the study objectives with a scientific manner without a define methodology. A sequential description of the methodologies that was followed in conducting this research work has been presented in this Chapter under the following headings-

3.1 Locale of the Study

The study was conducted in Brahmanpara upazila under Cumilla district. Brahmanpara upazila has 8 unions and out of 8 union's Sahebabad union was selected purposively as the locale of the study. Out of 7 villages of that union two villages were selected randomly as locale of the study.The area of Brahmanpara upazila (Cumilla district) is 128.9 sq km, located in between 23°35' and 23°44' north latitudes and in between 91°03' and 91°11' east longitudes. It is bounded by Kasba and Muradnagar upazilas on the north, Burichang upazila on the south, Tripura state of India and Kasba upazila on the east, Debidwar and Muradnagar upazilas on the west. Brahmanpara Upazila of Cumilla district, having an area of 128 square kilometers and consists of 8 unions. The unions are: Brahmanpara Sadar, Chandla, Dulalpur, Madhabpur, Malapara, Shahebabad, Shashidal and Shidli.

A map of Cumilla district showing Brahmanpara upazila and a map of Brahmanpara upazila showing study area considered as study area have been presented in Figure 3.1 and 3.2, respectively.

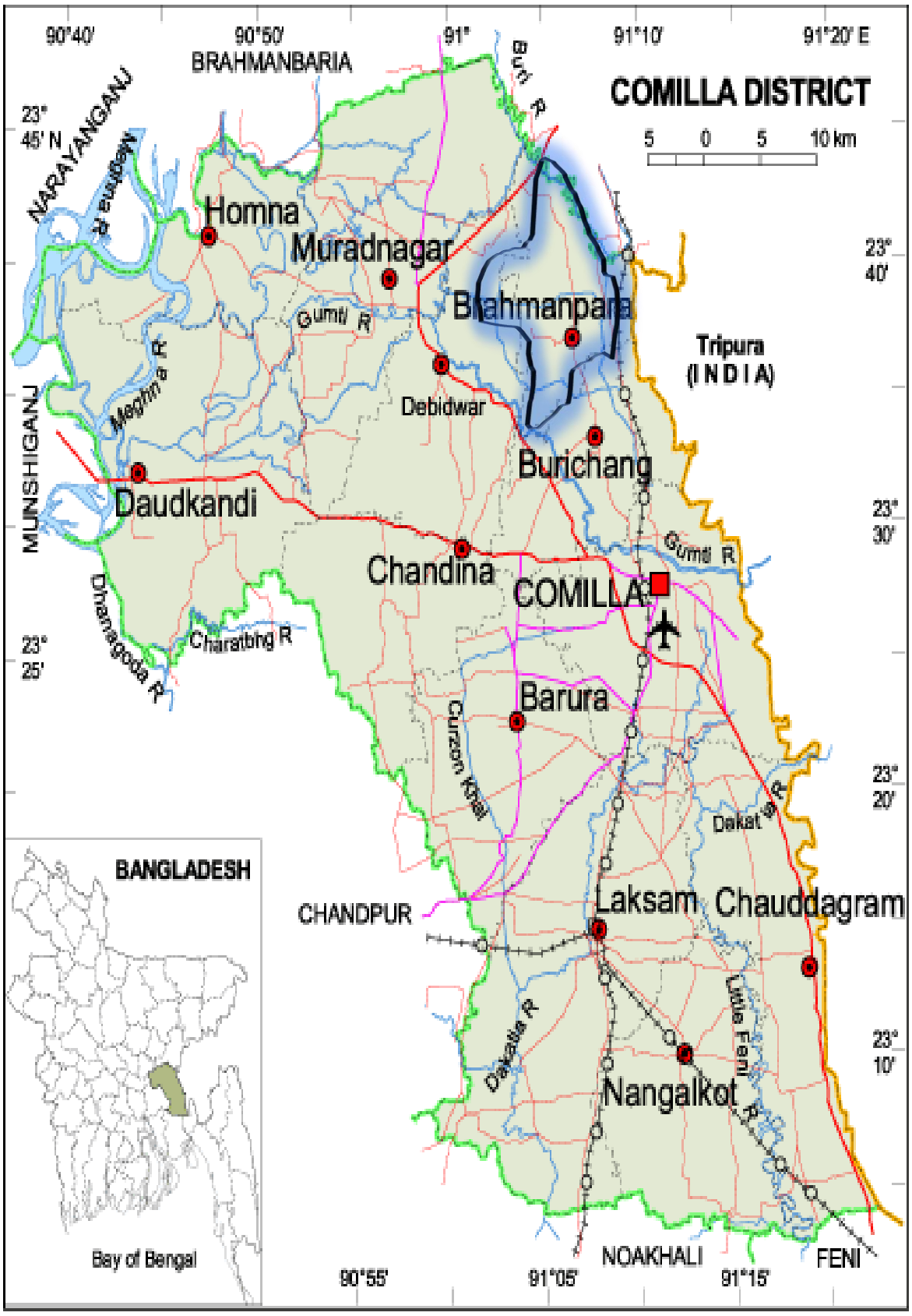

Figure 3.1 A Map of Cumilla district showing Brahmanpara upazila

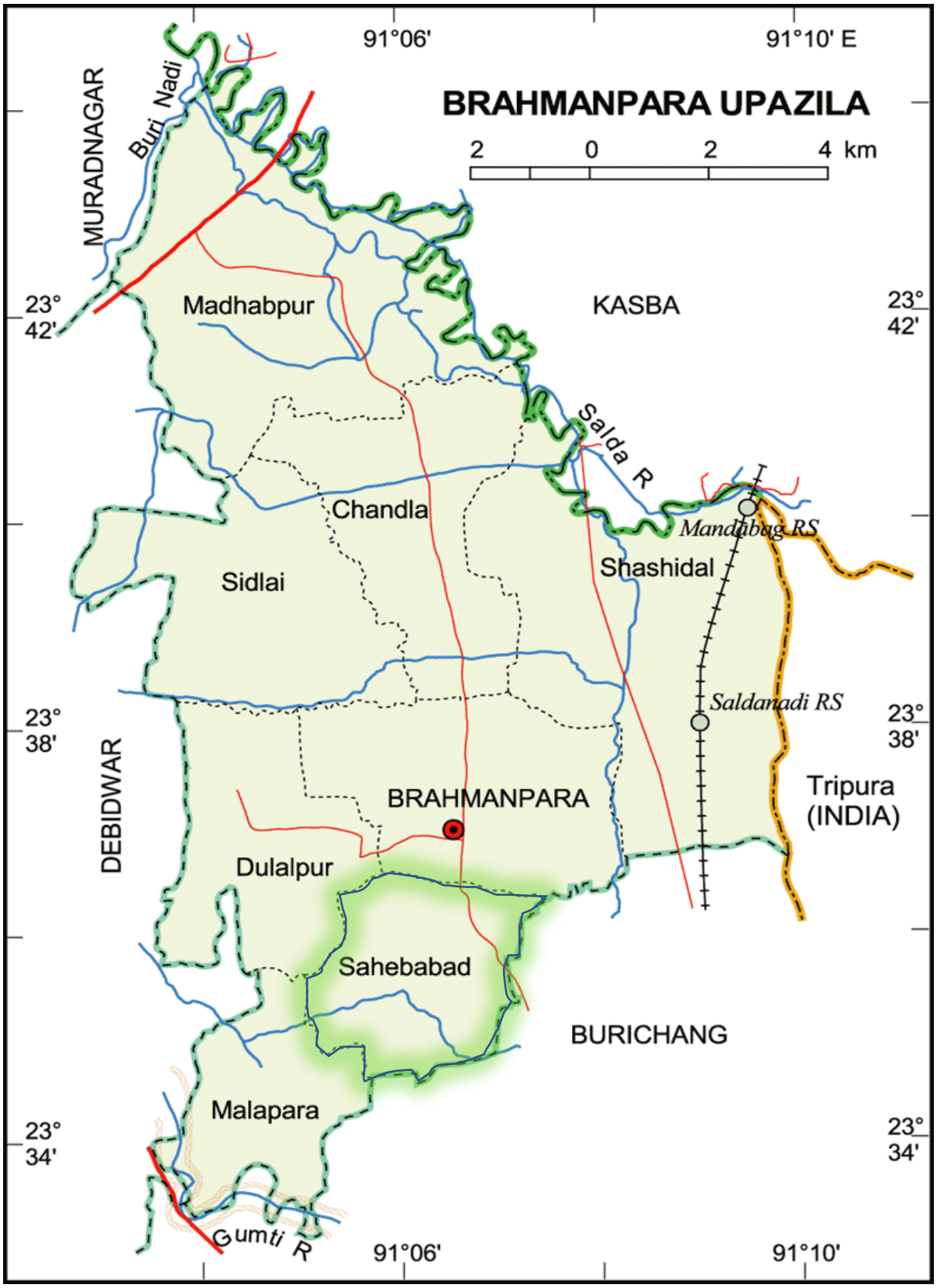

Figure 3.2 A Map of Brahmanpara upazila showing the study area

3.2 Population and Sample of the Study

All the BRRI dhan74 farmers of Sahebabad and Jiruin villages of Sahebabad union in the Brahmanpara upazila under Cumilla district constituted the population of the study. An update statistic of BRRI dhan74 farmers of the selected village area was collected from the local office of the UAO. The total number of BRRI dhan74 cultivars in these villages was 242; where 126 farm family heads from Sahebabad village and 116 from Jiruin village under same which constituted the population of the study. Thus, 242 BRRI dhan 74 farmers constituted the population of the study.

3.3 Distribution of the Population, Sample size and Reserve list

The total BRRI dhan74 farmers were 242, 50% of the total respondents comprised of 121 farmers were the sample of the study and data was collected by random sampling process. A reserve list of 12 BRRI dhan 74 farmers was also prepared by the same method so that the respondents of this list could be used for interview if the respondents included in the original sample were not available at the time of conduction of interview. The distribution of the population sample and number of respondents in the reserve list are given in Table 3.1.

Table 3.1 Distribution of the farmers according to population and sample size and reserve list

Name of unions	Name of villages	Population of BRRI dhan74 farmers	Sample size	Number of farmers included in the reserve list
Sahebabad	Sahebabad	126	63	6
	Jiruin	116	58	6
Total		**242**	**121**	**12**

3.4 Measurement of Variables

The variable is a characteristic, which can assume varying or different values in successive individual cases. A research work usually contains at least two

important variables viz. independent and dependent variables. An independent variable is that factor which is manipulated by the researcher in his attempt to ascertain its relationship to an observed phenomenon. A dependent variable is that factor which appears, disappears or varies as the researcher introduces, removes or varies the independent variable (Townsend, 1953). In the scientific research, the selection and measurement of variable constitute a significant task. Following this conception, the researcher reviewed literature to widen this understanding about the natures and scopes of the variables relevant to this research. At last, she had selected 12 independent variables and one dependent variable. The independent variables were: age, education, farm size, family size, land under BRRI dhan 74 production, experience in rice farming, experience in BRRI dhan74 production, annual family income, income from BRRI dhan74 production, training on BRRI dhan 74 production, organizational participation and extension media contact. The dependent variable of this study was the "adoption of BRRI dhan 74 production technologies". The methods and procedures in measuring the variables of this study are presented below:

3.5 Measurement of Independent Variables

The 12 characteristics of the farmers mentioned above constitute the independent variables of this study. The following procedures were followed for measuring the independent variables.

3.5.1 Age

Age of respondent sunflower farmers was measured by the period of time from their birth to the time of conducting interview and it was measured in terms of complete years on the basis of their response. A score of one (1) was assigned for each year age. This variable appears in item number one (1) in the interview schedule as presented in Appendix-A.

3.5.2 Education

Education was measured by assigning score against each successful year of schooling by a respondent. One score was given for passing each level in an educational institution. For example, if a respondent passed the final examination of class five or equivalent examination, his/her education score has given five (5). Each respondent of can't read & write has given a score of zero (0). A person not knowing reading or writing but being able to sign only has given a score of 0.5. If a farmer did not go to school but took non-formal education, his educational status was determined as the equivalent to a formal school student. This variable appears in item number two (2) in the interview schedule as presented in Appendix-A.

3.5.3 Farm size

Farm size of a respondent referred to the total area of land on which his family carried out the farming operation, the area being in terms of full benefit to the family. The term refers to the cultivated area either owned by the respondent or cultivated on share-cropping, lease or taking from other including homestead area. It was measured in hectares for each respondent using the following formula:

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

Were,

A_1=Homestead area

A_2= Own land under own cultivation

A_3= Own land given to others as borga

A_4= Land taken from others as borga

A_3= Land taken from others as lease

The data was first recorded in terms of local measurement unit i.e. decimal and then converted into hectare. The total area, thus, obtained is considered as his farm size score (assigning a score of one for each hectare of land). This

variable appears in item number three (3) in the interview schedule as presented in Appendix-A.

3.5.4 Family size

Family size of an advice was determined by the total number of members in his/her family who live under same roof and share same kitchen including himself/herself, his/her wife/husband, sons, daughters and others fully or partially dependent on him/her. Total number of family members was considered as the family size score of a respondent. For example, if a respondent has four (4) members in his/her family, his/her family size score was 4 (four). This variable appears in item number four (4) in the interview schedule as presented in Appendix-A.

3.5.5 Land under BRRI dhan74 production

BRRI dhan74 production areas refer to the area used in BRRI dhan74 production only by the farmers. It was first recorded in terms of local measurement unit i.e. decimal and bigha. Then it was converted in hectare (ha). The total area thus obtained was considered as the score of land under BRRI dhan74 production by assigning 1 score for one hectare (ha)' of land. This variable appears in item number four (5) in the interview schedule as presented in Appendix-A.

3.5.6 Experience in rice farming

In a measuring score of one (1) was assigned for each year of working experience of a respondent either in his own farm or to that of his parents. This variable appears in item number 6 in the interview schedule as presented in Appendix-A.

3.5.7 Experience in BRRI dhan74 production

In a measuring score of one (1) was assigned for each year of working experience of a respondent either in his own farm or to that of his parents. This

variable appears in item number 7 in the interview schedule as presented in Appendix-A.

3.5.8 Annual family income

Annual family income of a respondent referred to the total earning by her/him and other members of her/his family from agriculture, livestock, poultry, fisheries, and other sources (service, business, daily wages by working, etc.) during a year. It was expressed in Taka. In measuring this variable, total earning of an individual respondent was converted into score. A score of one (01) was given for every one (01) thousand ('000') taka. This variable appears in item number 8 in the interview schedule as presented in Appendix-A.

3.5.9 Income from BRRI dhan74 production

Income from BRRI dhan74 production of the respondents was measured in thousands taka on the basis of total annual income from BRRI dhan74 production. It was expressed in Taka. In measuring this variable, total earning of an individual respondent was converted into score. A score of one (01) was given for every one (01) thousand ('000') taka. This variable appears in item number 9 in the interview schedule as presented in Appendix-A.

3.5.10 Training on BRRI dhan 74 production technology

Training of a respondent was measured by the total number of days for which a respondent attended in different training programs on BRRI dhan74 production technology. If a respondent takes training for 7 days, he/she will get 7 scores. This variable appears in item number ten (10) in the interview schedule as presented in Appendix-A.

3.5.11 Organizational participation

Social organizational participation of respondent was measured on the basis of the nature of their participation in 5 selected organizations. Final score was computed by adding all the scores of selected organizations. Organizational

participation score = P x D

Were, P- Participation Score

D- Duration (no. of years)

Following scores were assigned for nature of participation:

Nature of participation	**Scores assigned**
No participation	0
Participation as ordinary member	1
Participation as executive member	2
Participation as executive committee officer	3

This variable appears in item number eleven (11) in the interview schedule as presented in Appendix-A.

3.5.12 Extension media contact

Extension media contact was measured as one's extent of contact to different information sources. Each respondent was asked to indicate his nature of contact for each of nine selected media with five alternative responses was prepared for the respondents.

Following scores were assigned for each of nine media.

Extent of exposure	**Scores assigned**
Not at all	0
Rarely	1
Occasionally	2
Often	3
Regularly	4

Thus, the extension media contact scores of farmers could range from 0 to 36 where '0' indicated no extension media contact and 36 indicated very high

extension media contact. This variable appears in item number twelve (12) in the interview schedule as presented in Appendix.

3.6 Measurement of Dependent Variable

Adoption of selected BRRI dhan 74 production technologies was the dependent variable of this study. It was measured on the basis of the extent of adoption of 8 selected BRRI dhan74 production technologies by the farmers for three year.

For example, a farmer is using BRRI dhan 74 with its cluster of technologies for the subsequent years 2017-18, 2018-19 and 2019-20 such as

a) Seedling growing method
b) Alternate Wetting and Drying (AWD)
c) Modern agricultural machineries
d) Line transplanting
e) Roughing
f) Use of Guti urea
g) Integrated pest management (IPM)
h) Use of organic fertilizer

Calculate the adoption of above-mentioned technologies. In this case adoption can be measured in the following ways?

Name of technologies	Year of the adoption			∑ l/L	X adoption
	2017-18	2018-19	2019-20		
Allocated area for cultivation (l)	2	2	3	1.75	.58
Potential area (L)	4	4	4		
Proportion of area coverage (l/L)	0.5	0.5	0.75		

Total adoption score of a respondent was found by adding one's adoption scores on eight aspects of adoption and then dividing by number of aspects. In this case the adoption score for single technology is 0.58. Adoption of multiple technologies is measured by the proportion of summation of mean area coverage (l) out of mean potential area (L) by the number of practices for

particular time period; it is expresses in percentage resulting mean (X) area coverage. The formula calculating the adoption stands as G. L. Ray (1998);

$$\text{Adoption scores} = \frac{\sum X}{\text{No.of technologies}} x100$$

The adoption was expressed in percentage. Hence the adoption of a BRRI dhan74 production technologies could range from 0 to 100, where '0' indicate no adoption and '100' indicate highest adoption.

3.7 Hypothesis of the Study

According to Kerlinger (1973), "a hypothesis is a conjectural statement of the relation between two or more variables". Hypothesis are always in declarative sentence form and they are related, either generally or specifically from variables to variables. In broad sense hypotheses are divided into two categories: (a) Research hypothesis and (b) Null hypothesis.

3.7.1 Research hypothesis

Based on review of literature and development of conceptual framework, the following research hypothesis was formulated:

"Each of the 12 selected characteristics (age, education, farm size, family size, land under BRRI dhan 74 production, experience in rice farming, experience in BRRI dhan74 production, annual family income, income from BRRI dhan 74 production, training on BRRI dhan 74 production, organizational participation and extension media contact) of the BRRI dhan 74 cultivars had significant influenced to adoption of BRRI dhan74 production technologies".

However, when a researcher tries to perform statistical tests, then it becomes necessary to formulate null hypothesis.

3.7.2 Null hypothesis

A null hypothesis states that there is no contribution between the concerned variables. The following null hypothesis was formulated to explore the contribution of the selected characteristics in empowering the farmers through e-Agriculture. Hence, in order to conduct tests, the earlier research hypothesis was converted into null form as follows:

"There is no contribution of the selected characteristics (age, education, farm size, family size, land under BRRI dhan 74 production, experience in rice farming, experience in BRRI dhan 74 production, annual family income, income from BRRI dhan 74 production, training on BRRI dhan 74 production, organizational participation and extension media contact) of adoption of BRRI dhan 74 production technologies."

3.8 Instrument for Collection of Data

In order to collect reliable and valid information from the respondents, an interview schedule was prepared for collection of data from respondents keeping the objectives of the study in mind. The question and statements contained in the schedule were simple, direct and easily understandable by the farmers. Simple and direct question, different scales, closed and open form statements and questions were included in the interview schedule to obtain necessary information. The draft interview schedule was prepared in accordance with the objective of the study. The interview schedule was pre-tested with 10 respondents of the farmers in the study area during 05 to 06 June, 2021.

The draft interview schedule was pretested in actual field situation before finalizing it for collection of data. The pre-test was helpful to identify inappropriate questions and statements in the draft schedule. Necessary addition, alternation and adjustments were made in the schedule on the basis of the experience of the pretest. The interview schedule was then printed in its

final form. An English version of the interview schedule has been shown in Appendix.

3.9 Data Collection

Data were collected personally by the researcher herself through personal interview schedule from the sampled farm families of the selected villages. Before starting the collection of data; the researcher met the respective Upazila Agriculture Officer (UAO), Additional Agriculture Extension Officer (AAEO) and the concerned Sub-Assistant Agriculture Office (SAAO). The researcher also discussed the objectives of the present study with the respondents and above- mentioned officers and requested them to provide actual information. A rapport was established with the rural people so that they feel easy to answer the questions. The researcher took all possible care to establish rapport with the respondents so that they would not feel any indecision while starting the interview. Very good cooperation was obtained from the field extension workers and the local leaders. No serious difficulty was faced by the researcher during the collection of data. The interviews were made individually in the places of respondents. Questions were asked in direct manner so that the respondents could easily understand the questions. Whenever a respondent faced difficulty in understanding any questions, care was taken to explain the same clearly with a view to enabling him to answer it properly.

Before going to the respondents' home for interviewing they were informed verbally to ensure their availability at home as per schedule date and time. In the case of failure to collect information from the respondents due to their other business, a revisit was made with prior to appointments. The final data were collected during 15 July, 2021 to 20 August, 2021.

3.10 Compilation of Data

After completion of field survey, data recorded in the interview schedules were coded, compiled, tabulated and analyzed in accordance with the objectives of

the study. In this process, all the responses in the interview schedule were given numerically coded values. Local units were converted into standard units and qualitative data were converted into quantitative ones by means of suitable scoring whenever necessary. All the collected data were checked and cross-checked before transplanting to the master sheets. To facilitate tabulation, the collected data were properly coded and transferred from interview schedule to a master sheet. Tabulation and cross tabulation were done on the basis of categorization developed by the researcher.

3.11 Categorization of Respondents

For describing the various independent and dependent variables the respondents were classified into various categories. In developing categories, the researcher was guided by the nature of data and general consideration prevailing on the social system. The procedures have been discussed while describing the variable in the sub-sequent sections of next chapter.

3.12 Statistical Analysis

Data collected from the respondents were analyzed and interpreted in accordance with the objectives of the study. The analysis of data was performed using statistical treatment with SPSS (Statistical Package for Social Sciences) computer program, version 20. Statistical measures as a number, range, mean, standard deviation was used in describing the variables whenever applicable. Regressions of coefficient test were used to determine the contribution and among the categories of farmers with regard to their adoption of BRRI dhan74 production technologies based on selected characteristics. Throughout the study the 0.05 and 0.01 levels of probability were used as the basis of rejection or accepting a null hypothesis.

CHAPTER IV
RESULTS AND DISCUSSION

In this chapter the findings of this study have been discussed in relation to the present findings and also to those found in other studies. The study investigated the adoption of BRRI dhan 74 production technology by the farmers of Cumilla district. In accordance with the objectives of the study, presentation of the findings has been made in three sections. The first sections deal about selected characteristics of the farmers. The second section deals with the extent of adoption of BRRI dhan 74 production and the third section deals with contribution of the selected characteristics of the farmers and their adoption of BRRI dhan 74 production technologies.

4.1 Selected Characteristics of the Farmers

Twelve characteristics of the farmers were selected for this research. The characteristics include: age, education, farm size, family size, land under BRRI dhan74 production, experience in rice farming, experience in BRRI dhan 74 production, annual family income, income from BRRI dhan 74 production, training on BRRI dhan 74 production, organizational participation and extension media contact. Some descriptive statistics of these features are given in Table 4.1 Data contained in the Table 4.1 reveal the salient features of the characteristics of the farmers in order to have an overall picture of these characteristics at a glance. However, for ready reference, separate Tables are provided while presenting categorizations, discussing and /or interpreting results concerning each of the characteristics in this chapter.

Table 4.1 The salient features of the selected characteristics of the farmers

Categories	Measuring Unit	Rang		Mean	S D
		possible	observed		
Age	Years	-	24-73	45.84	10.38
Education	Year of schooling	-	00-16	7.00	4.69
Farm size	Hectare	-	.09-3.13	0.68	.48
Family size	Members	-	2-13	5.34	1.63
Land under BRRI dhan74 cultivation	Hectare	-	0.06-1.31	0.21	.11
Experience in rice farming	Score	-	5-50	16.74	9.73
Experience in BRRI dhan74 cultivation	Score	-	1-3	2.50	.59
Annual family income	('000' Tk.)	-	60-400	192.73	90.42
Income from BRRI dhan74 cultivation	('000' Tk.)	-	10-120	36.81	18.21
Training on BRRI dhan74 cultivation	Days	-	0-9	2.28	2.25
Organizational participation	Score	-	0-24	4.55	4.26
Extension media contact	Score	0-36	6-28	13.63	3.86

4.1.1 Age

Age of the farmers ranged from 24 to 73 years, the average being 45.84 years and the standard deviation 10.38. All the variables were categorized on the basis of their possible scores except age was categorized based on the classification provided by the Ministry of Youth and Sports, Government of the People's Republic of Bangladesh. The distribution of the rice farmers according to their age is shown in Table 4.2.

Table 4.2 Distribution of the farmers according to their age

Categories	Farmers		Mean	SD
	Number	Percent		
Young aged (up to 35)	19	15.70	45.84	10.38
Middle-aged (36-50)	69	57.02		
Old (>50)	33	27.28		
Total	**121**	**100**		

Table 4.2 showed that the highest proportion 57.02 percent of the rice farmers fell in the "middle aged" category, while 15.70 percent of them fell in the "young aged" category and 27.28 percent in the "old aged" category. The findings indicate that a large proportion (84.30) of the farmers were middle to old aged.

4.1.2 Education

The education scores of the farmers ranged from 0 to 16. The average was 7.00 and the standard deviation was 4.69. On the basis of their educational scores, the hybrid rice growers were classified into four categories, namely "illiterate (0-0.5), primary (1-5), secondary (6-10) and above secondary (above 10). This distribution was supported by Hoque (2016) and Masud, (2007) and shown in the Table 4.3.

Table 4.3 Distribution of the farmers according to their education

Categories	Farmers		Mean	SD
	Number	Percent		
Illiterate (0-0.5)	34	28.10	7.00	4.69
Primary level (1-5)	8	6.61		
Secondary level (6-10)	59	48.76		
Above secondary level (>10)	20	16.53		
Total	**121**	**100**		

Table 4.3 indicated that the majority (48.76 percent) of the rice farmers was secondary level of education compared to 28.10 percent of them was illiterate. About 6.61 percent of the farmers were primary level of education, while 16.53 percent was above secondary level of education.

4.1.3 Farm size

The farm size of the respondents varied from 0.09 to 3.13 hectares. The average farm size was 0.68 hectare with a standard deviation of 0.48. The respondents were classified into three categories based on their farm size as followed by DAE (DAE, 1995): "marginal farm" (upto 0.2 ha), "small farm"

(0.21 – 1.0 ha), "medium farm" (1.0 -3.0) and large (above 3.01 ha). The distribution of the farmers according to their farm size is shown in Table 4.4.

Table 4.4 Distribution of the farmers according to their farm size

Categories	Farmers		Mean	SD
	Number	Percent		
Marginal farm (up to 0.2 ha)	37	30.58	0.68	.48
Small farm (0.21-1.0 ha)	77	63.64		
Medium farm (1.01-3.0 ha)	5	4.13		
Large farm (>3.01 ha)	2	1.65		
Total	**121**	**100**		

Table 4.4 indicated that more than half (63.64 percent) of the farmers possessed small farms compared to 30.58 percent of them having marginal farms and 4.13 percent had medium farms and only 1.65 % of the farmers having large farm. Thus, the overwhelming majority 67.75 percent of the farmers were small to medium farms. Majority of the farmers were under small farmer's category which is consistent with national scenario.

4.1.4 Family size

To describe the family size of the respondents, the category has been followed as represented by Poddar (2015). Family size scores of the farmers ranged from 2 to 13 with an average of 5.34 and standard deviation of 1.63. According to family size, the respondents were classified into three categories (Mean±SD) as shown in Table 4.5.

Table 4.5 Distribution of the farmers according to their family size

Categories	Farmers		Mean	S D
	Number	Percent		
Small family (up to 4)	37	30.58	5.34	1.63
Medium family (5-6)	59	48.76		
Large family (above 6)	25	20.66		
Total	**121**	**100**		

Data contained in Table 4.5 indicates that 48.76 percent of the farmers had medium family size while 20.66 percent of them had large family size and 30.58 percent of them had small family size. Thus, about two third 79.34 percent of the farmers had

medium to small family size.

4.1.5 Land under BRRI dhan 74 production

Land under hybrid rice seed production of the farmers varied from 0.06 to 1.31 hectare. The average land under BRRI dhan 74 production was 0.21 hectare with the standard deviation of 0.11. Based on land under BRRI dhan 74 production, the farmers are classified into three categories as shown in Table 4.6.

Table 4.6 Distribution of the farmers according to their land under BRRI dhan 74 production

Categories (ha)	Farmers		Mean	SD
	Number	Percent		
Marginal land (0.01-0.20)	65	53.72	0.21	0.11
Small land (up to 0.21-1 ha)	51	42.50		
Medium land (1.01-3 ha)	5	4.13		
Total	**121**	**100**		

Data contained in Table 4.6 indicates that the largest proportion (53.72 percent) of farmers had marginal land under BRRI dhan 74 production compared to 42.50 percent having small land under BRRI dhan 74 production and 4.13 percent had medium land under BRRI dhan 74 production. It was again found that most (95.87 percent) of the farmers had medium to marginal land under BRRI dhan 74 production.

4.1.6 Experience in rice farming

The experience score of the respondents ranged from 5 to 50. The mean score was 16.74 with the standard deviation 9.73. On the basis of experience, the respondents were classified into three categories namely, low experience, medium experience and high experience, as shown in Table 4.7.

Table 4.7 Distribution of the farmers according to their experience in rice farming

Categories (Scores)	Farmers		Mean	SD
	Number	Percent		
Low (up to 7)	21	17.35	16.74	9.73
Medium (8-25)	77	63.64		
High (above 25)	23	19.01		
Total	**121**	**100**		

Data contained in Table 4.7 revealed that the majority (63.64 percent) of the farmers had medium experience as compared to (17.35 percent) and (19.01 percent) having low and high experience in rice farming respectively. The majority (81.99 percent) of the respondents had medium to high experience in rice production.

4.1.7 Experience in BRRI dhan74 production

The experience score of the respondents ranged from 1 to 3. The mean score was 2.50 with the standard deviation 0.59. On the basis of observed scores, the respondents were classified into three categories namely, low experience, medium experience and high experience, as shown in Table 4.8.

Table 4.8 Distribution of the farmers according to their experience in BRRI dhan74 production

Categories (Scores)	Farmers		Mean	SD
	Number	Percent		
Low (up to 1)	6	4.96	2.50	0.59
Medium (1.01-2)	48	39.67		
High (above 2)	67	55.37		
Total	**121**	**100**		

Data contained in Table 4.8 revealed that the majority (55.37 percent) of the farmers had high experience in under BRRI dhan74 production as compared to (4.96 percent) and (39.67 percent) having low and medium experience in under BRRI dhan74 production respectively. The majority (95.04 percent) of the respondents had medium to high experience in under BRRI dhan74 production.

4.1.8 Annual family income

Annual income score of the respondents ranged from 60 to 400 (in thousands) with an average of 192.73 and standard deviation 90.42. On the basis of the observed scores, the respondents were classified into three categories (Mean ±SD) as shown in Table 4.9.

Table 4.9 Distribution of the farmers according to their annual income

Categories	Farmers		Mean	SD
	Number	Percent		
Low income (up to 102)	29	23.97	192.73	90.42
Medium income (102-282)	71	58.68		
High income (above 282)	21	17.35		
Total	**121**	**100**		

Data presented in Table 4.9 indicate that the highest proportion (58.68 percent) of the respondent had medium annual income, while (23.97 percent) had low annual income and (17.35 percent) had high annual income. As a result, the most (82.65 percent) of the respondents in the study area were low to medium annual income earners.

4.1.9 Income from BRRI dhan74 production

Income from rice cultivation score of the respondents ranged from 10 to 120 (in thousands) with an average of 36.81 and standard deviation 18.21. On the basis of the observed scores, the respondents were classified into three categories (Mean ± SD) as shown in Table 4.10.

Table 4.10 Distribution of the farmers according to their income from BRRI dhan74 production

Categories	Farmers		Mean	SD
	Number	Percent		
Low income (up to 18)	17	14.05	36.81	18.21
Medium income (19-54)	86	71.07		
High income (above 54)	18	14.88		
Total	**121**	**100**		

Data presented in Table 4.10 indicate that the highest proportion 71.07 percent of the respondent to medium income from BRRI dhan74 production, while 14.05 percent had low income and 14.88 percent had high income from BRRI dhan74 production. As a result, the most (85.95 percent) of the respondents in the study area were high to medium income from BRRI dhan74 production.

4.1.10 Training on BRRI dhan74 production

The score of training on BRRI dhan74 production of the farmers ranged from 0 to 9 days, the mean being 2.28 and standard deviation of 2.25. Based on observed range, the farmers were classified into four categories as shown in Table 4.11.

Table 4.11 Distribution of the farmers according to training BRRI dhan74 production

Categories (days)	Farmers		Mean	SD
	Number	Percent		
No training (0)	49	40.50	2.28	2.25
Low training (up to 3)	45	37.19		
Medium training (4-6)	25	20.66		
High training (above 6)	2	1.65		
Total	**121**	**100**		

Data contained in Table 4.11 indicates that 40.50 percent of the farmers had no training on BRRI dhan 74 production; while 37.19 percent of the farmer's low training on BRRI dhan 74 production and 20.66 percent had medium training on BRRI dhan 74 production and only 1.65 percent had high training on BRRI dhan 74 production. Thus, about 57.85 percent of farmers had low to medium training on BRRI dhan 74 production.

4.1.11 Organizational participation

The observed organizational participation score of the respondents ranged from 0 to 24. The mean score was 4.55 with the standard deviation 4.26. On the basis of observed scores, the respondents were classified into three categories namely, low organizational participation, medium organizational participation

and high organizational participation, as shown in Table 4.12.

Table 4.12 Distribution of the farmers according to their organizational participation

Categories (Scores)	Farmers		Mean	SD
	Number	Percent		
No (0)	34	28.10	4.55	4.26
Low (up to 8)	66	54.55		
Medium (9-16)	20	16.53		
High (above 16)	1	0.83		
Total	121	100		

Data contained in the Table 4.12 revealed that the majority 54.55% of the farmers had low organizational participation as compared to 28.10% and 16.53% having low and medium organizational participation respectively. Only 0.83 percent of the farmers had high organisational participation. Thus, about 71.08 percent of farmers had low to medium organisational participation.

4.1.12 Extension media contact

Extension media contact scores of the farmers ranged from 6 to 28 with an average of 13.63 and standard deviation of 3.86. On the basis of their media contact, the respondents were classified into three categories (Mean ±SD) namely, low contact, medium contact and high contact. The scale used for computing the media contact score of a respondent is given Table 4.13.

Table 4.13 Distribution of the farmers according to their media contact

Categories (Scores)	Farmers		Mean	SD
	Number	Percent		
Low (up to 10)	22	18.18	13.63	3.86
Medium (11-16)	72	59.50		
High (above 16)	27	22.32		
Total	**121**	**100**		

Data contained in the Table 4.13 indicated that the highest proportion 59.50% of the respondents had medium extension media contact as compared to 18.18% and 22.32% having low and high extension media contact respectively.

The majority (77.68%) of the respondents had low to medium extension contact.

4.2 Adoption of BRRI dhan74 production technologies

Adoption of BRRI dhan74 cultivation score of the respondents was found to be varying from 19.00 to 96.00 with an average of 63.32 and standard deviation of 20.98. Based on their score, the farmers were classified into three categories (Mean ±SD) as shown in Table 4.14.

Table 4.14 Distribution of the farmers according to their adoption of BRRI dhan74 production

Categories	Farmers		Mean	SD
	Number	Percent		
Low adoption (up to 43)	33	27.28	63.32	20.98
Medium adoption (44-83)	69	57.02		
High adoption (above 83)	19	15.70		
Total	**121**	**100**		

The Table 4.14 indicates that the majority (57.02%) of the farmers had medium adoption of BRRI dhan 74 production that comprised by 15.70 percent and 27.28 percent of the farmers having high and low adoption of BRRI dhan 74 production. The majority 72.72%) of the respondents had medium to high adoption of BRRI dhan74 production.

4.3 Contribution of the Selected Characteristics of the Respondents and their Adoption of BRRI dhan 74 Production Technologies

To explore the contribution of the selected characteristics of farmers with their adoption of BRRI dhan 74 production technologies, multiple regressions model was run to find out the contribution of the selected characteristics of the respondents and their adoption of BRRI dhan 74 production technologies. From this regression test, it was found that education, experience in rice farming, annual family income, training on BRRI dhan74 production and media contact had significant contribution with their adoption in BRRI dhan 74 production.

Of these, education was the most important contributing factors (significant at the 1% level of significant) and experience in rice farming, annual family income, training on BRRI dhan 74 production and media contact of the respondents were less important contributing factors (significant at 5% level of significant). Beside these four characteristics, rest eight characteristics of the farmers (age, farm size, family size, land under BRRI dhan 74 production, experience in BRRI dhan 74 production, income from BRRI dhan 74 production and organizational participation) had no significant contribution with their adoption. The summery of the results of the Co-efficient of regression indicating the contribution of the each of the selected characteristics of the farmers and their adoption of BRRI dhan 74 production are shown in Table 4.15.

Table 4.15 Co-efficient of regression showing contribution of the selected characteristics of the cultivars and adoption of BRRI dhan 74 production technologies

Dependent variable	Independent Variable	β	P	R^2	Adj. R^2	F
Adoption of BRRI dhan 74 production technologies	Age	.019	.877^{NS}	0.471	0.412	8.009
	Education	.262	.008**			
	Farm size	-.136	.117^{NS}			
	Family size	-.001	.990^{NS}			
	Land under BRRI dhan 74 production	-.203	.476^{NS}			
	Experience in rice farming	.256	.045*			
	Experience in BRRI dhan 74 production	.018	.826^{NS}			
	Annual family income	.152	.037*			
	Income from BRRI dhan 74 production	.247	.387^{NS}			
	Training on BRRI dhan 74 production	.217	.031*			
	Organizational participation	.084	.384^{NS}			
	Extension media contact	.205	.047*			

^{NS}Not significant; * Significant at 0.05 level of probability and ** Significant at 0.01 level of probability

The value of R^2 is a measure of how of the variability in the dependent variable is accounted by the independent variables. So, the value of R2 = 0.471 means

that independent variables account for 47% of the variation with their adoption of BRRI dhan 74 production technologies. The F ratio is 8.009 which is highly significant (p<001).

However, each predictor may explain some of the variance in respondents their adoption of BRRI dhan74 production technologies simply by chanced. The adjusted R^2 value penalizes the addition of extraneous predictors in the model, but value 0.412 is still show that variance is farmers their adoption of BRRI dhan 74 production technologies can be attributed to the predictor variables rather than by chanced (Table 4.19). In summary, the models suggest that the respective authority should be considers the farmers' education, experience in rice farming, annual family income, training on BRRI dhan 74 production and media contact of the farmers in adoption of BRRI dhan 74 production technologies and in this connection some predictive importance has been discussed below:

4.3.1 Contribution of adoption of BRRI dhan 74 production technologies and their education

The contribution of education of farmers to their adoption of BRRI dhan 74 production technologies was measured by the testing the following null hypothesis;

"There is no contribution of education of the farmers' to their adoption of BRRI dhan74 production technologies".

The following observations were made on the basis of the value of the concerned variable of the study under consideration.

a. The contribution of the education was at 1% significance level (.008).
b. So, the null hypothesis could be rejected.
c. The direction between education and adoption was positive.

The β-value of level education is (0.262). So, it can be stated that as education increased by one unit, farmers' adoption of BRRI dhan 74 production technologies increased by 0.262 units.

Based on the above finding, it can be said that farmers' education increased the farmers' adoption of BRRI dhan 74 production technologies. So, education has significantly contributed to the farmers' adoption of BRRI dhan 74 production technologies. Education plays an important role to reduce problems in adoption of BRRI dhan 74 production technologies in many cases. Education enhances knowledge on many aspects such as training, participation, extension contact and so on.

4.3.2 Contribution of experience in rice farming of the farmers to their adoption of BRRI dhan 74 production technologies

From the multiple regression, it was concluded that the contribution of experience in rice farming to the farmers' adoption of BRRI dhan 74 production technologies was measured by the testing the following null hypothesis;

"There is no contribution of experience in rice farming to the farmers' on adoption of BRRI dhan74 production technologies".

The following observations were made on the basis of the value of the concerned variable of the study under consideration.

a. The contribution of the experience in rice farming was significant at 5% level (.045)
b. So, the null hypothesis could be rejected.
c. The direction between experience in rice farming and adoption of BRRI dhan 74 production technologies was positive.

The β-value of experience in rice farming is (0.256). So, it can be stated that as experience in rice farming increased by one unit, farmers' adoption of BRRI

dhan74 production technologies increased by 0.256 units.

Based on the above finding, it can be said that farmers' had more experience in rice farming increased farmers' adoption of BRRI dhan 74 production technologies. So, experience in rice farming has high significantly contributed to the farmers' adoption increased. Experience in rice farming increase farmer's knowledge about various aspects which helps farmers make enough reduce their problem in rice farming.

4.3.3 Contribution of annual family income of the farmers to their adoption of BRRI dhan 74 production technologies

From the multiple regression, it was concluded that the contribution of annual family income to the farmers' adoption of BRRI dhan 74 production technologies was measured by the testing the following null hypothesis;

"There is no contribution of annual family income to the farmers' on adoption of BRRI dhan74 production technologies".

The following observations were made on the basis of the value of the concerned variable of the study under consideration.

a. The contribution of the annual family income was significant at 5% level (.037)
b. So, the null hypothesis could be rejected.
c. The direction between experience in rice farming and adoption of BRRI dhan 74 production technologies was positive.

The β-value of annual family income is (0.152). So, it can be stated that as annual family income increased by one unit, farmers' adoption of BRRI dhan74 production technologies increased by 0.152 units.

Based on the above finding, it can be said that farmers' had more annual family income increased farmers' adoption of BRRI dhan74 production technologies. So, annual family income has high significantly contributed to the farmers'

adoption increased.

4.3.4 Significant contribution of training in BRRI dhan74 production technology to their adoption of BRRI dhan74 production technologies

From the multiple regression, it was concluded that the contribution of training in BRRI dhan 74 production technology to their adoption of BRRI dhan 74 production technologies was measured by the testing the following null hypothesis;

"There is no contribution of training in BRRI dhan 74 production technology to their adoption of BRRI dhan 74 production technologies".

The following observations were made on the basis of the value of the concerned variable of the study under consideration.

a. The contribution of the training was significant at 5% level (0.031)
b. So, the null hypothesis could be rejected.
c. The direction between training and adoption was positive.

The β-value of training in BRRI dhan 74 production technology was (0.217). So, it can be stated that as training in BRRI dhan 74 production technology increased by one unit, farmers' adoption of BRRI dhan 74 production technologies increased by 0.217 units.

Based on the above finding, it can be said that farmers had more training increased the adoption of BRRI dhan 74 production technologies. So, training has high significantly contributed to the farmers' adoption. Training helps farmers to gather more knowledge on adoption of BRRI dhan 74 production technologies which ultimately helps farmers to reduce their problems in BRRI dhan 74 production technologies.

4.3.5 Significant contribution of extension contact to their adoption of BRRI dhan 74 production technologies

From the multiple regression, it was concluded that the contribution of extension contact to their adoption of BRRI dhan 74 production technologies was measured by the testing the following null hypothesis;

"There is no contribution of extension contact to their adoption of BRRI dhan 74 production technologies".

The following observations were made on the basis of the value of the concerned variable of the study under consideration.

a. The contribution of the extension contact was significant at 5% level (.047)
b. So, the null hypothesis could be rejected.
c. The direction between extension contact and adoption was positive.

The β-value of extension contact was (0.205). So, it can be stated that as extension contact increased by one unit, farmers' adoption of BRRI dhan 74 production technologies increased by 0.205 units.

Based on the above finding, it can be said that farmers had more extension contact increased farmers' adoption of BRRI dhan74 production technologies. So, extension contact has high significantly contributed to the farmers' adoption of BRRI dhan 74 production technologies increased.

CHAPTER V
SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

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

5.1 Summary of Findings

5.1.1 Characteristics of the farmers

Age

The highest proportion 57.02 percent of the rice farmers fell in the "middle aged" category, while 15.70 percent of them fell in the "young aged" category and 27.28 percent in the "old aged" category.

Education

The majority (48.76 percent) of the rice farmers was secondary level of education compared to 28.10 percent of them was illiterate. About 6.61 percent of the farmers were primary level of education, while 16.53 percent was above secondary level of education.

Farm size

The more than half (63.64 percent) of the farmers possessed small farms compared to 30.58 percent of them having marginal farms and 4.13 percent had medium farms and only 1.65 % of the farmers having large farm.

Family size

The majority 48.76 percent of the farmers had medium family size while 20.66 percent of them had large family size and 30.58 percent of them had small family size.

Experience in rice farming

The majority (63.64 percent) of the farmers had medium experience as compared to (17.35 percent) and (19.01 percent) having low and high experience in rice farming respectively.

Experience in BRRI dhan74 production

The majority (55.37 percent) of the farmers had high experience in under BRRI dhan74 production as compared to (4.96 percent) and (39.67 percent) having low and medium experience in under BRRI dhan74 production respectively.

Annual family income

The farmers having medium annual family income constitute the highest proportion (58.68 percent) followed by low income (23.97 percent) and high annual family income (17.35 percent).

Income from BRRI dhan74 production

The highest proportion 71.07 percent of the respondent to medium income from BRRI dhan 74 production, while14.05 percent had low income and 14.88 percent had high income from BRRI dhan 74 production.

Training on BRRI dhan 74 production

The highest proportion 40.50 percent of the farmers had no training on BRRI dhan 74 production; while 37.19 percent of the farmer's low training on BRRI dhan 74 production and 20.66 percent had medium training on BRRI dhan 74 production and only 1.65 percent had high training on BRRI dhan 74 production.

Organizational participation

The majority 54.55% of the farmers had low organizational participation as compared to 28.10% and 16.53% having low and medium organizational

participation respectively.

Extension media contact

The highest proportion 59.50% of the respondents had medium extension media contact as compared to 18.18% and 22.32% having low and high extension media contact respectively.

5.1.2 Adoption of BRRI dhan 74 production technologies

The majority (57.02%) of the farmers had medium adoption on BRRI dhan 74 production that comprised by 15.70 percent and 27.28 percent of the farmers having high and low adoption on BRRI dhan 74 production.

5.1.3 Contribution of the selected characteristics of the respondents and their adoption of BRRI dhan 74 production technologies

To explore the contribution of the selected characteristics of farmers with their adoption of BRRI dhan74 production technologies, multiple regressions model was run to find out the contribution of the selected characteristics of the respondents and their adoption of BRRI dhan74 production technologies. Among 12 selected characteristics of the farmers 5 characteristics namely, education, experience in rice farming, annual family income, training on BRRI dhan74 production and extension media contact of the respondents had significant positive contribution to their adoption of BRRI dhan74 production technologies. Age, farm size, family size, land under BRRI dhan74 production, experience in BRRI dhan74 production, income from BRRI dhan74 production and organizational participation had no significant contribution with their adoption.

5.2 Conclusions

Conclusions drawn on the basis of the findings of this study and their logical interpretation in the light of the other relevant factors are furnished below:

1. In the study area farmers have been adopting BRRI dhan74 production technologies in various extents. There were 57.02% medium adopters, 15.70% high adopters and 27.28% low adopters. Therefore, it may be concluded that the farmers of the study area were adopters in variety of degrees.

2. Majorities (28.10 percent) of the farmers were illiterate. Such result was achieved because there were fewer different NGOs' activities and lower number of educational institutes in the study area. There existed a positively significant contribution between education and their adoption of BRRI dhan74 production technologies. Therefore, it may be concluded that, high educated farmers adopted more BRRI dhan74 production technologies.

3. A great majority (81.99 percent) of the respondents had medium to high experience in rice farming, while there had positive significant contribution with their adoption of BRRI dhan74 production technologies. Therefore, it may be concluded that, the higher experience of the growers; higher their adoption of BRRI dhan74 production technologies.

4. The majority (82.65 percent) of the farmers had low to medium annual family income, while there had a very strong positive significant contribution between annual family income and their adoption of BRRI dhan74 production technologies. Therefore, it may be concluded that, with the increase in annual family income of the farmers tends to increase their rate of adoption.

5. Most of the farmers (57.85 percent) had low training to medium training. Findings expressed that training of the farmers had significant positive contribution with their adoption of BRRI dhan74 production technologies. So, it may be said that the farmers having higher training might be interested to adopt BRRI dhan74 production technologies more.

6. Almost 77.68 percent of the farmers had low to medium extension media contact. Findings expressed that extension media contact of the farmers had significant positive contribution with their adoption of BRRI dhan74 production technologies. So, it may be concluded that if the farmer come in more contact of extension service provider, electronics, and printed media, they would face less problems in adoption of BRRI dhan74 production technologies.

5.3 Recommendations

5.3.1 Recommendations for policy implications

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

1. A majority (72.72 percent) of the farmers had medium to high adoption of BRRI dhan74 cultivation technologies. All the sample farmers were more or less involved in BRRI dhan74 cultivation. But their extent of adoption was not satisfactory. Therefore, it may be recommended that necessary step should be taken to increase the adoption of BRRI dhan74 cultivation technologies in the study area.

2. Education of the farmers had significant positive contribution with their adoption of BRRI dhan74 cultivation technologies. Therefore, it may be recommended that, adult and extension education should be provided to the farmers so that they could increase their educational level which might be helpful to increase their adoption BRRI dhan74 cultivation technologies.

3. The experience in rice farming of the growers had high significant positive contribution with their adoption of BRRI dhan74 production technologies. It leads to the recommendation that extension service should provide adequate farm management advice to the growers for increasing their farming experience. It is a fact that if experience were

increased, growers' receptive capacity to adoption of BRRI dhan74 production technologies will be increased and thereby production will be increased.

4. Annual family income of the farmers had significant positive contribution with their adoption of BRRI dhan74 production technologies. Therefore, it may be recommended that, government and NGOs should provide credit facilities as well as other parties should increase their income with farmers so that their adoption of BRRI dhan74 production technologies could increase.

5. The findings revealed that the training on BRRI dhan74 production had a significant positive contribution with their adoption of BRRI dhan74 production technologies. So, it may be recommended that the concerned authority should increase training facilities to develop skills of the farmers technologically so that they can minimize their problems in adoption of BRRI dhan74 production technologies.

6. The findings extension media contact had a significant positive contribution with their adoption of BRRI dhan74 production technologies. So, it may be recommended that the extension workers of the concerned authority should increase the contact with farmers personally and motivate them to be connected with electronic and printed media that can help them to exchange related information which will reduce their problems in adoption of BRRI dhan74 production technologies.

5.3.2 Recommendation for further study

This study investigated adoption of BRRI dhan74 production technologies by the farmers of Brahmanpara Upazila under Cumilla district. As a small and limited research has been conducted in the present study cannot provide much information related to this aspect. Further studies should be undertaken to cover

more information in the relevant matters. So, the following suggestions were put forward for further research:

- It is difficult to determine the extent of adoption of BRRI dhan74 production technologies by the farmers. Measurement of adoption of the farmers is not free from questions. More reliable measurement of concerned variables is necessary for further study.

- The present study was conducted only in two villages of Brahmanpara Upazila under Cumilla district. Findings of the study need further verification through similar research in other parts of the country.

- The study investigated the contribution of twelve characteristics of the farmers with their adoption of BRRI dhan74 production technologies. So, it is recommended that further study would be conducted with other dependent and independent variables.

- Research should be undertaken on the effectiveness of agricultural extension services and other related organizations in helping farmers for adoption of BRRI dhan74 production technologies.

REFERENCES

Abara, I. and Singh, S. (1993). Ethics and Biases in Technology Adoption: The Small-Farm Argument. Technological Forecasting and Social Change, **43**, 289-289.

Adesina, A. and Zinnah, M. (1992). Adoption, Diffusion, and Economic Impacts of Modern Mangrove Rice Varieties in Western Africa: Further Results from Guinea and Sierra Leone. Towards a New Paradigm for Farming System Research/Extension, 443-466.

Aguila-Obra, A. R., & Padilla-Meléndez, A. (2006). Organizational Factors Affecting Internet Technology Adoption. *Internet Res.*, **16**(1), 94-110.

Ali, M. K., S. A Chowdhury, M. A. Kader and M. O. Gani. (1986). Factors influencing adoption of improved sugarcane production technologies among the growers of sugar mill zone. Bangladesh journal of Extension Education, 1(2): 25-31.

Aurangozeb, M. K. (2002). Adoption of Integrated Homestead Farming Technologies by the Rural Womens in RDRS. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh

Bantel, K. A. and Jackson, S. E. (1989). Top Management and Innovations in Banking: Does the Demography of the Top Team Make a Difference? *Strategic Management Journal*, **10**(2), 107-124.

Barkatullah, M. (1985). Adoption of Livestock of Green Revolution Technologies by the Farmers of Mudstadi Union-A Comparative Study. M.S. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.

Barr, N. and Cary, J. (1992). Greening a Brown Land: The Australian Search for Sustainable Land Use: MacMillan Education Australia Pty Ltd.

Bashar, M. K. (1993). Adoption of Intercropping in Sugarcane Cultivation

M.S. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.

BBS. (2020). Statistical Year Book of Bangladesh. Bangladesh Bureau of Statistics. Statistics Division, Ministry of Planning, Government of the People's Republic of Bangladesh.

BBS. (2019). Statistical Year Book of Bangladesh. Bangladesh Bureau of Statistics. Statistics Division, Ministry of Planning, Government of the People's Republic of Bangladesh.

BEC. (2021). Bangladesh Economic Census. Finance Division, Ministry of Finance, Government of the People's Republic of Bangladesh.

Bezbora, S. N. (1980). Factors Affecting Adoption of Improved Agricultural Technologies for Paddy Cultivation by the Farmers of Assam. Summary of Extension Research. 6: 24-27. Department of Extension Education, Punjab Agricultural University, Ludhiana.

Cary, J., Webb, T. and Barr, N. (2002). Understanding Landholders' Capacity to Change to Sustainable Practices: Insights about Practice Adoption and Social Capacity for Change. Canberra: Bureau of Rural Sciences.

Chau, P. Y. K. and Tam, K. Y. (1997). Factors Affecting the Adoption of Open Systems: An Exploratory Study. *Mis Quarterly*, 1-24.

Chowdhury, M. S. A. (1997). Adoption of BINA Technologies by the Farmers of Boira Union in Mymensmgh District. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension and Education. Bangladesh Agricultural University, Mymensingh.

DAE. (1995). Agricultural Extension Manual. Department of Agricultural Extension, Ministry of Agriculture, Government of the People’s Republic of Bangladesh.

Deressa, T. T., Hassan, R. M., Ringler, C., Alemu, T. and Yesuf, M. (2009). Determinants of Farmers' Choice of Adaptation Methods to Climate Change in the Nile Basin of Ethiopia. *Global Env. Change*, **19**(2), 248-255.

Doorman, F. (1991). A Framework for the Rapid Appraisal of Factors that

Influence the Adoption and Impact of New Agricultural Technology. *Human Organization*, **50**(3), 235-244.

Duncan, B. O. D. Duncan (1969). Family Stability and Occupational Success. *Social Problems*, **16**(3), 273-285.

Feder, G. and Just, D. L. (1985). The Adoption of Agricultural Innovations: A review. *Technol. Forecasting and Social Change*, **43**(3-4), 215-239.

Feder, G. and Umali, D. L. (1993). The Adoption of Agricultural Innovations: A review. *Technol. Forecasting and Social Change*, **44**(3-4), 240-259.

Feder, G., Just, R. E. and Zilbverman, D. (1985). Adoption of Agricultural Innovation in Developing Countries: *A Survey Journal of Economic Development and Cultural Ehange*, **33**: 255-298.

Floyd, C., Harding, A.H., Paudel, K.C., Rasali, D.P., Subedi, K. and Subedi, P.P (2003). Household Adoption and the Associated Impact of Multiple Agric. Technologies in the Western Hills of Nepal. *Agric. Sys.* **76** (2), 715-738.

Gibson, J. (1994). Rice Import Substitution and Employment In Papua New Guinea. *Pacific Economic Bulletin*, **9**(1), 46-52.

Gogoi, S. K. and Gogoi, D. K. (1989). Adoption of Recommended Plant Protection Practices in Rice. *Indian Journal Extension Education*, 25 (1&2): 26-29.

Guerin, L. and Guerin, T. (1994). Constraints to the Adoption of Innovations in Agricultural Research and Environmental Management: A Review. *Australian J. of Exp. Agric.*, **34**(4), 549-572.

Hamid, M. A. (1995). Adoption of recommended sugarcane cultivation practices by the farmers. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education Bangladesh Agricultural University, Mymensingh.

Haque, M. S. (1984). A study on the Adoption of Improved Practices in Sugarcane Cultivation in Some Selected Areas of Jossore District. 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 of the International Conference on Plant Pretection in the Tropics, Kualalumpur: Malaysian Plant Protection Society, 5:30-84.

Hoque, D. M. (2016). Farmers Attitude towards Industrialization in Narayanganj District. Sher-E-Bangla Agricultural University, Dhaka, Bangladesh.

Hoque, M. M. (1993). Adoption of Improved Practices in Sugarcane Cultivation by the Sugarcane Growers in Sreepur Thana under Gazipur District. M.S. (Ag. Ext. Ed.) Thesis Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.

Hossain, K. (2006). Adoption of Selected High Yielding Variety of Rice by the Farmers of Rajpat Union under Kasiani Upzila in Gopalgonj District. .S. (Ag Ext. Edu.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh, Bangladesh.

Hossain, M. N. (1999). Relationships of Selected Characteristics of the Jute Growers wish their Improved Practices of Jute Cultivation. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension and Teachers' Training. Bangladesh Agricultural University, Mymensingh.

Hossain, M., Bose, M. L. and Mustafi, B. A. A. (2013). Adoption and Productivity Impact of Modern Rice Varieties in Bangladesh. *The Developing Economies*, **44**(2), 149-166.

Hossain. M. A. (1991). Adoption Behaviour of Contact Wheat Growers in Sadar Upazila of Jamalpur District. M.S. (Ag Ext. Ed) Thesis. Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensmgh.

Hussen, M. A. M. (2001). Farmers' Knowledge and Adoption of Modem Sugarcane Cultivation Practices. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.

ILEIA. (1991). Information Centre for Low-external Input and Sustainable

Agriculture. Newsletter, 7(3): Leusden, the Nether lands.

Islam, M. S. (2002). Adoption of Modem Agricultural Technologies by the Farmers of Sandip. M.S. (Ag Ext Ed.) Thesis. Department of Agricultural Extension Education. Bangladesh Agricultural University. Mymensingh.

Ison, R. and Russell, D. (2000). Agricultural Extension and Rural Development: Breaking out of Traditions: Cambridge University Press.

Jahan, I. (2017). Socio-Economic Determinants of Adoption of Sunflower Production by the Farmers of Patuakhali Sadar Upazila. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension and Information System, Sher-e-Bangla Agricultural University, Dhaka.

Kashem, M. (2013). Sequential Adoption of Site-Specific Technologies and Its Implications for Nitrogen Productivity: A Double Selectivity Model. *American J. of Agric. Economics*, **83**(1), 35-51.

Kashem, M. A. and Islam, M. M. (1990). 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.

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.

Kerlinger, F. N. (1973). Foundations of Behabioural Research. 2nd Edn. Delhi: Surjeet Publications.

Khan, M. A. H. (1993). Adoption of Insecticides and Related Issues in the Village of Pachon Union, Madaripur District. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.

Khan, M. O. (2019). Adoption of Selected Rice Production Technologies by the farmers of Joypurhat district in Bangladesh. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension and Information System, Sher-e-Bangla Agricultural University, Dhaka.

Kher, S. K. (1992). Adoption of Improved Wheat Cultivation Practices. *Indian Journal of Extension Education,* 22(182):97-99.

Knowler, D. and Bradshaw, B. (2007). Farmers' Adoption of Conservation Agriculture: A Review and Synthesis of Recent Research. *Food Policy*, **32**(1), 25-48.

Krishna, P. V. (1969). Hybrid Maize in Karimnagar. *Economic and Political Weekly*, 4(18):755-756.

Leathers, H. D. and Smale, M. (1991). A Bayesian Approach to Explaining Sequential Adoption of Components of a Technological Package. *American J. of Agric. Eco.*, **73**(3), 734-742.

Lionberger, H. F. (1968). Adoption of New Ideas and Practices: A Summary of Research Dealings with Acceptance of Technological Changes in Agriculture. The Iowa State University Press, Iowa. pp: 403.

Mandal, M. Z. (1980). Adoption of BRRI dhan29 Production Technologies by the Farmers. M.S. Thesis, Department of Agricultural Extension and Information System, Sher-e-Bangla Agricultural University, Dhaka, Bangladesh.

Masud, M. A. (2007). Farmers' Adoption of Modern Maize Cultivation. Sher-E-Bangla Agricultural University, Dhaka, Bangladesh.

Moser, C. M., and Barrett, C. B. (2003). The Disappointing Adoption Dynamics of a Yield Increasing, Low External-Input Technology: The Case of SRI in Madagascar. *Agric. Sys.*, **76**(3), 1085-1100.

Mostofa, M. G. (1999). Adoption of Recommended Mango Cultivation Practices by the Mango Growers of Nawabganj Sadar Thana. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh, Bangladesh.

Muttaleb, A. (1995). Relationship of Selected Characteristics of Potato Growers with their Adoption of Improved Potato Technologies. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.

Nahar, N. (1996). Relationship of Selected Characteristics of the Farm Women

with Usefulness of Agricultural Radio Program and Homestead Farming Knowledge. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.

Niyegela, T. K. (2007). Effectiveness of Farmer Field School in Dissemination of Agricultural Knowledge in Kagera Region. Dissertation for Award of MSc Degree at Sokoine University of Agriculture, Morogoro, Tanzania, pp: 104.

Ogunlana, E. A. (2004). The Technology Adoption Behavior cf Women Farmers: The Case cf Alley Farming in Nigeria. *Renewable Agric. and Food Sys.*, **19**(01), 57-65.

Okoro, M. N. and Obibuaka, L. U. (1992). Factors influencing the adoption of improved oil palm management practices among Small holders in IMP States, Nigeria *Bangladesh Journal of Extension Education*, 7 (1&3): 45-52.

Osunloogun, A., Ademoyo, R. and Anyanwu, E. (1996). "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 in Two selected Centres of North Bengal Sugar Mills. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensmgh.

Pannell, D. J., Marshall, G. R., Barr, N., Curtis, A., Vanclay, F. and Wilkinson, R. (2006). Understanding and Promoting Adoption cf Conservation Practices by Rural Landholders. *Australian J. of Exp. Agric.*, **46**(11), 1407-1424.

Poddar, K. K. 2015. Effects of Climate Change on Rural Farmers Livelihood. M.S. (Ag. Ext. & Info. Syst) Thesis, Department of Agricultural Extension and Information System, Sher-e-Bangla Agricultural University, Dhaka.

Podder, S. K. (1999). Adoption of Mehersagar Banana by the Farmers of Gazaria Union under Sakhipur Thana of Tangail 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 Boro Rice Farmers of Ishwarganj Thana. M.S. (Ag. Ext. Ed.) Thesis Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.

Rahman, M. S. (2001). Knowledge, Attitude and Adoption of the Farmers Regarding Aalok 6201 Hybrid Rice in Sadar Upazila of Mymensingh District. MS. (Ag Ext. Ed.) Thesis. Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.

Ray, G. L. (1991). Extension Communication and Management. Calcutta: Naya Prokash.

Risingbd. (2014). Rice Production in Bangladesh. Risingbd, An online news Portal. Retrieve from: http://www.risingbd.com/english/ Rice_production_reach es_34449_million_ton_in_FY_2013-14/16217.

Rogers, E. (2003). Diffusion of Innovations. Fifth Edition, Free Press, New York. pp: 221.

Rogers, E. M. (1983). Diffusion of Innovation. (3rd Ed.), Macmillan Publisher, NeYork.11pp,453pp. (http//enwikipedia.org/wiki/Technology _adoption

Rogers, E. M. (1995). Diffusion of Innovations. (4th Ed.), Free Press, New York.

Sardar, M. H. U. (2002). Adoption of IPM Practices by the Farmers under PETRRA Project of RDRS M. S. (Ag. Ext Ed.) Thesis. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.

Sarkar, D. C. (1997). Correlation of Selected Characteristics of Potato Growers with their Adoption of Improved Potato Cultivation Practices in Five Villages of Commilla District M.S (Ag. Ext Ed.) Thesis. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.

Singh, P. K. (1989). Extent of Adoption of Selected Recommended Practices

by Kinnow Growers of Ferozpur and Fridcot district of Punjab. M. S. Thesis Abstract Panjab Agricultural University, Ludhiana**.**

Slade, R., Feder, G. and Shikaria. (1988). Reforming Agricultural Extension. The Training and Visit System in India. *Quarterly Journal of International Agricultural;* (3 & 4): 228-246.

Sobhan, M. A. (1975). Adoption of Winter Vegetable Cultivation by the Farmers in Boilor Union of Mymensingh District. M.S. (Ag.Ext.Ed.) Thesis, Bangladesh Agricultural University, Mymensingh, Bangladesh.

Spence, W. R. (1994). Innovation: The Communication of Change in Ideas, Practices And Products: Thomson Learning.

Staal, S., Baltenweck, I., Waithaka, M., DeWolff, T. and Njoroge, L. (2002). Location and Uptake: Integrated Household and GIS Analysis of Technology Adoption and Land Use, With Application to Smallholder Dairy Farms in Kenya. *Agric. Eco.*, **27**(3), 295-315

Tolawar, S. and Hirevenkarangouda, L. V. (1989). Factors of Adoption of Poultry management practices. *Indian Journal of Extension Education*, 25(l&2):67-73.

Townsend, J. C. (1953). Introduction to Experimental Methods. International Student Edition. New York: McGraw Hill Book Company, Inc.

Van den Ban, A. and Hawkins, H. (1996). Agricultural Extension. London, Cambridge.

Van den Ban, A.W. and Hawkins, H. S. (1996). Agricultural Extension 2nd Ed. Published by Black Well Science Ltd., London. pp: 294.

Webb, T. (2004). Understanding Behaviour: Social and Economic Influences on Land Practice Change. Land Management Practices Information, Priorities, Classification and Mapping-Towards an Agreed National Approach. Kamberra Winery, Canberra, pp: 11-12.

Wilkinson, R. (2011). The Many Meanings of Adoption. Changing Land Management: Adoption of New Practices by Rural Landholders, 39.

Appendix -A

English version of the Interview Schedule
Department of Agricultural Extension & Information System
Sher-e-Bangla Agricultural University
Dhaka – 1207

Interview Schedule for data collection for the Research on

"Adoption of BRRI dhan 74 Production Technologies by the Farmers of Brahmanpara Upazila under Cumilla District"

(This interview schedule is entitled for a research. Collected data will only be used for research purpose and will be published aggregately)

Serial No.…….
Name of the respondent ……..
Village ……Union ……
Upazila ……District
……..

1. **Age**:
2. What is your present age? …… Years.
3. **Education:**
   a) Cannot read and write …….. b) Can sign only…….
   c) I read up to class …….
3. **Farm size**;

Please indicate area of your lands according to the following items

Sl. No.	Use of land	Measuring unit	
		Local unit	Hectare
1	Homestead area (A_1)		
2	Own land under own cultivation (A_2)		
3	Land taken from others on borga system (A_3)		
4	Land given to others on borga system (A_4)		
5	Land taken from others on lease (A_5)		
Total farm size = $A_1+A_2+1/2(A_3+A_4)+A_5$			

4. **Family size**
   How many members are there in your household including you? .....
5. **Land under BRRI dhan 74 production**
   What is the area you used for BRRI dhan 74 production in last year?
   Ans:……. ha.
6. **Experience in rice farming**
   How long have you engaged with rice farming?
   Ans:……years
7. **Experience in BRRI dhan 74 production**
   How long have you engaged with BRRI dhan 74 production?
   Ans:……years

8. Annual family income

Please indicate the income of your family from different sources in the last year.

Sl. No.	Sources of income	Value (TK)
1.	Crops:	
	a) Rice	
	b) Wheat	
	c) Jute	
	d) Vegetables	
2.	Livestock	
3.	Poultry	
4.	Fisheries	
5.	Others (please specify)	
Total		

9. Income from BRRI dhan 74 production

How much did you earn from BRRI dhan74 production in the last year?

Sl. No.	Name of the product	Total production (local unit)	Price/unit (tk.)	Total price (tk.)	Production cost (tk.)	Net income (tk.)
1.	BRRI dhan74 production					
2.	By products					

10. Training on BRRI dhan 74 production

Have you participated in any training program regarding BRRI dhan 74 production?

i. Yes
ii. No

If yes, furnish the following information:

No.	Name of the training	Sponsoring Organization	No. of Days

11. Organizational participation

Please mention the nature and duration of your participation in the following organizations.

.No	Duration and Nature of participation				
	Name of the organizations	No participation	Ordinary Member	Executive Member	Executive Officer (President, Secretary, Treasurer)
1	NGO (eg. BRAC, PROSHIKA, ASA, Grameen Bank)				
2	IPM/ICM Club				
3	Farmers' Cooperative Society				

4	Youth Club				
5	Bazar Committee				

12. Extension media contact

Please indicate the extend of your contact with the following information sources for BRRI dhan 74 production:

No.	Sources	Not at all (0)	Extent of Contact			
			Rarely (1)	Occasionally (2)/	Often (3)	Regularly (4)
1	Peer farmers /Neighbors		1 time /month	2-3 times /month	4 - 5 times /month	More than 5 times /month
2	SAAO		1 time /month	2-3 times /month	4 - 5 times /month	More than 5 times /month
3	AAEO/AEO		1-2 times /year	3-4 times /year	5- 6 times /year	More than 6 times /year
4	UAO		1-2 times /year	3-4 times /year	5- 6 times /year	More than 6 times /year
5	NGO workers		1 time /month	2-3 times /month	4 - 5 times /month	More than 5 times /month
6	Inputs dealers (Fertilizer, Pesticides, Irrigation)		1 time /month	2-3 times /month	4 - 5 times /month	More than 5 times /month
7	Farm Radio Program listening		1 time /month	2-3 times /month	4 - 5 times /month	More than 5 times /month
8	Farm TV program watching		1 time /month	2 - 3 times /month	4 - 5 times /month	More than 5 times /month
9	Agril. Info. Centre (eg. AISS, DISC)		1 time /month	2-3 times /month	4 - 5 times /month	More than 5 times /month

13. Adoption of BRRI dhan 74 production technologies

Please give information about the use of following of BRRI dhan 74 production technologies:

Sl. No	Technologies	Potential Area (L)	Allocated Area (l)	Years of the adoption		
				2017-18	2018-19	2019-20
1	Seedling growing method					
2	Alternate Wetting and Drying (AWD)					
3	Modern agricultural machineries					

4	Line transplanting					
5	Roughing					
6	Use of Guti urea					
7	Integrated Pest Management (IPM)					
8	Use of organic fertilizer					

$$\text{Adoption scores} = \frac{\sum x}{\text{No. of technologies}} \times 100$$

Thanks for your co-operation

Date:

_____

Signature of the interviewer

CHAPTER I
INTRODUCTION

1.1 General Background of the Study

Bangladesh is an agrarian country; about 76% of the people live in rural areas, and 47.5% of the total manpower is involved in agriculture. In Bangladesh, agriculture contributes 13.10% of the gross domestic product (GDP) of the country in the year of 2020-2021 (BEC, 2021). Bangladesh has a long history of rice cultivation. Rice is grown throughout the country except in the southeastern hilly areas. The agroclimatic conditions of the country are suitable for growing rice year-round. However, the national average of rice yield is much lower (2.94 t/ha) than that of other rice-growing countries (BBS, 2019). Rice is the staple food for about 166 million people of the country. The population growth rate is 1.36 percent per year, and if the population increases at this rate, the total population will reach 238 million by 2050. An increase in total rice production is required to feed this ever-increasing population. At the same time, the total cultivable land is decreasing more than 1% per year owing to the construction of industries, factories, houses, and highways. On the other hand, due to urbanization, food habits tend to be changed demanding the cultivation of new crops that should share land used for rice cultivation. Therefore, the modern varieties of rice have the capacity to contribute to increase the yield per unit area. Among the modern varieties, BRRI dhan74 is tend to have the capacity to increase rice production in a sustainable manner for the food and nutritional security of this highly populated country.

There are three rice-growing seasons in Bangladesh: Aus, Aman, and Boro. Aus is the pre-monsoon upland rice growing season under rain fed conditions. Boro is the dry-season irrigated rice planted from December to early February and harvested between April and June. Earlier, Boro was grown in the very low-lying areas with residual water from the wet season and irrigated manually

using surface water in times of water shortage (Fujita, 2010). Such traditional boro rice was transplanted after the recession of floodwater in November and harvested from April to May. In the mid-1960s, the modern high yielding rice variety IR-8 was introduced in Bangladesh agriculture, primarily for Boro using irrigation. Then, beginning in 1970, another International Rice Research Institute (IRRI) bred variety IR-20 was introduced to farmers for the Aman season. Since 1973, the Bangladesh Rice Research Institute (BRRI), in partnership with IRRI, has been engaged in adaptive research to evaluate elite genetic lines under the IRRI-managed International Network for Genetic Evaluation of Rice (INGER). Under the brand name BR, and later BRRI dhan, it has released varieties that suit the agro-ecological conditions in Bangladesh (Hossain *et al.*, 2013). Many IRRI lines were well suited in Bangladesh for the Boro season, such as BR1, BR3, BR14, BRRI dhan28, BRRI dhan29 and BRRI dhan74.

The development of groundwater irrigation system by tube wells accelerated, the rapid installation of shallow tube wells throughout the 1980s boosted the cropped area and yield of dry-season Boro rice dramatically (Fujita, 2010). With the introduction of ground water irrigation systems and the incorporation of modern high-yielding varieties, dry-season Boro rice gained popularity. The rice cropping pattern of Bangladesh has changed-areas once occupied by the rainfed Aus gradually shifted to Boro cultivation. As a result, the contribution from each season also changed-Aman rice previously contributed a major portion of total rice, but Boro is now the major contributor to total rice production in the country, despite Aman coverage area being greater. Aus, Aman, and Boro rice were recently reported to account for 7%, 38%, and 55%, respectively, of the total rice production in Bangladesh (Risingbd, 2014). In the year 2018-2019, rice production was 43.3 million ton (BBS, 2020). Bangladesh has made notable progress in sustaining commendable growth in rice production, and this growth in production has originated mostly from the shift from low-yielding traditional to high-yielding modern varieties when irrigation

facilities were developed (Hossain, 2006). Another factor contributing to the increase total rice production by irrigation and modern rice varieties such as BRRI dhan74 is the key to change the rural economy.

Although Bangladesh has an agrarian economy, about 89% of total farm-holdings are below 2.49 acres in size (Kashem, 2013). Socioeconomic factors, such as the predominance of small and marginal farmers and tenancy cultivation in agrarian structure, did not impede the adoption of modern rice varieties in Bangladesh (Mandal, 1980). Moreover, the major constraints to the adoption of modern rice varieties were in fact logistic factors (Hossain, 2006).

History proves that the logical development (when rehearsed by expansive number of rice cultivators) decisively affect rice generation in nations like Japan, the Philippines and Indonesia. It is likely that the farmers of Bangladesh will create comparable outcomes on the off chance that they receive modem innovations and utilize sufficient and gainful info on their territories. It is along these lines, vital that the idea and advantages of modem advances ought to be scattered to the farmers in persuading and appealing way, so that agriculturist reaction rapidly to receive those advances. This is without a doubt an educative process and, concerned for the most part with expanding farming generation and enhancing expectations for everyday comforts of farmers. The legislature has taken another rural augmentation strategy to achieve the craved objective. An individual more often doesn't receive another innovation unless he finds the advantage of it by himself. Regardless of the possibility that he is persuaded about its advantage still he may not utilize the same due to absence of money related capacity. Now and again, he may have intended to utilize the innovation however his social standards and conventions does not urge him to utilize the same for prestigious elements. All these identity socio-economy and mental elements take a shot at a person when he is gone up against with another circumstance or with a changed program.

Cumilla locale is considered as surplus rice growing zone of the nation, where BRRI dhan74 was a noteworthy endeavor. Brahmanpara upazila range, in this manner, considered a most reasonable area to concentrate the marvels of selection of BRRI dhan74 innovations by the rice cultivators. Contemplates on individual, gathering and society uncovered that acknowledgment of modem innovations is restrictive upon many variables. Some of these are social, individual, practical and situational components. While directing any review on the reception of modem advancements, these elements should be considered. An extremely couple of past research work attempted to discover the above certainties. Subsequently, the present examine felt need to lead an exploration entitled "Adoption of BRRI dhan74 production technologies by the farmers in Brahmanpara upazila under Cumilla District."

1.2 Statement of the Problem

The achievement of any innovation relies on its dissemination among the potential clients, which eventually is measured by the level of selection of that innovation. Whenever advancement is acquainted with the farmer, it might be promptly or somewhat or completely acknowledged and it might likewise happen that the reception of advancement is stopped or completely ceased.

These happenings are unquestionably because of various variables. Selection of BRRI dhan74 innovations are impacted by the farmer's statistic and financial position. A comprehension about a similar will be helpful to the specialists, organizers and augmentation specialists in doing exploration, arranging and execution of expansion projects for upgrading adoption of BRRI dhan74 production technologies. The motivation behind this review along these lines was to investigate the connections between various qualities of the farmers and their selection of BRRI dhan74 production. This was finished by looking for answers to the accompanying queries:

i. What are the attributes of BRRI dhan29 producers?
ii. To what extent the BRRI dhan74 production technologies were adopted by the farmers?
iii. What personal and socio-economic characteristics influence farmers to adopt BRRI dhan74 production?
iv. To what extent of the selected characteristics of farmers contribute to the adoption of BRRI dhan74 production technologies?

The above-mentioned questions obviously impel the researcher for conducting the present research entitled "Adoption of BRRI dhan74 production technologies by the farmers in Brahmanpara upazila under Cumilla District".

1.3 Specific Objectives of the Study

i. To determine the socioeconomic characteristics of the BRRI dhan74 cultivars;
ii. To determine the extent of adoption of BRRI dhan74 production technologies; and
iii. To explore the contribution of the factors that significantly influences adoption of BRRI dhan74 production technologies by the farmers.

1.4 Justification of the Study

Cumilla district has a rich heritage of the farmers mostly living in hilly areas, except Brahmanpara upazila. This area is suitable for hybrid rice seed production considering following aspects i) temperature, ii) wind follow, iii) sun light, iv) rain fall and v) low storm. In that areas deficit of food grains is a chronic problem as the pressure of population is massive. Limitation of cultivable land and lack of knowledge and skill about selective hybrid rice seed production are the major problem for the farmers. So, to ensure adequate food supply, it is necessary to give thrust to increase food production using BRRI dhan74 production technologies. Agricultural intensification, to minimize food

shortage and maximize self-sufficiency in food production is possible only when Adoption of BRRI dhan74 production technologies and their application skills create positive impact on the behavior of ultimate users.

Several research institutes have developed quite a good number of modern agricultural technologies but the farmers have so far adopted a few of them. Technical, biological, environmental and socio-economic barriers are the main hindrances of technology transfer and adoption of hybrid rice seed production technologies. Selected BRRI dhan74 production technologies must be simple, demand driven, locally available, economically feasible and socially acceptable to bring desirable changes in attitude of the farmers for their adoption.

It is obviously true that farmers are the key elements of adoption of BRRI dhan74 technologies. At present, there is a lack of adequate understanding as to how the characteristics of the farmers influence their adoption of hybrid rice seed cultivation technologies. These facts indicate the need for an investigation to ascertain the relationships of the characteristics of the farmers with their adoption of BRRI dhan74 production technologies. Findings of this study, therefore, would be helpful to the planners and extension personnel in planning and execution of programs for enhancing the rice production yield.

1.5 Assumptions of the Study

In this study, the researcher had the following assumptions in mind while carrying out the study:

1. The farmers included in the sample were competent to furnish proper responses to the items included in the interview schedule.

2. The researcher who also acted as the interviewer was well adjusted to the socio-cultural environment of the study area. The researcher collected data with utmost care and can be treated as reliable.

3. The responses furnished by the respondents were reliable and they truly expressed their opinion on adoption of BRRI dhan74 production technologies and their selected characteristics.

4. The sample size was representative of the whole families of the study area.

5. The findings of the study would be useful for planning and execution of the programmers in connection with adoption of BRRI dhan74 production technologies.

6. The measures of the adoption of BRRI dhan74 production technologies by the farmers are normally and independently distributed with their respective means and standard deviation.

7. The adoption of BRRI dhan74 production technologies by the farmers was linearly related with their selected characteristics.

1.6 Scope of the Study

The findings of the study will particularly be applicable to Brahmanpara upazila under Cumilla district. However, the findings may also be generally applicable to other areas of the district where the social ecosystem is not differing much with those of the study area. Thus, the findings are expected to be useful to the planners for preparation of programmers for rapid adoption of BRRI dhan74 cultivation technologies by the farmers. The findings may also be helpful to the extension workers of different national building departments / organizations to improve their technique and strategy of action for effective working method with the people to generate rural employment and to improve rural economy. Finally, there is a great scope for investigation on farmers' adoption of BRRI dhan74 production technologies, because little study was conducted on this so far in greater Cumilla district.

1.7 Limitations of the Study

The present study was undertaken with a view to have an understanding on the level of adoption of BRRI dhan74 production technologies by the farmers of Brahmanpara upazila under Cumilla district. In order to manage the handle, the research, it became necessary to impose some limitations on certain aspects of the study. Considering time, money and other necessary resources available to the researcher, the following limitations had been observed throughout the study:

1. The study was confined to villages of Brahmanpara upazila under Cumilla district.
2. Eight (8) BRRI dhan74 production technologies were selected to examine the extent of adoption among the rice growers of farmers of Brahmanpara upazila.
3. Only the farmers who cultivated BRRI dhan74 were selected for this study.
4. There are many attributers or characteristics of the growers that always vary but only twelve (12) 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 farmers from their memory during interview.
6. Population for the present study was kept confined within the heads of farm families in the study area, because they were the decision makers in their respective rice cultivation technologies.

1.8 Definition of the Terms

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

Age: Age of the respondent was defined as the period of time in actual years from his birth up to the time of interviewing.

Education: Education referred to the development of desirable Knowledge, skill and attitude in the individual through reading, writing and other related activities. It was measured in terms of actual grades or class passed by a respondent.

Farm size: It referred to the total area on which a farmers family carries on farming operation. The area is estimated in terms of full benefit to the farmers family.

Family size: Family size of sugarcane growers refers to the actual number of members in this family.

Experience in rice production: Experience as a general concept comprises knowledge or skill of something or some event gained through involvement in or exposure to that thing or event. Experience refers to the nature of the events someone or something has undergone. Experience is what is happening to use all the time-as long we exist. However, in this study, it was considered as the year of starting from first rice production till the year of data collection.

Annual Family Income: The term annual family income refers to the annual gross income or total earning of a respondent himself and the members of his family from agriculture, service, business and other sources during a year. It was expressed in taka. However, a unit scores of one (1) was assigned for each thousand-taka income.

Training received: It referred to the total number of days that a respondent received training in his entire life from different organization under different training programs.

Extension contact: It refers to the extent of contact with various communication media by the farmers in receiving agricultural information.

Improved Seed: Improved seed means standardized quality seed, which possesses the quality of the varietal purity, germination capacity, physical purity, optimum moisture content, optimum size and shape, healthy and vigorous.

Technology: Technology is a design of instrumental action that reduces the uncertainty in the cause-effect relationship involved in achieving a desired outcome (Rogers, 1995). In other words, technology refers to the combination of knowledge, inputs and managed mental practices, which are used together with productive resources to gain a desired output (ILEIA, 1991: 3).

BRRI dhan74 production technologies: BRRI dhan74 production technologies referred to the different kind of technologies which were used for BRRI dhan74 cultivation. In this study, technology was defined as the combination of four practices (i.e. variety, intercropping, recommended dose of urea and use of Sheller) used for BRRI dhan cultivation.

Variable: A general indication in statistical research of characteristic 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).

CHAPTER II
REVIEW OF LITERTURE

Review of literature gives the clear and concise direction to the researcher for conducting the experiment. In this Chapter, review of literatures relevant to the objectives of this study was presented. This was mainly concerned with "adoption of modern technology". There was dearth of literature with respect to research studies on this aspect. So, the directly related literatures were not readily available for this study. Some researchers addressed various aspects of the adoption of technology and its effect on client group and suggesting strategies for their emancipation from socio-economic deprivations. A few of these studies relevant to this research are briefly discussed in this chapter under the following three sections:

Section 1: Concept of Adoption and Agricultural Innovation
Section 2: Factors Related to the Adoption of Agriculture Technology
Section 3: Review of the Studies Concerning the Relationship between Farmers' Characteristics and Their Adoption
Section 4: Conceptual Framework of the Study

2.1 Concept of Adoption and Agricultural Innovation

2.1.1 The concept of adoption

According to Feder *et al.* (1985), adoption is "the degree of use of new innovation in long run equilibrium when a farmer has full information about the new technology and its potential". However, the equilibrium level of adoption will not be achieved if the technology is still being experimented by the farmers. Rogers (1995) defines innovation as an idea, practice, or object that is perceived as new by an individual or other unit of adoption. This wide definition captures any idea or process that is perceived to have utility. Lionberger (1968) and Van den Ban and Hawkins (1996) contended that, adoption is a process, which the decision to adopt usually takes time. People do

not adopt new practice or idea as soon as they hear about it; they may wait several years before trying it. Therefore, the adoption and diffusion of innovation process has been characterized as the acceptance overtime of some specific items by individuals (or adoption unit) linked to specific channels of communication. In this study the word innovation, technology and recommended practices will be used interchangeably.

2.1.2 Technology adoption

The term technology „has been defined in different ways by various authors. Rogers (1995) defined technology as, the design for instrumental action that reduces the uncertainty in the cause-effect relationship involved in achieving a desired outcome. According to Guerin and Guerin (1994), and Rogers (1995), technology is usually comprised of hardware (the object component) and software (idea component) but it can also be made up entirely of information, which is the software component. In contrast, however, Ison and Rusell (2002) defined technology as the application of scientific knowledge to practical tasks. Abara and Singh (1993) in their work on the ethics and biases of technology adoption supported this view. They argued that it is the actual application of knowledge that is termed - technology. According to Phiri (2011), this definition by Ison and Rusell (2002), and Abara and Singh (1993) can be best used to describe those technologies that are comprised of entirely new ideas or information. Feder and Just (1985) on the other hand, described technology as an agricultural practice that is considered new to an area. These agricultural practices (technology) may take the form of new machinery, a high yielding crop, a recommendation for a new method of fertilizer use, or new methods of controlling pests and diseases (Guerin and Guerin, 1994). The word technology and innovation are used synonymously (Rogers, 2003). Various definitions are used in the literature to refer to the ideas, practices or objects perceived to be new by a potential adopter. Guerin and Guerin (1994) support Rogers (2003) definition of innovation as an-idea, practice or object perceived as new by an individual or other unit of adoption. They defined innovation in terms of how it

is viewed by farmers whilst making a decision to adopt or reject it. Therefore, a technology can be a new idea, technique or object. For this study, the term technology will be used from this point onward to also mean innovation. In the following section, the adoption process is reviewed.

2.1.3 Adoption process

Rogers (2003) described adoption as the decision by an individual to use the introduced technology as the best available alternative. Feder *et al.,* (1985) on the other hand defined adoption as-the degree of use of a new technology in the long-run equilibrium when farmers have the full information about the new technology. According to Spence (1994), adoption is not a one-off decision but a process in which the individual finally decides to use the introduced ideas or techniques, after a thorough assessment has been carried out. On the other hand, Guerin and Guerin (1994) defined technology adoption as - the implementation of the already transferred knowledge about a technological innovation and is the end product of the technology transfer is the process. According to Rogers (2003), technology adoption involves a mental process that individual goes through when he or she becomes aware of information regarding the idea that is perceived to be new. The adoption process continues until decisions are made to use or reject the new idea (Rogers, 2003). The five steps in the adoption decision process are conceptualized as knowledge, persuasion, decision, implementation, and confirmation (Rogers, 2003). Spence (1994) on the other hand, indicated awareness, interest, evaluation, trial and adoption, as the stages involved in the adoption process. Although these authors term the adoption process differently, the steps described by them although have some minor differences, are very similar. These two models are compared in the following paragraphs.

The knowledge stage of the model is when an individual becomes aware of the existence of a technology as he/she receives information about it and

understands how it works (Rogers, 2003). However, Spence (1994) described this stage as the awareness stage. Spence further pointed out that the individual may obtain the information through mass media, or from written, spoken or visual material which the individual farmer can access.

The second stage of Rogers (2003) model is persuasion. At this stage, an individual may change his/her attitude towards the technology being introduced. Spence (1994) described this as the interest stage, whilst Pannell *et al.*, (2006) referred to it as the non-trial evaluation phase. During the interest stage, an individual will typically attempt to gain more factual data in order to enable an examination of the innovation at a closer level and to explore it in the context of personal circumstances, past experiences, and prevailing beliefs (Spence, 1994).

The third stage of Rogers (2003) model is decision. During this stage, the individual farmer engages in the activities that will consequently lead to the adoption (or rejection) of the new idea or technique. Spence (1994) considered this to be the evaluation of an innovation. Furthermore, during this process, an individual is attempting to assess whether the advantages will outweigh any perceived disadvantages. Pannell *et al.*, (2006) however, described this stage as the trial evaluation. They stressed that trials contribute substantially to both the decision-making and skill development aspects of the learning process. If small-scale trials are not possible (or not enlightening) for some reason, the opportunities for widespread adoption are greatly diminished. Farmers will be cautious about leaping into full-scale adoption due to the risk that the innovation may prove to be a full-scale failure. Practices which are not trial able may still be adopted, but generally the adoption occurs only after substantial information-seeking, discussion, analysis, and reflection (Pannell *et al.*, 2006).

The fourth stage of Rogers (2003) model is implementation. At this stage, the individual begins to completely apply or use the new idea (Rogers, 1995, 2003). Also, at this stage, farmers often look for more information to find out whether they have made the correct decision by adopting the technology (Van den Ban and Hawkins, 1996). Spence (1994) considered this stage as a trial stage, since the implementation of the new idea is undertaken on a smaller scale. Duncan (1969) confirmed Spence's argument by stating that adoption is not an all-or-nothing decision. He suggested that there is a grey area between small-scale trialing and the eventual scale of adoption. Adoption is often a continuous process and it may occur within a gradual or stepwise manner, which sometimes results in only a partial adoption (Wilkinson, 2011). Farmers often change and modify their practices or technology, in order to adapt it to their own circumstances. However, Rogers (1995, 2003) argued that this is a full implementation stage, since the decision has already been made.

The fifth stage of Rogers (2003) model is confirmation. This stage is reached when the individual seeks more information towards supporting and reinforcing the decision he or she has made or when he or she discontinues the use of the new idea because of resultant difficulties (Rogers, 2003). Adopters, who are sometimes confronted with conflicting messages from change agents or peers, regarding the new practices, tend to discontinue using the new practice (Van den Ban and Hawkins, 1996). Some adopters may discontinue the use of a new idea or practice after adoption (Rogers, 2003). The discontinuation of a technology may be a result of the individual adopter being dissatisfied with the performance of the new idea or practice. It may also due to the fact that the individual has found a new practice that surpasses the existing one and as such they would like to replace it (Rogers, 2003). Spence (1994) on the other hand indicated that such a rejection could happen immediately after the acceptance of a technology, if there is a better alternative. The adoption of technology is influenced by a range of factors. In the following sections, the factors that influence the adoption decision of a new technology are examined.

2.1.4 Levels of adoption of agricultural innovation

Agriculture is a way of life to many subsistence farmers and other farmers are in constant search of ways in which to improve upon their lives. In agriculture context, adoption is decision made by an individual to start using new agricultural innovations with the aim to increase productivity. This might be a new crop variety or management practices adopted by an individual, family or corporation. Adoption of agricultural technologies is considered as one of the ways that offer opportunities for improved agricultural production and hence improved life (Niyegela, 2007).

The technology must be widely adopted in order to self-sustain. Within the rate of adoption, there is a point at which agricultural technology reaches critical mass. The categories of adopters are: innovators, early adopters, early majority, late majority, and laggard. Innovators (2.5%) - had larger farms, were more educated, more prosperous and more risk-oriented, early adopters (13.5%) - younger, more educated, tended to be community leaders, less prosperous, early majority (34%) - more conservative but open to new ideas, active in community and influence to neighbors, late majority (34%) - older, less educated, fairly conservative and less socially active, laggards (16%) - very conservative, had small farms, oldest and least educated. Level of adoption of technology manifests itself in different ways in various cultures and fields and is highly subject to the type of adopters and innovation-decision process (Rogers, 1983).

2.2 Factors Related to the Adoption of Agriculture Technology

There were a number of factors identified in the literature, which have influenced the adoption of agricultural technology. Drawing on several studies on technology adoption such as Adesina and Zinnah (1992); Aguila-Obra and Melendez (2006); Chau and Tam (1997); Doorman (1991); Feder, Just and Zilberman (1985); Rogers (1985). It can be ascertained that the factors, which influence the farmers‟ decision to either adopt or not to adopt a technology can

be grouped under three major headings: 1) the characteristics of the technology; 2) internal factors; and 3) external factors. These factors are discussed in the following section.

2.2.1 Characteristic of technology

Rogers (1995) identified five characteristics of a technology that influenced adoption. These are: 1) relative advantage; 2) compatibility; 3) complexity; 4) trialability; and 5) observability. Feder *et al.*, (1985) identified three others and classified these technologies in relation to resource use. These characteristics included: 1) capital-saving or capital intensive; 2) land-saving or land-using; and 3) labor-saving or labor using. Feder and Umali (1993), Leathers and Smale (1991), and Pannell *et al.*, (2006) also identified associated risks with a new technology as an important factor that influenced adoption decisions of individuals. The following sections draw on the relevant literature to describe in detail each of these factors and their impacts on the adoption decisions of individuals.

a) Relative advantage

Relative advantage is the degree to which an innovation is perceived to be better than the idea it supersedes (Rogers, 1995). Relative advantage can also be described as the advantage of an innovation to achieve goals better (or at a lower cost) than previously (Van Den Ban and Hawkins, 1996). The degree of relative advantage is commonly expressed as economic profit, social prestige or other benefits (Rogers, 1995). It has been found that agricultural practices, which are believed to be profitable, have an increased likelihood of adoption, whilst those that are believed to provide less return are less likely to be adopted (Barr and Cary, 1992; Webb, 2004).

b) Compatibility

Compatibility refers to the degree to which an innovation is perceived as consistent with existing values, past experience, and the needs of the potential

adopter (Roger, 1995; 2003). The more compatible an innovation is to a potential farmer's life experiences and situation, the more familiar they will be with the innovation and the less uncertain they will be about adopting the innovation (Deressa *et al*., 2009). Ogunlana (2004) also defined compatibility as being the ease by which the farmers can integrate the new practices into their farming system and access other relevant inputs that would help in its adoption.

c) Complexity

The complexity factor is the degree to which a technology is perceived to be difficult to understand and use (Rogers, 2003). The greater the complexity of an innovation the more negatively a new farmer may view the technology. For example, the discontinuation of a system of rice intensification program, which was introduced in Madagascar for rice farmers, was largely due to the difficulties faced by farmers in understanding the application of the new practices and methods (Moser and Barrett, 2002). Gibson (1994) shared a similar view and reported that farmers in Papua New Guinea rejected growing rice because rice cultivation was seen as complex and difficult to manage.

d) Trialability

Trialability is the degree to which the technology can be tested on a small scale (Rogers, 2003). Ogunlana (2004) pointed out that farmers are always keen to adopt technologies which they have first trialed on a limited basis on their farm, compared to one they have to adopt on a larger scale - which might fail. Floyd *et al.*, (2003) and Rogers (2003) added that a technology, which can be gradually implemented without a large capital investment from outside, is important, since it will certainly enhance the farmers‟ decision to adopt the technology.

e) Observability

Observability is the degree to which the results of a technology can be visible to others (Rogers, 1995). *Cary et al.*, (2002) argued that a profitable outcome is

an important factor that influences the adoption decision. A lack of observable profit, as result of adopting a technology would inhibit the adoption of the technology by others. The more observable the outcomes of an innovation offer and is perceived as being suitable by the farmer, the rate of adoption will become more positive (Rogers, 2003). For example, in a study on mangrove swamp rice varieties in Sierra Leone, Adesina and Zinnah (1992) found that farmers adopted a new variety of rice introduced to the area because they observed that the results were highly visible.

2.2.2 Internal factors

Several authors (Bantel and Jackson, 1989; Deressa *et al.*, 2009; Knowler and Bradshar, 2006; Pannell *et al.*, 2006; Staal *et al.*, 2002) suggested that there are four key internal factors that influence the adoption of technology. These factors include: 1) characteristics of the farmer; 2) on-farm factors; 3) cultural factors; and 4) leadership characteristics. The following sections draw on the relevant literature to describe in detail each internal factor that can influence a farmer's adoption decision.

2.3 Review of the Studies Concerning the Relationship between Farmers' Characteristics and Their Adoption

2.3.1 Age and Adoption

Khan (2019) conducted a study on adoption of hybrid rice production technologies by the farmers of Kalai upazila under Joypurhat district. He found that age of the farmers had no significant relationship with their adoption of hybrid rice production technologies.

Jahan (2017) conducted investigation on "Socio-Economic Determinants of Adoption of Sunflower Production by the Farmers of Patuakhali sadar upazila" in Bangladesh. She found that age of the farmers had no significant contribution with their adoption of improved practices of sunflower production.

Islam (2002) conducted a study on adoption of modem agricultural technologies by the farmers of Sandwip. He found that age of the farmers was not related to their adoption of modem agricultural technologies.

Aurangozeb (2002) conducted a study on adoption of integrated homestead farming technologies by the rural women in RDRS. He found that there was a significant negative relationship between age and adoption of integrated homestead farming Technologies.

Sardar (2002) conducted a study on adoption of IPM practices by the farmers under PETRRA project of RDRS. He found that age of the farmers had a negatively significant relationship with their adoption of IPM practices.

Rahman (2001) observed that there was no significant relationship between age and adoption of Aalok-6201 hybrid rice cultivation practices.

Podder (1999) and Hossain (1999) are found similar results in their respective studies.

Hussen (2001) conducted a study, which concluded that age of the sugarcane growers had a significant negative relationship with their adoption of modem sugarcane cultivation practices. Rahman (1999) also found similar result in this study. Chowdhury (1997) observed that the age of the farmers had no significant relationship with their adoption of selected BINA technologies. Sarkar 1997) observed that there was no significant relationship between age of the farmers and their adoption of improved potato cultivation practices. Similar finding were observed by Singh (1989) and Kher (1992) in their respective studies.

Hamid (1995) conducted a study on adoption of recommended sugarcane cultivation practices by the farmers. He found that age had a significant negative relationship with the adoption of recommended sugarcane cultivation practices.

However, researchers cannot come to a unified decision on farmers' age and adoption of BRRI dhan74 production technology relationship, which requires further research.

2.3.2 Education and Adoption

Khan (2019) conducted a study on adoption of hybrid rice production technologies by the farmers of Kalai upazila under Joypurhat district. He found that education of the farmers had a positive significant relationship with their adoption of hybrid rice production technologies.

Jahan (2017) conducted investigation on "Socio-Economic Determinants of Adoption of Sunflower Production by the Farmers of Patuakhali sadar upazila" in Bangladesh. She found that education of the farmers had significant contribution with their adoption of improved practices of sunflower production.

Islam (2002) conducted a study on adoption of modem agricultural technologies by the farmers of Sandwip. He found that education of the farmers had a positive significant relationship with their adoption of modem agricultural technologies.

Sardar (2002) conducted a study on adoption of IPM practices by the farmers under PETRRA project of RDRS. He found that education of the farmers had a positive significant relationship with their adoption of IPM practices.

Aurangozeb (2002) conducted a study on adoption of integrated farming technologies by the rural women in RDRS. He found that there was a positive relationship between education and their adoption on integrated farming technologies.

Hussen (2001) conducted a study on farmers' knowledge and adoption of modem sugarcane cultivation practices. He found that education of the growers had a positive significant relationship with their adoption of modem sugarcane cultivation practices.

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

Chowdhury (1997) found a positive significant relationship between the education of the farmers and their adoption of selected BINA technologies. Similar results were found by Barkatullah (1985), Ali *et al.* (1986), Hoque (1993), Bashar (1993) Khan (1993), Pal (1995) and Sarkar (1997) in their respective studies.

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

Krishna (1969) conducted a research study on the adoption of hybrid maize in Karimnagar, India. He found significant negative relationship between the education of the respondents and their adoption of hybrid maize.

Under above circumstance, we hypothesized that there is positive relation between education and adoption.

2.3.3 Farm size and Adoption

Khan (2019) conducted a study on adoption of hybrid rice production technologies by the farmers of Kalai upazila under Joypurhat district. He found that farm size of the farmers had a positive significant relationship with their adoption of hybrid rice production technologies.

Jahan (2017) conducted investigation on "Socio-Economic Determinants of Adoption of Sunflower Production by the Farmers of Patuakhali sadar upazila" in Bangladesh. She found that farm size of the farmers had no significant contribution with their adoption of improved practices of sunflower production.

Islam (2002) conducted a study on adoption of modem agricultural technologies by the farmers of Sandwip. He observed that farm size of the farmers had a positive significant relationship with their adoption of modem agricultural technologies. Technologies by the farmers under PETRRA project of RDRS. He found that farm size of the farmers had a positive significant relationship with their adoption of IPM practices.

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

Gogoi and Gogoi (1989) in their study observed that size of land holding of farmers had a significant relationship and positive effect on their adoption of plant protection practices.

Rahman (2001) conducted an investigation on knowledge, attitude and adoption of Aalok-6201 hybrid rice by the farmers of sadar upazila in Mymenshigh district. He observed that there was a significant positive relationship between farm size of the farmers and their adoption of Aalok-6201 hybrid rice.

Hussen (2001) conducted an investigation on adoption of modem sugarcane cultivation practices by the farmers' of Dewangonj upazila in Jamalpur district. He observed that there was a significant positive relationship between farm size of the farmers and their adoption of modem sugarcane cultivation practices.

Chowdhury (1997) conducted a research on adoption of selected BINA technologies by the farmers. He indicated that farm size of the farmers had a strongly positive significant relationship with their adoption of selected BINA technologies. Okoro and Obibuak. (1992), Khan (1993). Hoque (1993) and Sarkar (1997) observed similar results in their respective studies.

2.3.4 Family size and Adoption

Jahan (2017) conducted investigation on "Socio-Economic Determinants of Adoption of Sunflower Production by the Farmers of Patuakhali sadar upazila" in Bangladesh. She found that family size of the farmers had no significant contribution with their adoption of improved practices of sunflower production. Hossain (2003) revealed that family size of the farmers had a significant and positive relationship with their adoption of modern Boro rice cultivation practices.

Sardar (2002) found that the family size of the farmers had significant positive relationship with their adoption of IPM practices.

Hossain (1999) conducted a study to determine the farmers' perception of the effects of agro-chemicals on environment. He found no relationship between the farmer's family sizes with their adoption of fertilizer.

Chowdhury (1997) conducted a research study on adoption of selected BINA technologies by the farmers of Boira union in Mymensingh district. He observed that family size of the farmers had positive and significant relationship with the adoption of selected BINA technologies.

Hossain (1991) in his study in sadar thana of Jamalpur observed that family size of the farmers had no significant effect on their adoption of improved farm practices. Similar results were observed by Sobhan (1975), Hoque (1993), Bashar (1993), Hossain (1999) also found that family size of the farmers had positive significant relationship with the adoption of agro-chemical. Similar results were also observed by Pal (1995), Muttalab (1995), Sarker (1997), Chowhdury (1997), Hoque (1993) and Khan (1993).

2.3.5 Annual income and Adoption

Sardar (2002) conducted a study on adoption of IPM practices by the farmers under PETRRA project of RDRS. He found that the annual income of the farmers had no relationship with their adoption of IPM practices.

Aurangozeb (2002) conducted a study on adoption of integrated homestead farming technologies by the rural women in RDRS. He found that there was a positive significant relationship between annual income of the respondents and their adoption of integrated homestead farming Technologies.

Rahman (2001) conducted an investigation on knowledge; attitude and adoption of Alok-6201 hybrid rice fry the farmers of sadar upaziia in

Mymensingh district. He observed that there was a significant positive relationship between annual income of the farmers and their adoption of Alok-6201 hybrid rice.

Hussen (2001) conducted an investigation on adoption of modem sugarcane cultivation practices by the farmers of Dewangonj upazila in Jamalpur district. He observed that there was a significant positive relationship between annual income of the farmers and their adoption of modem sugarcane cultivation practices.

Islam (2002) conducted a study on adoption of modem agricultural technologies by the farmers of Sandwip. He observed that the annual income of the farmers had no relationship with their adoption of modem agricultural technologies.

Chowdhury (1997) found a significant and positive relationship between annual income and adoption of selected BINA technologies. Okoro and obibuak (1992), Khan (1993), Sarker (1997) observed similar result in their respective studies. Tolawar and Hirevenkaragouder (1989) studied on factors of adoption of poultry management practices. They revealed that the farmers having high income tend to own bigger size of poultry unit and possess more knowledge of improved practices leading to higher level of adoption.

2.3.6 Training and Adoption

Rahman (2001) observed in study that training received of the farmers had a significant and positive relationship with their adoption regarding Aalok-6201 hybrid rice.

Islam (2002) conducted a study on farmers‟ knowledge and adoption of ecological agricultural practices under the supervision of Proshika. He found that agricultural training exposure of the farmers had no significant relationship with their adoption of ecological agricultural practices.

2.3.7 Organizational Participation and Adoption

Khan (2019) conducted a study on adoption of hybrid rice production technologies by the farmers of Kalai upazila under Joypurhat district. He found that organizational participation of the farmers had a positive significant relationship with their adoption of hybrid rice production technologies.

Jahan (2017) conducted investigation on “Socio-Economic Determinants of Adoption of Sunflower Production by the Farmers of Patuakhali sadar upazila” in Bangladesh. She found that organizational participation of the farmers had significant contribution with their adoption of improved practices of sunflower production.

Sardar (2002) conducted a study on adoption of IPM practices by the farmers under PETRRA project of RDRS. He observed that organizational participation of the farmers had no significant relationship with their adoption of IPM 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 organizational participation of the farmers had a significant and positive relationship with their adoption regarding Aalok 6201 hybrid rice.

Mostafa (1999) conducted a study on adoption of recommended mango cultivation practices by the mango growers of Nawabganj Sadar thana. He found that organizational participation of mango growers had a significant

positive relationship with their adoption of recommended mango cultivation practices.

Sarker (1997) conducted a study on correlates of selected characteristics of potato growers with their adoption of improved potato cultivation practices in five village of Comilla district. He observed that organizational participation of the potato growers had no relationship with their adoption of improved potato cultivation practices.

Kher (1992) carried out a research study on the adoption of improved wheat cultivation practices by the farmers in selected village Rajouri block, India. He observed that there was no significant relationship between the farmers' social participation and their adoption of improved wheat cultivation practices.

2.2.8 Extension Media Contact and Adoption

Khan (2019) conducted a study on adoption of hybrid rice production technologies by the farmers of Kalai upazila under Joypurhat district. He found that extension media contact of the farmers had a positive significant relationship with their adoption of hybrid rice production technologies.

Jahan (2017) conducted investigation on “Socio-Economic Determinants of Adoption of Sunflower Production by the Farmers of Patuakhali sadar upazila” in Bangladesh. She found that extension media contact of the farmers had significant contribution with their adoption of improved practices of sunflower production.

Islam (2002) conducted a study on adoption of modem agricultural technologies by the farmers of Sandwip. He found that extension media, contact of the farmers had no significant relationship with their adoption of modem agricultural technologies.

Aurangozeb (2002) conducted a study on adoption of integrated homestead farming technologies by the rural women in RDRS. He found that there was a positive significant relationship between contact with extension media of the respondents and their adoption of integrated homestead farming technologies.

Slade *et al*. (1988) studied that adoption rates among farmers receiving one or more view visits per month were generally higher than those farmers who were not visited by view's contact farmers were better adopter of some technologies that non-contact farmers.

Osunloogun *et al*. (1996) studied adoption of improved Agricultural practices by co-operative farmers in Nigeria. The findings of the study indicated a positive relationship between extension contact and adoption improved practices.

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

Rahman (2001) conducted an investigation on knowledge, attitude and adoption of Aalok-6201 hybrid rice by the farmers of sadar upazila in Mymensingh district. He observed that there was a significant positive relationship between extension contact of the farmers and their adoption of Aalok-6201 hybrid rice.

Sardar (2002) conducted a study on adoption of IPM practices by the farmers under PETRRA project of RDRS. He observed that contact with RDRS personnel of the farmers had a positive significant relationship with their adoption of IPM practices.

Hussen (2001) conducted an investigation on adoption of modem sugarcane cultivation practices by the farmers of Dewangonj upazila in Jamalpur district. He observed that there was a positive significant relationship between extension contact of the farmers and their adoption of modem sugarcane cultivation practices. Sarker (1997) observed a positive and significant relationship between extension contact and adoption of improved potato cultivation practices. Kashem and Islam (1990). Kher (1992), Pal (1995), Haque (1984) also found the similar results in their respective studies.

Nahar (1996) found that there was a significant positive relationship in agricultural knowledge on farm women in homestead farming and their level of contact with information sources. Heong (1990) observed that the lack of adoption of IPM technologies in rice was frequently attributed to lack of sufficient extension.

However, researchers can't come to a unified decision on farmers' agricultural extension contact and adoption of BRRI dhan74 production technology relationship, which requires further research.

2.4 The Conceptual Framework of the Study

This study is concerned with the adoption of BRRI dhan74 production technologies by the farmers of Brahmanpara upazila. Thus, the adoption was the main focus of the study and 12 selected characteristics of the farmers were considered as those might have relationship with adoption. It is not possible to deal with all the factors in a single study. Therefore, it was necessary to limit the factors, which included age, education, farm size, family size, experience in rice farming, experience in BRRI dhan74 production, annual family income, annual income from BRRI dhan74 production, training on BRRI dhan74 production technology, organizational participation and extension media contact. The conceptual framework of the study has been presented in Fig. 2.1.

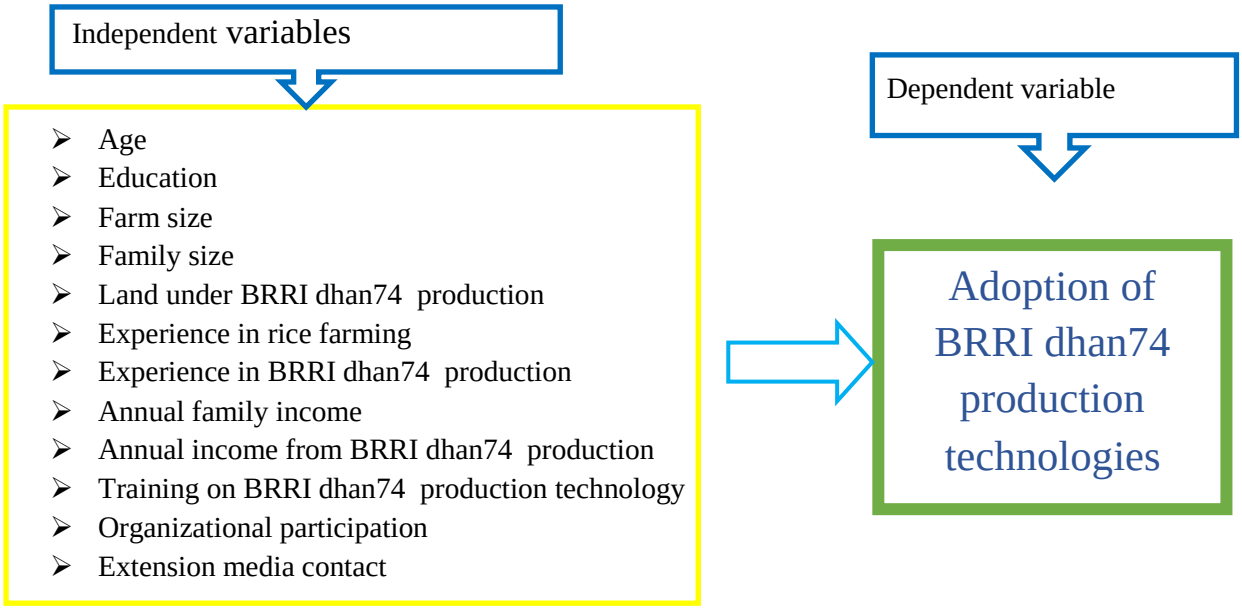

Figure 2.1 The conceptual framework of the study

CHAPTER III
METHODOLOGY

This chapter deals with the procedures for the collection of valid information as well as procedure of data coding and also data analysis. For conduction, a research work smoothly proper methodology is an obligatory one and it is very difficult to address the study objectives with a scientific manner without a define methodology. A sequential description of the methodologies that was followed in conducting this research work has been presented in this chapter under the following headings-

3.1 Locale of the Study

The study was conducted in Brahmanpara Upazila under Cumilla district. Brahmanpara upazila has 8 unions and out of 8 union's Sahebabad union was selected purposively as the locale of the study. Out of 7 villages, two villages of one union were selected randomly as locale of the study. Brahmanpara Upazila (Cumilla district) area 128.9 sq km, located in between 23°35' and 23°44' north latitudes and in between 91°03' and 91°11' east longitudes. It is bounded by kasba and muradnagar upazilas on the north, burichang upazila on the south, tripura state of India and Kasba upazila on the east, debidwar and Muradnagar upazilas on the west. Brahmanpara Upazila of Cumilla district, having an area of 128 square kilometers and consists of 8 unions. The unions are: Brahmanpara Sadar, Chandla, Dulalpur, Madhabpur, Malapara, Shahebabad, Shashidal and Shidli.

A map of Cumilla district showing Brahmanpara upazila and a map of Brahmanpara upazila showing study area considered as study area have been presented in Figure 3.1 and 3.2, respectively.

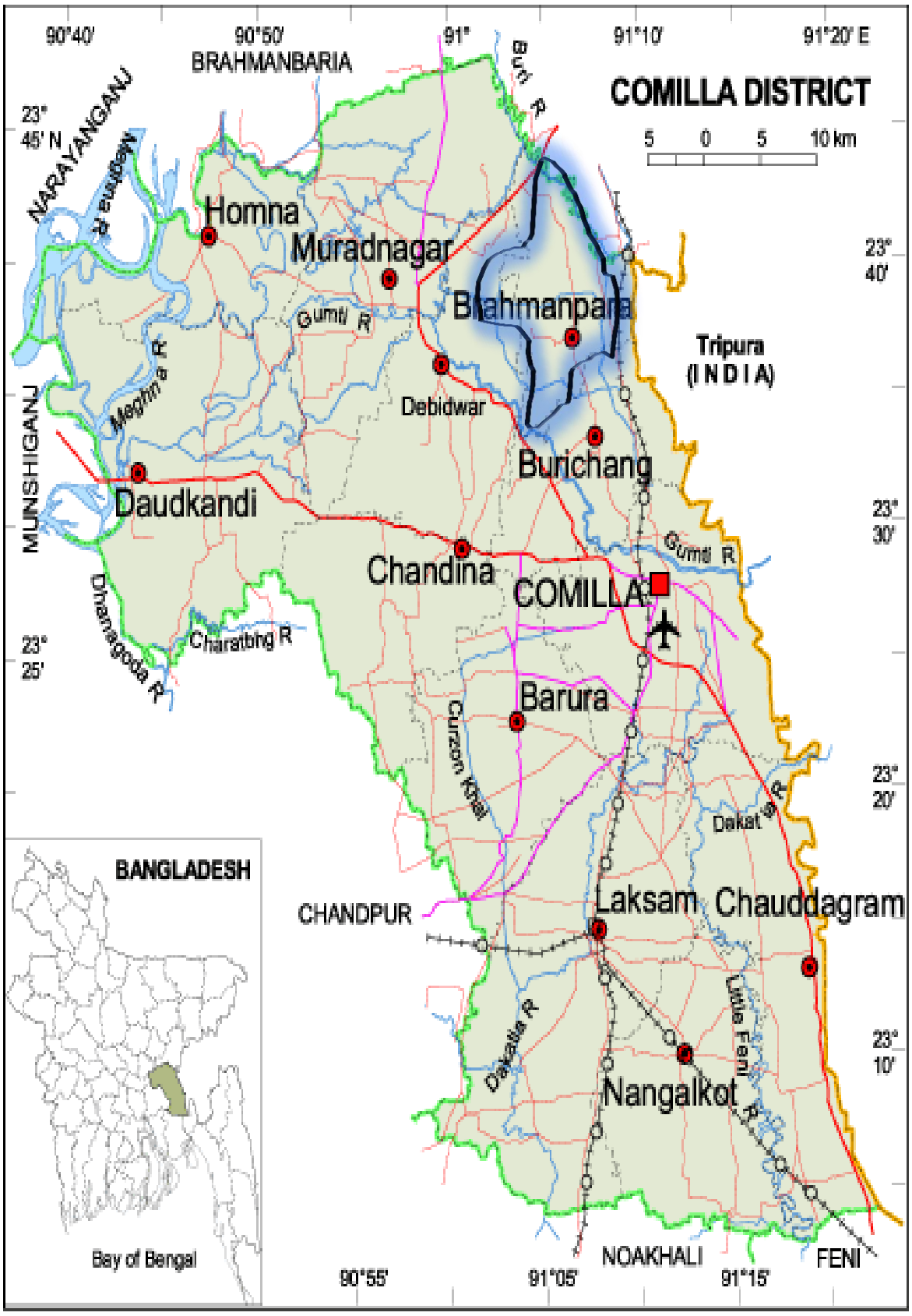

Figure 3.1 A map of Cumilla district showing Brahmanpara upazila

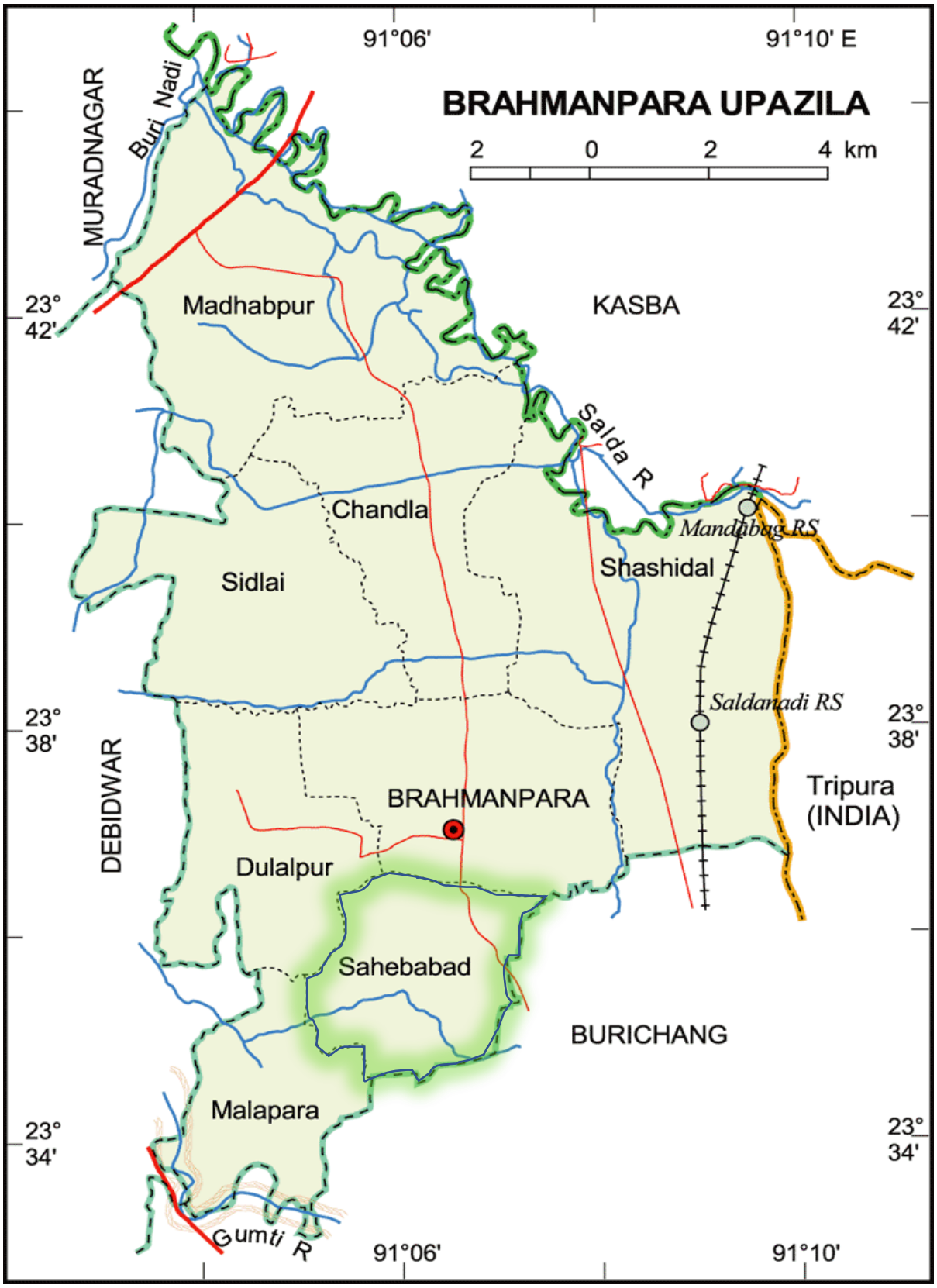

Figure 3.2 A map of Brahmanpara upazila showing the study area

3.2 Population and Sample of the Study

All the BRRI dhan74 farmers of Sahebabad and Jiruin villages of Sahebabad union in the Brahmanpara upazila under Cumilla district constituted the population of the study. An update statistic of BRRI dhan74 farmers of the selected village area was collected from the local office of the UAO. The total number of BRRI dhan74 cultivars in these villages was 242; where 126 farm family heads from Sahebabad village and 116 from Jiruin village under same which constituted the population of the study. Thus, 242 BRRI dhan74 farmers constituted the population of the study.

3.3 Distribution of the Population, Sample size and Reserve list

The total BRRI dhan74 farmers were 242, 50% of the total respondents comprised of 121 farmers were the sample of the study and data was collected by random sampling process. A reserve list of 12 BRRI dhan74 farmers was also prepared by the same method so that the respondents of this list could be used for interview if the respondents included in the original sample were not available at the time of conduction of interview. The distribution of the population sample and number of respondents in the reserve list are given in Table 3.1.

Table 3.1 Distribution of the farmers according to population and sample size and reserve list

Name of unions	Name of villages	Population of BRRI dhan74 farmers	Sample size	Number of farmers included in the reserve list
Sahebabad	Sahebabad	126	63	6
	Jiruin	116	58	6
Total		**242**	**121**	**12**

3.4 Measurement of Variables

The variable is a characteristic, which can assume varying or different values in successive individual cases. A research work usually contains at least two

important variables viz. independent and dependent variables. An independent variable is that factor which is manipulated by the researcher in his attempt to ascertain its relationship to an observed phenomenon. A dependent variable is that factor which appears, disappears or varies as the researcher introduces, removes or varies the independent variable (Townsend, 1953). In the scientific research, the selection and measurement of variable constitute a significant task. Following this conception, the researcher reviewed literature to widen this understanding about the natures and scopes of the variables relevant to this research. At last, she had selected 12 independent variables and one dependent variable. The independent variables were: age, education, farm size, family size, land under BRRI dhan74 production, experience in rice farming, experience in BRRI dhan74 production, annual family income, income from BRRI dhan74 production, training on BRRI dhan74 production, organizational participation and extension media contact. The dependent variable of this study was the "adoption of BRRI dhan74 production technologies". The methods and procedures in measuring the variables of this study are presented below:

3.5 Measurement of Independent Variables

The 12 characteristics of the farmers mentioned above constitute the independent variables of this study. The following procedures were followed for measuring the independent variables.

3.5.1 Age

Age of respondent sunflower farmers was measured by the period of time from their birth to the time of conducting interview and it was measured in terms of complete years on the basis of their response. A score of one (1) was assigned for each year age. This variable appears in item number one (1) in the interview schedule as presented in Appendix-A.

3.5.2 Education

Education was measured by assigning score against each successful year of schooling by a respondent. One score was given for passing each level in an educational institution. For example, if a respondent passed the final examination of class five or equivalent examination, his/her education score has given five (5). Each respondent of can't read & write has given a score of zero (0). A person not knowing reading or writing but being able to sign only has given a score of 0.5. If a farmer did not go to school but took non-formal education, his educational status was determined as the equivalent to a formal school student. This variable appears in item number two (2) in the interview schedule as presented in Appendix-A.

3.5.3 Farm size

Farm size of a respondent referred to the total area of land on which his family carried out the farming operation, the area being in terms of full benefit to the family. The term refers to the cultivated area either owned by the respondent or cultivated on share-cropping, lease or taking from other including homestead area. It was measured in hectares for each respondent using the following formula:

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

Were,

A_1=Homestead area

A_2= Own land under own cultivation

A_3= Own land given to others as borga

A_4= Land taken from others as borga

A_3= Land taken from others as lease

The data was first recorded in terms of local measurement unit i.e. decimal and then converted into hectare. The total area, thus, obtained is considered as his farm size score (assigning a score of one for each hectare of land). This

variable appears in item number three (3) in the interview schedule as presented in Appendix-A.

3.5.4 Family size

Family size of an advice was determined by the total number of members in his/her family who live under same roof and share same kitchen including himself/herself, his/her wife/husband, sons, daughters and others fully or partially dependent on him/her. Total number of family members was considered as the family size score of a respondent. For example, if a respondent has four (4) members in his/her family, his/her family size score was 4 (four). This variable appears in item number four (4) in the interview schedule as presented in Appendix-A.

3.5.5 Land under BRRI dhan74 production

BRRI dhan74 production areas refer to the area used in BRRI dhan74 production only by the farmers. It was first recorded in terms of local measurement unit i.e. decimal and bigha. Then it was converted in hectare (ha). The total area thus obtained was considered as the score of land under BRRI dhan74 production by assigning 1 score for one hectare (ha)' of land. This variable appears in item number four (5) in the interview schedule as presented in Appendix-A.

3.5.6 Experience in rice farming

In a measuring score of one (1) was assigned for each year of working experience of a respondent either in his own farm or to that of his parents. This variable appears in item number 6 in the interview schedule as presented in Appendix-A.

3.5.7 Experience in BRRI dhan74 production

In a measuring score of one (1) was assigned for each year of working experience of a respondent either in his own farm or to that of his parents. This

variable appears in item number 7 in the interview schedule as presented in Appendix-A.

3.5.8 Annual family income

Annual family income of a respondent referred to the total earning by her/him and other members of her/his family from agriculture, livestock, poultry, fisheries, and other sources (service, business, daily wages by working, etc.) during a year. It was expressed in Taka. In measuring this variable, total earning of an individual respondent was converted into score. A score of one (01) was given for every one (01) thousand ('000') taka. This variable appears in item number 8 in the interview schedule as presented in Appendix-A.

3.5.9 Income from BRRI dhan74 production

Income from BRRI dhan74 production of the respondents was measured in thousands taka on the basis of total annual income from BRRI dhan74 production. It was expressed in Taka. In measuring this variable, total earning of an individual respondent was converted into score. A score of one (01) was given for every one (01) thousand ('000') taka. This variable appears in item number 9 in the interview schedule as presented in Appendix-A.

3.5.10 Training on BRRI dhan74 production technology

Training of a respondent was measured by the total number of days for which a respondent attended in different training programs on BRRI dhan74 production technology. If a respondent takes training for 7 days, he/she will get 7 scores. This variable appears in item number ten (10) in the interview schedule as presented in Appendix-A.

3.5.11 Organizational participation

Social organizational participation of respondent was measured on the basis of the nature of their participation in 5 selected organizations. Final score was computed by adding all the scores of selected organizations. Organizational

participation score = P x D

Were, P- Participation Score

D- Duration (no. of years)

Following scores were assigned for nature of participation:

Nature of participation	**Scores assigned**
No participation	0
Participation as ordinary member	1
Participation as executive member	2
Participation as executive committee officer	3

This variable appears in item number eleven (11) in the interview schedule as presented in Appendix-A.

3.5.12 Extension media contact

Extension media contact was measured as one's extent of contact to different information sources. Each respondent was asked to indicate his nature of contact for each of nine selected media with five alternative responses was prepared for the respondents.

Following scores were assigned for each of nine media.

Extent of exposure	**Scores assigned**
Not at all	0
Rarely	1
Occasionally	2
Often	3
Regularly	4

Thus, the extension media contact scores of farmers could range from 0 to 32 where '0' indicated no extension media contact and 32 indicated very high

extension media contact. This variable appears in item number twelve (12) in the interview schedule as presented in Appendix.

3.6 Measurement of Dependent Variable

Adoption of selected BRRI dhan74 production technologies was the dependent variable of this study. It was measured on the basis of the extent of adoption of 8 selected BRRI dhan74 production technologies by the farmers for three year.

For example, a farmer is using BRRI dhan74 with its cluster of technologies for the subsequent years 2017-18, 2018-19 and 2019-20 such as

a) Seedling growing method
b) Alternate Wetting and Drying (AWD)
c) Modern agricultural machineries
d) Line transplanting
e) Roughing
f) Use of Guti urea
g) Integrated pest management (IPM)
h) Use of organic fertilizer

Calculate the adoption of above-mentioned technologies. In this case adoption can be measured in the following ways?

Name of technologies	Year of the adoption			∑ l/L	X adoption
	2017-18	2018-19	2019-20		
Allocated area for cultivation (l)	2	2	3	1.75	.58
Potential area (L)	4	4	4		
Proportion of area coverage (l/L)	0.5	0.5	0.75		

Total adoption score of a respondent was found by adding one's adoption scores on eight aspects of adoption and then dividing by number of aspects. In this case the adoption score for single technology is 0.58. Adoption of multiple technologies is measured by the proportion of summation of mean area coverage (l) out of mean potential area (L) by the number of practices for

particular time period; it is expresses in percentage resulting mean (X) area coverage. The formula calculating the adoption stands as G. L. Ray (1998);

$$\text{Adoption scores} = \frac{\sum X}{\text{No.of technologies}} x100$$

The adoption was expressed in percentage. Hence the adoption of a BRRI dhan74 production technologies could range from 0 to 100, where '0' indicate no adoption and '100' indicate highest adoption.

3.7 Hypothesis of the Study

According to Kerlinger (1973), "a hypothesis is a conjectural statement of the relation between two or more variables". Hypothesis are always in declarative sentence form and they are related, either generally or specifically from variables to variables. In broad sense hypotheses are divided into two categories: (a) Research hypothesis and (b) Null hypothesis.

3.7.1 Research hypothesis

Based on review of literature and development of conceptual framework, the following research hypothesis was formulated:

"Each of the 12 selected characteristics (age, education, farm size, family size, land under BRRI dhan74 production, experience in rice farming, experience in BRRI dhan74 production, annual family income, income from BRRI dhan74 production, training on BRRI dhan74 production, organizational participation and extension media contact) of the BRRI dhan74 cultivars had significant influenced to adoption of BRRI dhan74 production technologies".

However, when a researcher tries to perform statistical tests, then it becomes necessary to formulate null hypothesis.

3.7.2 Null hypothesis

A null hypothesis states that there is no contribution between the concerned variables. The following null hypothesis was formulated to explore the contribution of the selected characteristics in empowering the farmers through e-Agriculture. Hence, in order to conduct tests, the earlier research hypothesis was converted into null form as follows:

"There is no contribution of the selected characteristics (age, education, farm size, family size, land under BRRI dhan74 production, experience in rice farming, experience in BRRI dhan74 production, annual family income, income from BRRI dhan74 production, training on BRRI dhan74 production, organizational participation and extension media contact) of adoption of BRRI dhan74 production technologies."

3.8 Instrument for Collection of Data

In order to collect reliable and valid information from the respondents, an interview schedule was prepared for collection of data from respondents keeping the objectives of the study in mind. The question and statements contained in the schedule were simple, direct and easily understandable by the farmers. Simple and direct question, different scales, closed and open form statements and questions were included in the interview schedule to obtain necessary information. The draft interview schedule was prepared in accordance with the objective of the study. The interview schedule was pre-tested with 10 respondents of the farmers in the study area during 05 to 06 June, 2021.

The draft interview schedule was pretested in actual field situation before finalizing it for collection of data. The pre-test was helpful to identify inappropriate questions and statements in the draft schedule. Necessary addition, alternation and adjustments were made in the schedule on the basis of the experience of the pretest. The interview schedule was then printed in its

final form. An English version of the interview schedule has been shown in Appendix.

3.9 Data Collection

Data were collected personally by the researcher herself through personal interview schedule from the sampled farm families of the selected villages. Before starting the collection of data; the researcher met the respective Upazila Agriculture Officer (UAO), Additional Agriculture Extension Officer (AAEO) and the concerned Sub-Assistant Agriculture Office (SAAO). The researcher also discussed the objectives of the present study with the respondents and above- mentioned officers and requested them to provide actual information. A rapport was established with the rural people so that they feel easy to answer the questions. The researcher took all possible care to establish rapport with the respondents so that they would not feel any indecision while starting the interview. Very good cooperation was obtained from the field extension workers and the local leaders. No serious difficulty was faced by the researcher during the collection of data. The interviews were made individually in the places of respondents. Questions were asked in direct manner so that the respondents could easily understand the questions. Whenever a respondent faced difficulty in understanding any questions, care was taken to explain the same clearly with a view to enabling him to answer it properly.

Before going to the respondents' home for interviewing they were informed verbally to ensure their availability at home as per schedule date and time. In the case of failure to collect information from the respondents due to their other business, a revisit was made with prior to appointments. The final data were collected during 15 July, 2021 to 20 August, 2021.

3.10 Compilation of Data

After completion of field survey, data recorded in the interview schedules were coded, compiled, tabulated and analyzed in accordance with the objectives of

the study. In this process, all the responses in the interview schedule were given numerically coded values. Local units were converted into standard units and qualitative data were converted into quantitative ones by means of suitable scoring whenever necessary. All the collected data were checked and cross-checked before transplanting to the master sheets. To facilitate tabulation, the collected data were properly coded and transferred from interview schedule to a master sheet. Tabulation and cross tabulation were done on the basis of categorization developed by the researcher.

3.11 Categorization of Respondents

For describing the various independent and dependent variables the respondents were classified into various categories. In developing categories, the researcher was guided by the nature of data and general consideration prevailing on the social system. The procedures have been discussed while describing the variable in the sub-sequent sections of next chapter.

3.12 Statistical Analysis

Data collected from the respondents were analyzed and interpreted in accordance with the objectives of the study. The analysis of data was performed using statistical treatment with SPSS (Statistical Package for Social Sciences) computer program, version 20. Statistical measures as a number, range, mean, standard deviation was used in describing the variables whenever applicable. Regressions of coefficient test were used to determine the contribution and among the categories of farmers with regard to their adoption of BRRI dhan74 production technologies based on selected characteristics. Throughout the study the 0.05 and 0.01 levels of probability were used as the basis of rejection or accepting a null hypothesis.

CHAPTER IV
RESULTS AND DISCUSSION

In this chapter the findings of this study have been discussed in relation to the present findings and also to those found in other studies. The study investigated the adoption of BRRI dhan74 production technology by the farmers of Cumilla district. In accordance with the objectives of the study, presentation of the findings has been made in three sections. The first sections deal about selected characteristics of the farmers. The second section deals with the extent of adoption of BRRI dhan74 production and the third section deals with contribution of the selected characteristics of the farmers and their adoption of BRRI dhan74 production technologies.

4.1 Selected Characteristics of the Farmers

Twelve characteristics of the farmers were selected for this research. The characteristics include: age, education, farm size, family size, land under BRRI dhan74 production, experience in rice farming, experience in BRRI dhan74 production, annual family income, income from BRRI dhan74 production, training on BRRI dhan74 production, organizational participation and extension media contact. Some descriptive statistics of these features are given in Table 4.1 Data contained in the Table 4.1 reveal the salient features of the characteristics of the farmers in order to have an overall picture of these characteristics at a glance. However, for ready reference, separate Tables are provided while presenting categorizations, discussing and /or interpreting results concerning each of the characteristics in this chapter.

Table 4.1 The salient features of the selected characteristics of the farmers

Categories	Measuring Unit	Rang		Mean	S D
		possible	observed		
Age	Years	-	24-73	45.84	10.38
Education	Year of schooling	-	00-16	7.00	4.69
Farm size	Hectare	-	.09-3.13	0.68	.48
Family size	Members	-	2-13	5.34	1.63
Land under BRRI dhan74 cultivation	Hectare	-	0.06-1.31	0.21	.11
Experience in rice farming	Score	-	5-50	16.74	9.73
Experience in BRRI dhan74 cultivation	Score	-	1-3	2.50	.59
Annual family income	('000' Tk.)	-	60-400	192.73	90.42
Income from BRRI dhan74 cultivation	('000' Tk.)	-	10-120	36.81	18.21
Training on BRRI dhan74 cultivation	Days	-	0-9	2.28	2.25
Organizational participation	Score	-	0-24	4.55	4.26
Extension media contact	Score	0-36	6-28	13.63	3.86

4.1.1 Age

Age of the farmers ranged from 24 to 73 years, the average being 45.84 years and the standard deviation 10.38. All the variables were categorized on the basis of their possible scores except age was categorized based on the classification provided by the Ministry of Youth and Sports, Government of the People's Republic of Bangladesh. The distribution of the rice farmers according to their age is shown in Table 4.2.

Table 4.2 Distribution of the farmers according to their age

Categories	Farmers		Mean	SD
	Number	Percent		
Young aged (up to 35)	19	15.70	45.84	10.38
Middle-aged (36-50)	69	57.02		
Old (>50)	33	27.28		
Total	**121**	**100**		

Table 4.2 showed that the highest proportion 57.02 percent of the rice farmers fell in the "middle aged" category, while 15.70 percent of them fell in the "young aged" category and 27.28 percent in the "old aged" category. The findings indicate that a large proportion (84.30) of the farmers were middle to old aged.

4.1.2 Education

The education scores of the farmers ranged from 0 to 16. The average was 7.00 and the standard deviation was 4.69. On the basis of their educational scores, the hybrid rice growers were classified into four categories, namely "illiterate (0-0.5), primary (1-5), secondary (6-10) and above secondary (above 10). This distribution was supported by Hoque (2016) and Masud, (2007) and shown in the Table 4.3.

Table 4.3 Distribution of the farmers according to their education

Categories	Farmers		Mean	SD
	Number	Percent		
Illiterate (0-0.5)	34	28.10	7.00	4.69
Primary level (1-5)	8	6.61		
Secondary level (6-10)	59	48.76		
Above secondary level (>10)	20	16.53		
Total	**121**	**100**		

Table 4.3 indicated that the majority (48.76 percent) of the rice farmers was secondary level of education compared to 28.10 percent of them was illiterate. About 6.61 percent of the farmers were primary level of education, while 16.53 percent was above secondary level of education.

4.1.3 Farm size

The farm size of the respondents varied from 0.09 to 3.13 hectares. The average farm size was 0.68 hectare with a standard deviation of 0.48. The respondents were classified into three categories based on their farm size as followed by DAE (DAE, 1995): "marginal farm" (upto 0.2 ha), "small farm"

(0.21 – 1.0 ha), "medium farm" (1.0 -3.0) and large (above 3.01 ha). The distribution of the farmers according to their farm size is shown in Table 4.4.

Table 4.4 Distribution of the farmers according to their farm size

Categories	Farmers		Mean	SD
	Number	Percent		
Marginal farm (up to 0.2 ha)	37	30.58	0.68	.48
Small farm (0.21-1.0 ha)	77	63.64		
Medium farm (1.01-3.0 ha)	5	4.13		
Large farm (>3.01 ha)	2	1.65		
Total	**121**	**100**		

Table 4.4 indicated that more than half (63.64 percent) of the farmers possessed small farms compared to 30.58 percent of them having marginal farms and 4.13 percent had medium farms and only 1.65 % of the farmers having large farm. Thus, the overwhelming majority 67.75 percent of the farmers were small to medium farms. Majority of the farmers were under small farmer's category which is consistent with national scenario.

4.1.4 Family size

To describe the family size of the respondents, the category has been followed as represented by Poddar (2015). Family size scores of the farmers ranged from 2 to 13 with an average of 5.34 and standard deviation of 1.63. According to family size, the respondents were classified into three categories (Mean±SD) as shown in Table 4.5.

Table 4.5 Distribution of the farmers according to their family size

Categories	Farmers		Mean	S D
	Number	Percent		
Small family (up to 4)	37	30.58	5.34	1.63
Medium family (5-6)	59	48.76		
Large family (above 6)	25	20.66		
Total	**121**	**100**		

Data contained in Table 4.5 indicates that 48.76 percent of the farmers had medium family size while 20.66 percent of them had large family size and 30.58 percent of them had small family size. Thus, about two third 79.34 percent of the farmers had

medium to small family size.

4.1.5 Land under BRRI dhan74 production

Land under hybrid rice seed production of the farmers varied from 0.06 to 1.31 hectare. The average land under BRRI dhan74 production was 0.21 hectare with the standard deviation of 0.11. Based on land under BRRI dhan74 production, the farmers are classified into three categories as shown in Table 4.6.

Table 4.6 Distribution of the farmers according to their land under BRRI dhan74 production

Categories (ha)	Farmers		Mean	SD
	Number	Percent		
Marginal land (0.01-0.20)	65	53.72	0.21	0.11
Small land (up to 0.21-1 ha)	51	42.50		
Medium land (1.01-3 ha)	5	4.13		
Total	**121**	**100**		

Data contained in Table 4.6 indicates that the largest proportion (53.72 percent) of farmers had marginal land under BRRI dhan74 production compared to 42.50 percent having small land under BRRI dhan74 production and 4.13 percent had medium land under BRRI dhan74 production. It was again found that most (95.87 percent) of the farmers had medium to marginal land under BRRI dhan74 production.

4.1.6 Experience in rice farming

The experience score of the respondents ranged from 5 to 50. The mean score was 16.74 with the standard deviation 9.73. On the basis of experience, the respondents were classified into three categories namely, low experience, medium experience and high experience, as shown in Table 4.7.

Table 4.7 Distribution of the farmers according to their experience in rice farming

Categories (Scores)	Farmers		Mean	SD
	Number	Percent		
Low (up to 7)	21	17.35	16.74	9.73
Medium (8-25)	77	63.64		
High (above 25)	23	19.01		
Total	**121**	**100**		

Data contained in Table 4.7 revealed that the majority (63.64 percent) of the farmers had medium experience as compared to (17.35 percent) and (19.01 percent) having low and high experience in rice farming respectively. The majority (81.99 percent) of the respondents had medium to high experience in rice production.

4.1.7 Experience in BRRI dhan74 production

The experience score of the respondents ranged from 1 to 3. The mean score was 2.50 with the standard deviation 0.59. On the basis of observed scores, the respondents were classified into three categories namely, low experience, medium experience and high experience, as shown in Table 4.8.

Table 4.8 Distribution of the farmers according to their experience in BRRI dhan74 production

Categories (Scores)	Farmers		Mean	SD
	Number	Percent		
Low (up to 1)	6	4.96	2.50	0.59
Medium (1.01-2)	48	39.67		
High (above 2)	67	55.37		
Total	**121**	**100**		

Data contained in Table 4.8 revealed that the majority (55.37 percent) of the farmers had high experience in under BRRI dhan74 production as compared to (4.96 percent) and (39.67 percent) having low and medium experience in under BRRI dhan74 production respectively. The majority (95.04 percent) of the respondents had medium to high experience in under BRRI dhan74 production.

4.1.8 Annual family income

Annual income score of the respondents ranged from 60 to 400 (in thousands) with an average of 192.73 and standard deviation 90.42. On the basis of the observed scores, the respondents were classified into three categories (Mean ±SD) as shown in Table 4.9.

Table 4.9 Distribution of the farmers according to their annual income

Categories	Farmers		Mean	SD
	Number	Percent		
Low income (up to 102)	29	23.97	192.73	90.42
Medium income (102-282)	71	58.68		
High income (above 282)	21	17.35		
Total	**121**	**100**		

Data presented in Table 4.9 indicate that the highest proportion (58.68 percent) of the respondent had medium annual income, while (23.97 percent) had low annual income and (17.35 percent) had high annual income. As a result, the most (82.65 percent) of the respondents in the study area were low to medium annual income earners.

4.1.9 Income from BRRI dhan74 production

Income from rice cultivation score of the respondents ranged from 10 to 120 (in thousands) with an average of 36.81 and standard deviation 18.21. On the basis of the observed scores, the respondents were classified into three categories (Mean ± SD) as shown in Table 4.10.

Table 4.10 Distribution of the farmers according to their income from BRRI dhan74 production

Categories	Farmers		Mean	SD
	Number	Percent		
Low income (up to 18)	17	14.05	36.81	18.21
Medium income (19-54)	86	71.07		
High income (above 54)	18	14.88		
Total	**121**	**100**		

Data presented in Table 4.10 indicate that the highest proportion 71.07 percent of the respondent to medium income from BRRI dhan74 production, while 14.05 percent had low income and 14.88 percent had high income from BRRI dhan74 production. As a result, the most (85.95 percent) of the respondents in the study area were high to medium income from BRRI dhan74 production.

4.1.10 Training on BRRI dhan74 production

The score of training on BRRI dhan74 production of the farmers ranged from 0 to 9 days, the mean being 2.28 and standard deviation of 2.25. Based on observed range, the farmers were classified into four categories as shown in Table 4.11.

Table 4.11 Distribution of the farmers according to training BRRI dhan74 production

Categories (days)	Farmers		Mean	SD
	Number	Percent		
No training (0)	49	40.50	2.28	2.25
Low training (up to 3)	45	37.19		
Medium training (4-6)	25	20.66		
High training (above 6)	2	1.65		
Total	**121**	**100**		

Data contained in Table 4.11 indicates that 40.50 percent of the farmers had no training on BRRI dhan74 production; while 37.19 percent of the farmer's low training on BRRI dhan74 production and 20.66 percent had medium training on BRRI dhan74 production and only 1.65 percent had high training on BRRI dhan74 production. Thus, about 57.85 percent of farmers had low to medium training on BRRI dhan74 production.

4.1.11 Organizational participation

The observed organizational participation score of the respondents ranged from 0 to 24. The mean score was 4.55 with the standard deviation 4.26. On the basis of observed scores, the respondents were classified into three categories namely, low organizational participation, medium organizational participation

and high organizational participation, as shown in Table 4.12.

Table 4.12 Distribution of the farmers according to their organizational participation

Categories (Scores)	Farmers		Mean	SD
	Number	Percent		
No (0)	34	28.10	4.55	4.26
Low (up to 8)	66	54.55		
Medium (9-16)	20	16.53		
High (above 16)	1	0.83		
Total	121	100		

Data contained in the Table 4.12 revealed that the majority 54.55% of the farmers had low organizational participation as compared to 28.10% and 16.53% having low and medium organizational participation respectively. Only 0.83 percent of the farmers had high organisational participation. Thus, about 71.08 percent of farmers had low to medium organisational participation.

4.1.12 Extension media contact

Extension media contact scores of the farmers ranged from 6 to 28 with an average of 13.63 and standard deviation of 3.86. On the basis of their media contact, the respondents were classified into three categories (Mean ±SD) namely, low contact, medium contact and high contact. The scale used for computing the media contact score of a respondent is given Table 4.13.

Table 4.13 Distribution of the farmers according to their media contact

Categories (Scores)	Farmers		Mean	SD
	Number	Percent		
Low (up to 10)	22	18.18	13.63	3.86
Medium (11-16)	72	59.50		
High (above 16)	27	22.32		
Total	**121**	**100**		

Data contained in the Table 4.13 indicated that the highest proportion 59.50% of the respondents had medium extension media contact as compared to 18.18% and 22.32% having low and high extension media contact respectively.

The majority (77.68%) of the respondents had low to medium extension contact.

4.2 Adoption of BRRI dhan74 production technologies

Adoption of BRRI dhan74 cultivation score of the respondents was found to be varying from 19.00 to 96.00 with an average of 63.32 and standard deviation of 20.98. Based on their score, the farmers were classified into three categories (Mean ±SD) as shown in Table 4.14.

Table 4.14 Distribution of the farmers according to their adoption of BRRI dhan74 production

Categories	Farmers		Mean	SD
	Number	Percent		
Low adoption (up to 43)	33	27.28	63.32	20.98
Medium adoption (44-83)	69	57.02		
High adoption (above 83)	19	15.70		
Total	**121**	**100**		

The Table 4.14 indicates that the majority (57.02%) of the farmers had medium adoption of BRRI dhan74 production that comprised by 15.70 percent and 27.28 percent of the farmers having high and low adoption of BRRI dhan74 production. The majority 72.72%) of the respondents had medium to high adoption of BRRI dhan74 production.

4.3 Contribution of the Selected Characteristics of the Respondents and their Adoption of BRRI dhan74 Production Technologies

To explore the contribution of the selected characteristics of farmers with their adoption of BRRI dhan74 production technologies, multiple regressions model was run to find out the contribution of the selected characteristics of the respondents and their adoption of BRRI dhan74 production technologies. From this regression test, it was found that education, experience in rice farming, annual family income, training on BRRI dhan74 production and media contact had significant contribution with their adoption in BRRI dhan74 production. Of

these, education was the most important contributing factors (significant at the 1% level of significant) and experience in rice farming, annual family income, training on BRRI dhan74 production and media contact of the respondents were less important contributing factors (significant at 5% level of significant). Beside these four characteristics, rest eight characteristics of the farmers (age, farm size, family size, land under BRRI dhan74 production, experience in BRRI dhan74 production, income from BRRI dhan74 production and organizational participation) had no significant contribution with their adoption. The summery of the results of the Co-efficient of regression indicating the contribution of the each of the selected characteristics of the farmers and their adoption of BRRI dhan74 production are shown in Table 4.15.

Table 4.15 Co-efficient of regression showing contribution of the selected characteristics of the cultivars and adoption of BRRI dhan74 production technologies

Dependent variable	Independent Variable	β	P	R^2	Adj. R^2	F
Adoption of BRRI dhan74 production technologies	Age	.019	.877^{NS}	0.471	0.412	8.009
	Education	.262	.008**			
	Farm size	-.136	.117^{NS}			
	Family size	-.001	.990^{NS}			
	Land under BRRI dhan74 production	-.203	.476^{NS}			
	Experience in rice farming	.256	.045*			
	Experience in BRRI dhan74 production	.018	.826^{NS}			
	Annual family income	.152	.037*			
	Income from BRRI dhan74 production	.247	.387^{NS}			
	Training on BRRI dhan74 production	.217	.031*			
	Organizational participation	.084	.384^{NS}			
	Extension media contact	.205	.047*			

^{NS}Not significant; * Significant at 0.05 level of probability and ** Significant at 0.01 level of probability

The value of R^2 is a measure of how of the variability in the dependent variable is accounted by the independent variables. So, the value of R2 = 0.471 means

that independent variables account for 47% of the variation with their adoption of BRRI dhan74 production technologies. The F ratio is 8.009 which is highly significant (p<001).

However, each predictor may explain some of the variance in respondents their adoption of BRRI dhan74 production technologies simply by chanced. The adjusted R^2 value penalizes the addition of extraneous predictors in the model, but value 0.412 is still show that variance is farmers their adoption of BRRI dhan74 production technologies can be attributed to the predictor variables rather than by chanced (Table 4.19). In summary, the models suggest that the respective authority should be considers the farmers' education, experience in rice farming, annual family income, training on BRRI dhan74 production and media contact of the farmers in adoption of BRRI dhan74 production technologies and in this connection some predictive importance has been discussed below:

4.3.1 Contribution of adoption of BRRI dhan74 production technologies and their education

The contribution of education of farmers to their adoption of BRRI dhan74 production technologies was measured by the testing the following null hypothesis;

"There is no contribution of education of the farmers' to their adoption of BRRI dhan74 production technologies".

The following observations were made on the basis of the value of the concerned variable of the study under consideration.

a. The contribution of the education was at 1% significance level (.008).
b. So, the null hypothesis could be rejected.
c. The direction between education and adoption was positive.

The β-value of level education is (0.262). So, it can be stated that as education increased by one unit, farmers' adoption of BRRI dhan74 production technologies increased by 0.262 units.

Based on the above finding, it can be said that farmers' education increased the farmers' adoption of BRRI dhan74 production technologies. So, education has significantly contributed to the farmers' adoption of BRRI dhan74 production technologies. Education plays an important role to reduce problems in adoption of BRRI dhan74 production technologies in many cases. Education enhances knowledge on many aspects such as training, participation, extension contact and so on.

4.3.2 Contribution of experience in rice farming of the farmers to their adoption of BRRI dhan74 production technologies

From the multiple regression, it was concluded that the contribution of experience in rice farming to the farmers' adoption of BRRI dhan74 production technologies was measured by the testing the following null hypothesis;

"There is no contribution of experience in rice farming to the farmers' on adoption of BRRI dhan74 production technologies".

The following observations were made on the basis of the value of the concerned variable of the study under consideration.

a. The contribution of the experience in rice farming was significant at 5% level (.045)
b. So, the null hypothesis could be rejected.
c. The direction between experience in rice farming and adoption of BRRI dhan74 production technologies was positive.

The β-value of experience in rice farming is (0.256). So, it can be stated that as experience in rice farming increased by one unit, farmers' adoption of BRRI dhan74 production technologies increased by 0.256 units.

Based on the above finding, it can be said that farmers' had more experience in rice farming increased farmers' adoption of BRRI dhan74 production technologies. So, experience in rice farming has high significantly contributed to the farmers' adoption increased. Experience in rice farming increase farmer's knowledge about various aspects which helps farmers make enough reduce their problem in rice farming.

4.3.3 Contribution of annual family income of the farmers to their adoption of BRRI dhan74 production technologies

From the multiple regression, it was concluded that the contribution of annual family income to the farmers' adoption of BRRI dhan74 production technologies was measured by the testing the following null hypothesis;

"There is no contribution of annual family income to the farmers' on adoption of BRRI dhan74 production technologies".

The following observations were made on the basis of the value of the concerned variable of the study under consideration.

a. The contribution of the annual family income was significant at 5% level (.037)
b. So, the null hypothesis could be rejected.
c. The direction between experience in rice farming and adoption of BRRI dhan74 production technologies was positive.

The β-value of annual family income is (0.152). So, it can be stated that as annual family income increased by one unit, farmers' adoption of BRRI dhan74 production technologies increased by 0.152 units.

Based on the above finding, it can be said that farmers' had more annual family income increased farmers' adoption of BRRI dhan74 production technologies. So, annual family income has high significantly contributed to the farmers' adoption increased.

4.3.4 Significant contribution of training in BRRI dhan74 production technology to their adoption of BRRI dhan74 production technologies

From the multiple regression, it was concluded that the contribution of training in BRRI dhan74 production technology to their adoption of BRRI dhan74 production technologies was measured by the testing the following null hypothesis;

"There is no contribution of training in BRRI dhan74 production technology to their adoption of BRRI dhan74production technologies".

The following observations were made on the basis of the value of the concerned variable of the study under consideration.

a. The contribution of the training was significant at 5% level (0.031)
b. So, the null hypothesis could be rejected.
c. The direction between training and adoption was positive.

The β-value of training in BRRI dhan74 production technology was (0.217). So, it can be stated that as training in BRRI dhan74 production technology increased by one unit, farmers' adoption of BRRI dhan74 production technologies increased by 0.217 units.

Based on the above finding, it can be said that farmers had more training increased the adoption of BRRI dhan74 production technologies. So, training has high significantly contributed to the farmers' adoption. Training helps farmers to gather more knowledge on adoption of BRRI dhan74 production technologies which ultimately helps farmers to reduce their problems in BRRI dhan74 production technologies.

4.3.5 Significant contribution of extension contact to their adoption of BRRI dhan74 production technologies

From the multiple regression, it was concluded that the contribution of extension contact to their adoption of BRRI dhan74 production technologies was measured by the testing the following null hypothesis;

"There is no contribution of extension contact to their adoption of BRRI dhan74 production technologies".

The following observations were made on the basis of the value of the concerned variable of the study under consideration.

a. The contribution of the extension contact was significant at 5% level (.047)
b. So, the null hypothesis could be rejected.
c. The direction between extension contact and adoption was positive.

The β-value of extension contact was (0.205). So, it can be stated that as extension contact increased by one unit, farmers' adoption of BRRI dhan74 production technologies increased by 0.205 units.

Based on the above finding, it can be said that farmers had more extension contact increased farmers' adoption of BRRI dhan74 production technologies. So, extension contact has high significantly contributed to the farmers' adoption of BRRI dhan74 production technologies increased.

CHAPTER V
SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

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

5.1 Summary of Findings

5.1.1 Characteristics of the farmers

Age

The highest proportion 57.02 percent of the rice farmers fell in the "middle aged" category, while 15.70 percent of them fell in the "young aged" category and 27.28 percent in the "old aged" category.

Education

The majority (48.76 percent) of the rice farmers was secondary level of education compared to 28.10 percent of them was illiterate. About 6.61 percent of the farmers were primary level of education, while 16.53 percent was above secondary level of education.

Farm size

The more than half (63.64 percent) of the farmers possessed small farms compared to 30.58 percent of them having marginal farms and 4.13 percent had medium farms and only 1.65 % of the farmers having large farm.

Family size

The majority 48.76 percent of the farmers had medium family size while 20.66 percent of them had large family size and 30.58 percent of them had small family size.

Experience in rice farming

The majority (63.64 percent) of the farmers had medium experience as compared to (17.35 percent) and (19.01 percent) having low and high experience in rice farming respectively.

Experience in BRRI dhan74 production

The majority (55.37 percent) of the farmers had high experience in under BRRI dhan74 production as compared to (4.96 percent) and (39.67 percent) having low and medium experience in under BRRI dhan74 production respectively.

Annual family income

The farmers having medium annual family income constitute the highest proportion (58.68 percent) followed by low income (23.97 percent) and high annual family income (17.35 percent).

Income from BRRI dhan74 production

The highest proportion 71.07 percent of the respondent to medium income from BRRI dhan74 production, while14.05 percent had low income and 14.88 percent had high income from BRRI dhan74 production.

Training on BRRI dhan74 production

The highest proportion 40.50 percent of the farmers had no training on BRRI dhan74 production; while 37.19 percent of the farmer's low training on BRRI dhan74 production and 20.66 percent had medium training on BRRI dhan74 production and only 1.65 percent had high training on BRRI dhan74 production.

Organizational participation

The majority 54.55% of the farmers had low organizational participation as compared to 28.10% and 16.53% having low and medium organizational participation respectively.

Extension media contact

The highest proportion 59.50% of the respondents had medium extension media contact as compared to 18.18% and 22.32% having low and high extension media contact respectively.

5.1.2 Adoption of BRRI dhan74 production technologies

The majority (57.02%) of the farmers had medium adoption on BRRI dhan74 production that comprised by 15.70 percent and 27.28 percent of the farmers having high and low adoption on BRRI dhan74 production.

5.1.3 Contribution of the selected characteristics of the respondents and their adoption of BRRI dhan74 production technologies

To explore the contribution of the selected characteristics of farmers with their adoption of BRRI dhan74 production technologies, multiple regressions model was run to find out the contribution of the selected characteristics of the respondents and their adoption of BRRI dhan74 production technologies. Among 12 selected characteristics of the farmers 5 characteristics namely, education, experience in rice farming, annual family income, training on BRRI dhan74 production and extension media contact of the respondents had significant positive contribution to their adoption of BRRI dhan74 production technologies. Age, farm size, family size, land under BRRI dhan74 production, experience in BRRI dhan74 production, income from BRRI dhan74 production and organizational participation had no significant contribution with their adoption.

5.2 Conclusions

Conclusions drawn on the basis of the findings of this study and their logical interpretation in the light of the other relevant factors are furnished below:

1. In the study area farmers have been adopting BRRI dhan74 production technologies in various extents. There were 57.02% medium adopters,

15.70% high adopters and 27.28% low adopters. Therefore, it may be concluded that the farmers of the study area were adopters in variety of degrees.

2. Majorities (28.10 percent) of the farmers were illiterate. Such result was achieved because there were fewer different NGOs' activities and lower number of educational institutes in the study area. There existed a positively significant contribution between education and their adoption of BRRI dhan74 production technologies. Therefore, it may be concluded that, high educated farmers adopted more BRRI dhan74 production technologies.

3. A great majority (81.99 percent) of the respondents had medium to high experience in rice farming, while there had positive significant contribution with their adoption of BRRI dhan74 production technologies. Therefore, it may be concluded that, the higher experience of the growers; higher their adoption of BRRI dhan74 production technologies.

4. The majority (82.65 percent) of the farmers had low to medium annual family income, while there had a very strong positive significant contribution between annual family income and their adoption of BRRI dhan74 production technologies. Therefore, it may be concluded that, with the increase in annual family income of the farmers tends to increase their rate of adoption.

5. Most of the farmers (57.85 percent) had low training to medium training. Findings expressed that training of the farmers had significant positive contribution with their adoption of BRRI dhan74 production technologies. So, it may be said that the farmers having higher training might be interested to adopt BRRI dhan74 production technologies more.

6. Almost 77.68 percent of the farmers had low to medium extension media contact. Findings expressed that extension media contact of the farmers had significant positive contribution with their adoption of BRRI dhan74

production technologies. So, it may be concluded that if the farmer come in more contact of extension service provider, electronics, and printed media, they would face less problems in adoption of BRRI dhan74 production technologies.

5.3 Recommendations

5.3.1 Recommendations for policy implications

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

1. A majority (72.72 percent) of the farmers had medium to high adoption of BRRI dhan74 cultivation technologies. All the sample farmers were more or less involved in BRRI dhan74 cultivation. But their extent of adoption was not satisfactory. Therefore, it may be recommended that necessary step should be taken to increase the adoption of BRRI dhan74 cultivation technologies in the study area.

2. Education of the farmers had significant positive contribution with their adoption of BRRI dhan74 cultivation technologies. Therefore, it may be recommended that, adult and extension education should be provided to the farmers so that they could increase their educational level which might be helpful to increase their adoption BRRI dhan74 cultivation technologies.

3. The experience in rice farming of the growers had high significant positive contribution with their adoption of BRRI dhan74 production technologies. It leads to the recommendation that extension service should provide adequate farm management advice to the growers for increasing their farming experience. It is a fact that if experience were increased, growers' receptive capacity to adoption of BRRI dhan74 production technologies will be increased and thereby production will be increased.

4. Annual family income of the farmers had significant positive contribution with their adoption of BRRI dhan74 production technologies. Therefore, it may be recommended that, government and NGOs should provide credit facilities as well as other parties should increase their income with farmers so that their adoption of BRRI dhan74 production technologies could increase.

5. The findings revealed that the training on BRRI dhan74 production had a significant positive contribution with their adoption of BRRI dhan74 production technologies. So, it may be recommended that the concerned authority should increase training facilities to develop skills of the farmers technologically so that they can minimize their problems in adoption of BRRI dhan74 production technologies.

6. The findings extension media contact had a significant positive contribution with their adoption of BRRI dhan74 production technologies. So, it may be recommended that the extension workers of the concerned authority should increase the contact with farmers personally and motivate them to be connected with electronic and printed media that can help them to exchange related information which will reduce their problems in adoption of BRRI dhan74 production technologies.

5.3.2 Recommendation for further study

This study investigated adoption of BRRI dhan74 production technologies by the farmers of Brahmanpara Upazila under Cumilla district. As a small and limited research has been conducted in the present study cannot provide much information related to this aspect. Further studies should be undertaken to cover more information in the relevant matters. So, the following suggestions were put forward for further research:

- It is difficult to determine the extent of adoption of BRRI dhan74 production technologies by the farmers. Measurement of adoption of the farmers is not free from questions. More reliable measurement of concerned variables is necessary for further study.

- The present study was conducted only in two villages of Brahmanpara Upazila under Cumilla district. Findings of the study need further verification through similar research in other parts of the country.

- The study investigated the contribution of twelve characteristics of the farmers with their adoption of BRRI dhan74 production technologies. So, it is recommended that further study would be conducted with other dependent and independent variables.

- Research should be undertaken on the effectiveness of agricultural extension services and other related organizations in helping farmers for adoption of BRRI dhan74 production technologies.

REFERENCES

Abara, I. and Singh, S. (1993). Ethics and Biases in Technology Adoption: The Small-Farm Argument. Technological Forecasting and Social Change, **43**, 289-289.

Adesina, A. and Zinnah, M. (1992). Adoption, Diffusion, and Economic Impacts of Modern Mangrove Rice Varieties in Western Africa: Further Results from Guinea and Sierra Leone. Towards a New Paradigm for Farming System Research/Extension, 443-466.

Aguila-Obra, A. R., & Padilla-Meléndez, A. (2006). Organizational Factors Affecting Internet Technology Adoption. *Internet Res.*, **16**(1), 94-110.

Ali, M. K., S. A Chowdhury, M. A. Kader and M. O. Gani. (1986). Factors influencing adoption of improved sugarcane production technologies among the growers of sugar mill zone. Bangladesh journal of Extension Education, 1(2): 25-31.

Aurangozeb, M. K. (2002). Adoption of Integrated Homestead Farming Technologies by the Rural Womens in RDRS. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh

Bantel, K. A. and Jackson, S. E. (1989). Top Management and Innovations in Banking: Does the Demography of the Top Team Make a Difference? *Strategic Management Journal*, **10**(2), 107-124.

Barkatullah, M. (1985). Adoption of Livestock of Green Revolution Technologies by the Farmers of Mudstadi Union-A Comparative Study. M.S. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.

Barr, N. and Cary, J. (1992). Greening a Brown Land: The Australian Search for Sustainable Land Use: MacMillan Education Australia Pty Ltd.

Bashar, M. K. (1993). Adoption of Intercropping in Sugarcane Cultivation M.S. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.

BBS. (2020). Statistical Year Book of Bangladesh. Bangladesh Bureau of

Statistics. Statistics Division, Ministry of Planning, Government of the People's Republic of Bangladesh.

BBS. (2019). Statistical Year Book of Bangladesh. Bangladesh Bureau of Statistics. Statistics Division, Ministry of Planning, Government of the People's Republic of Bangladesh.

BEC. (2021). Bangladesh Economic Census. Finance Division, Ministry of Finance, Government of the People's Republic of Bangladesh.

Bezbora, S. N. (1980). Factors Affecting Adoption of Improved Agricultural Technologies for Paddy Cultivation by the Farmers of Assam. Summary of Extension Research. 6: 24-27. Department of Extension Education, Punjab Agricultural University, Ludhiana.

Cary, J., Webb, T. and Barr, N. (2002). Understanding Landholders' Capacity to Change to Sustainable Practices: Insights about Practice Adoption and Social Capacity for Change. Canberra: Bureau of Rural Sciences.

Chau, P. Y. K. and Tam, K. Y. (1997). Factors Affecting the Adoption of Open Systems: An Exploratory Study. *Mis Quarterly*, 1-24.

Chowdhury, M. S. A. (1997). Adoption of BINA Technologies by the Farmers of Boira Union in Mymensmgh District. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension and Education. Bangladesh Agricultural University, Mymensingh.

DAE. (1995). Agricultural Extension Manual. Department of Agricultural Extension, Ministry of Agriculture, Government of the People's Republic of Bangladesh.

Deressa, T. T., Hassan, R. M., Ringler, C., Alemu, T. and Yesuf, M. (2009). Determinants of Farmers' Choice of Adaptation Methods to Climate Change in the Nile Basin of Ethiopia. *Global Env. Change*, **19**(2), 248-255.

Doorman, F. (1991). A Framework for the Rapid Appraisal of Factors that Influence the Adoption and Impact of New Agricultural Technology. *Human Organization*, **50**(3), 235-244.

Duncan, B. O. D. Duncan (1969). Family Stability and Occupational Success.

Social Problems, **16**(3), 273-285.

Feder, G. and Just, D. L. (1985). The Adoption of Agricultural Innovations: A review. *Technol. Forecasting and Social Change*, **43**(3-4), 215-239.

Feder, G. and Umali, D. L. (1993). The Adoption of Agricultural Innovations: A review. *Technol. Forecasting and Social Change*, **44**(3-4), 240-259.

Feder, G., Just, R. E. and Zilbverman, D. (1985). Adoption of Agricultural Innovation in Developing Countries: *A Survey Journal of Economic Development and Cultural Ehange,* **33**: 255-298.

Floyd, C., Harding, A.H., Paudel, K.C., Rasali, D.P., Subedi, K. and Subedi, P.P (2003). Household Adoption and the Associated Impact of Multiple Agric. Technologies in the Western Hills of Nepal. *Agric. Sys.* **76** (2), 715-738.

Gibson, J. (1994). Rice Import Substitution and Employment In Papua New Guinea. *Pacific Economic Bulletin*, **9**(1), 46-52.

Gogoi, S. K. and Gogoi, D. K. (1989). Adoption of Recommended Plant Protection Practices in Rice. *Indian Journal Extension Education*, 25 (1&2): 26-29.

Guerin, L. and Guerin, T. (1994). Constraints to the Adoption of Innovations in Agricultural Research and Environmental Management: A Review. *Australian J. of Exp. Agric.*, **34**(4), 549-572.

Hamid, M. A. (1995). Adoption of recommended sugarcane cultivation practices by the farmers. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education Bangladesh Agricultural University, Mymensingh.

Haque, M. S. (1984). A study on the Adoption of Improved Practices in Sugarcane Cultivation in Some Selected Areas of Jossore District. 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 of the International Conference on Plant Pretection in the Tropics, Kualalumpur: Malaysian Plant Protection

Society, 5:30-84.

Hoque, D. M. (2016). Farmers Attitude towards Industrialization in Narayanganj District. Sher-E-Bangla Agricultural University, Dhaka, Bangladesh.

Hoque, M. M. (1993). Adoption of Improved Practices in Sugarcane Cultivation by the Sugarcane Growers in Sreepur Thana under Gazipur District. M.S. (Ag. Ext. Ed.) Thesis Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.

Hossain, K. (2006). Adoption of Selected High Yielding Variety of Rice by the Farmers of Rajpat Union under Kasiani Upzila in Gopalgonj District. .S. (Ag Ext. Edu.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh, Bangladesh.

Hossain, M. N. (1999). Relationships of Selected Characteristics of the Jute Growers wish their Improved Practices of Jute Cultivation. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension and Teachers' Training. Bangladesh Agricultural University, Mymensingh.

Hossain, M., Bose, M. L. and Mustafi, B. A. A. (2013). Adoption and Productivity Impact of Modern Rice Varieties in Bangladesh. *The Developing Economies*, **44**(2), 149-166.

Hossain. M. A. (1991). Adoption Behaviour of Contact Wheat Growers in Sadar Upazila of Jamalpur District. M.S. (Ag Ext. Ed) Thesis. Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensmgh.

Hussen, M. A. M. (2001). Farmers' Knowledge and Adoption of Modem Sugarcane Cultivation Practices. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.

ILEIA. (1991). Information Centre for Low-external Input and Sustainable Agriculture. Newsletter, 7(3): Leusden, the Nether lands.

Islam, M. S. (2002). Adoption of Modem Agricultural Technologies by the Farmers of Sandip. M.S. (Ag Ext Ed.) Thesis. Department of

Agricultural Extension Education. Bangladesh Agricultural University. Mymensingh.

Ison, R. and Russell, D. (2000). Agricultural Extension and Rural Development: Breaking out of Traditions: Cambridge University Press.

Jahan, I. (2017). Socio-Economic Determinants of Adoption of Sunflower Production by the Farmers of Patuakhali Sadar Upazila. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension and Information System, Sher-e-Bangla Agricultural University, Dhaka.

Kashem, M. (2013). Sequential Adoption of Site-Specific Technologies and Its Implications for Nitrogen Productivity: A Double Selectivity Model. *American J. of Agric. Economics*, **83**(1), 35-51.

Kashem, M. A. and Islam, M. M. (1990). 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.

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.

Kerlinger, F. N. (1973). Foundations of Behabioural Research. 2nd Edn. Delhi: Surjeet Publications.

Khan, M. A. H. (1993). Adoption of Insecticides and Related Issues in the Village of Pachon Union, Madaripur District. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.

Khan, M. O. (2019). Adoption of Selected Rice Production Technologies by the farmers of Joypurhat district in Bangladesh. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension and Information System, Sher-e-Bangla Agricultural University, Dhaka.

Kher, S. K. (1992). Adoption of Improved Wheat Cultivation Practices. *Indian Journal of Extension Education,* 22(182):97-99.

Knowler, D. and Bradshaw, B. (2007). Farmers' Adoption of Conservation

Agriculture: A Review and Synthesis of Recent Research. *Food Policy*, **32**(1), 25-48.

Krishna, P. V. (1969). Hybrid Maize in Karimnagar. *Economic and Political Weekly*, 4(18):755-756.

Leathers, H. D. and Smale, M. (1991). A Bayesian Approach to Explaining Sequential Adoption of Components of a Technological Package. *American J. of Agric. Eco.*, **73**(3), 734-742.

Lionberger, H. F. (1968). Adoption of New Ideas and Practices: A Summary of Research Dealings with Acceptance of Technological Changes in Agriculture. The Iowa State University Press, Iowa. pp: 403.

Mandal, M. Z. (1980). Adoption of BRRI dhan29 Production Technologies by the Farmers. M.S. Thesis, Department of Agricultural Extension and Information System, Sher-e-Bangla Agricultural University, Dhaka, Bangladesh.

Masud, M. A. (2007). Farmers' Adoption of Modern Maize Cultivation. Sher-E-Bangla Agricultural University, Dhaka, Bangladesh.

Moser, C. M., and Barrett, C. B. (2003). The Disappointing Adoption Dynamics of a Yield Increasing, Low External-Input Technology: The Case of SRI in Madagascar. *Agric. Sys.*, **76**(3), 1085-1100.

Mostofa, M. G. (1999). Adoption of Recommended Mango Cultivation Practices by the Mango Growers of Nawabganj Sadar Thana. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh, Bangladesh.

Muttaleb, A. (1995). Relationship of Selected Characteristics of Potato Growers with their Adoption of Improved Potato Technologies. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.

Nahar, N. (1996). Relationship of Selected Characteristics of the Farm Women with Usefulness of Agricultural Radio Program and Homestead Farming Knowledge. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.

Niyegela, T. K. (2007). Effectiveness of Farmer Field School in Dissemination of Agricultural Knowledge in Kagera Region. Dissertation for Award of MSc Degree at Sokoine University of Agriculture, Morogoro, Tanzania, pp: 104.

Ogunlana, E. A. (2004). The Technology Adoption Behavior cf Women Farmers: The Case cf Alley Farming in Nigeria. *Renewable Agric. and Food Sys.*, **19**(01), 57-65.

Okoro, M. N. and Obibuaka, L. U. (1992). Factors influencing the adoption of improved oil palm management practices among Small holders in IMP States, Nigeria *Bangladesh Journal of Extension Education*, 7 (1&3): 45-52.

Osunloogun, A., Ademoyo, R. and Anyanwu, E. (1996). "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 in Two selected Centres of North Bengal Sugar Mills. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensmgh.

Pannell, D. J., Marshall, G. R., Barr, N., Curtis, A., Vanclay, F. and Wilkinson, R. (2006). Understanding and Promoting Adoption cf Conservation Practices by Rural Landholders. *Australian J. of Exp. Agric.*, **46**(11), 1407-1424.

Poddar, K. K. 2015. Effects of Climate Change on Rural Farmers Livelihood. M.S. (Ag. Ext. & Info. Syst) Thesis, Department of Agricultural Extension and Information System, Sher-e-Bangla Agricultural University, Dhaka.

Podder, S. K. (1999). Adoption of Mehersagar Banana by the Farmers of Gazaria Union under Sakhipur Thana of Tangail 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 Boro Rice

Farmers of Ishwarganj Thana. M.S. (Ag. Ext. Ed.) Thesis Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.

Rahman, M. S. (2001). Knowledge, Attitude and Adoption of the Farmers Regarding Aalok 6201 Hybrid Rice in Sadar Upazila of Mymensingh District. MS. (Ag Ext. Ed.) Thesis. Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.

Ray, G. L. (1991). Extension Communication and Management. Calcutta: Naya Prokash.

Risingbd. (2014). Rice Production in Bangladesh. Risingbd, An online news Portal. Retrieve from: http://www.risingbd.com/english/ Rice_production_reach es_34449_million_ton_in_FY_2013-14/16217.

Rogers, E. (2003). Diffusion of Innovations. Fifth Edition, Free Press, New York. pp: 221.

Rogers, E. M. (1983). Diffusion of Innovation. (3rd Ed.), Macmillan Publisher, NeYork.11pp,453pp. (http//enwikipedia.org/wiki/Technology _adoption

Rogers, E. M. (1995). Diffusion of Innovations. (4th Ed.), Free Press, New York.

Sardar, M. H. U. (2002). Adoption of IPM Practices by the Farmers under PETRRA Project of RDRS M. S. (Ag. Ext Ed.) Thesis. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.

Sarkar, D. C. (1997). Correlation of Selected Characteristics of Potato Growers with their Adoption of Improved Potato Cultivation Practices in Five Villages of Commilla District M.S (Ag. Ext Ed.) Thesis. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.

Singh, P. K. (1989). Extent of Adoption of Selected Recommended Practices by Kinnow Growers of Ferozpur and Fridcot district of Punjab. M. S. Thesis Abstract Panjab Agricultural University, Ludhiana.

Slade, R., Feder, G. and Shikaria. (1988). Reforming Agricultural Extension. The Training and Visit System in India. *Quarterly Journal of International Agricultural;* (3 & 4): 228-246.

Sobhan, M. A. (1975). Adoption of Winter Vegetable Cultivation by the Farmers in Boilor Union of Mymensingh District. M.S. (Ag.Ext.Ed.) Thesis, Bangladesh Agricultural University, Mymensingh, Bangladesh.

Spence, W. R. (1994). Innovation: The Communication of Change in Ideas, Practices And Products: Thomson Learning.

Staal, S., Baltenweck, I., Waithaka, M., DeWolff, T. and Njoroge, L. (2002). Location and Uptake: Integrated Household and GIS Analysis of Technology Adoption and Land Use, With Application to Smallholder Dairy Farms in Kenya. *Agric. Eco.,* **27**(3), 295-315

Tolawar, S. and Hirevenkarangouda, L. V. (1989). Factors of Adoption of Poultry management practices. *Indian Journal of Extension Education*, 25(l&2):67-73.

Townsend, J. C. (1953). Introduction to Experimental Methods. International Student Edition. New York: McGraw Hill Book Company, Inc.

Van den Ban, A. and Hawkins, H. (1996). Agricultural Extension. London, Cambridge.

Van den Ban, A.W. and Hawkins, H. S. (1996). Agricultural Extension 2nd Ed. Published by Black Well Science Ltd., London. pp: 294.

Webb, T. (2004). Understanding Behaviour: Social and Economic Influences on Land Practice Change. Land Management Practices Information, Priorities, Classification and Mapping-Towards an Agreed National Approach. Kamberra Winery, Canberra, pp: 11-12.

Wilkinson, R. (2011). The Many Meanings of Adoption. Changing Land Management: Adoption of New Practices by Rural Landholders, 39.

Appendix -A

English version of the Interview Schedule
Department of Agricultural Extension & Information System
Sher-e-Bangla Agricultural University
Dhaka – 1207
Interview Schedule for data collection for the Research on

"Adoption of BRRI dhan74 Production Technologies by the Farmers of Brahmanpara Upazila under Cumilla District"

(This interview schedule is entitled for a research. Collected data will only be used for research purpose and will be published aggregately)

Serial No.…….
Name of the respondent ……..
Village ……Union ……
Upazila ……District
……..

1. Age: What is your present age? …… Years.
2. Education:
   a) Cannot read and write …….. b) Can sign only…….
   c) I read up to class …….
3. Farm size: Please indicate area of your lands according to the following items

Sl. No.	Use of land	Measuring unit	
		Local unit	Hectare
1	Homestead area (A_1)		
2	Own land under own cultivation (A_2)		
3	Land taken from others on borga system (A_3)		
4	Land given to others on borga system (A_4)		
5	Land taken from others on lease (A_5)		
Total farm size = $A_1+A_2+1/2(A_3+A_4)+A_5$			

4. Family size
   How many members are there in your household including you? .....
5. Land under BRRI dhan74 production
   How much land did you allot for BRRI dhan74 production last year?
   Ans:……. ha.
6. Experience in rice farming
   How long have you engaged with rice farming?
   Ans:……years
7. Experience in BRRI dhan74 production
   How long have you engaged with BRRI dhan74 production?
   Ans:……years
8. Annual family income

Please indicate the income of your family from different sources in the last year.

Sl. No.	**Sources of income**	**Value (TK)**
1.	Crops:	
	a) Rice	
	b) Wheat	
	c) Jute	

	d) Vegetables	
2.	Livestock	
3.	Poultry	
4.	Fisheries	
5.	Others (please specify)	
Total		

9. Income from BRRI dhan74 production

How much did you earn from BRRI dhan74 production in the last year?

Sl. No.	Name of the product	Cost per unit (tk.)	Total cost (tk.)	Total production (local unit)	Price/unit (tk.)	Total price (tk.)	Net income (tk.)
1.	BRRI dhan74 production						
2.	By products						

10. Training on BRRI dhan74 production (Have you participated in any professional training program regarding BRRI dhan74 production? Yes /No,If yes furnish the following information :

No.	Name of the training	Sponsoring Organization	o. of Days

11. Organizational participation

Please mention the nature and duration of your participation in the following organizations.

No	Duration and Nature of participation				
	Name of the organizations	No participation	Ordinary Member	Executive Member	Executive Officer (President, Secretary, Treasurer)
1	NGO (eg. BRAC, PROSHIKA, ASA, Grameen Bank)				
2	IPM/ICM Club				
3	Farmers' Cooperative Society				
4	Youth Club				
5	Bazar Committee				

12. Extension media contact

Please indicate the extend of your contact with the following information sources for BRRI dhan74 production:

No.	Sources	Not at all (0)	Extent of Contact			
			Rarely (1)	Occasionally (2)/	Often (3)	Regularly (4)
1	Peer farmers /Neighbors		1 time /month	2-3 times /month	4 - 5 times /month	More than 5 times

						/month
2	SAAO		1 time /month	2-3 times /month	4 - 5 times /month	More than 5 times /month
3	AAEO/AEO		1-2 times /year	3-4 times /year	5- 6 times /year	More than 6 times /year
4	UAO		1-2 times /year	3-4 times /year	5- 6 times /year	More than 6 times /year
5	NGO workers		1 time /month	2-3 times /month	4 - 5 times /month	More than 5 times /month
6	Inputs dealers (Fertilizer, Pesticides, Irrigation)		1 time /month	2-3 times /month	4 - 5 times /month	More than 5 times /month
7	Farm Radio Program listening		1 time /month	2-3 times /month	4 - 5 times /month	More than 5 times /month
8	Farm TV program watching		1 time /month	2 - 3 times /month	4 - 5 times /month	More than 5 times /month
9	Agril. Info. Centre (eg. AISS, DISC)		1 time /month	2-3 times /month	4 - 5 times /month	More than 5 times /month

13. Adoption of BRRI dhan74 production technologies

Please give information about the use of following of BRRI dhan74 production technologies:

Sl. No	Technologies	Potential Area (L)	Allocated Area (l)	Years of the adoption		
				2017-18	2018-19	2019-20
1	Seedling growing method					
2	Alternate Wetting and Drying (AWD)					
3	Modern agricultural machineries					
4	Line transplanting					
5	Roughing					
6	Use of Guti urea					
7	Integrated Pest Management (IPM)					
8	Use of organic fertilizer					

$$\text{Adoption scores} = \frac{\sum x}{\text{No. of technologies}} \times 100$$

Thanks for your co-operation

Date:

_____

Signature of the interviewer