ADOPTION OF SELECTED T. AMAN PRODUCTION TECHNOLOGIES BY THE FARMERS

BY

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A Thesis

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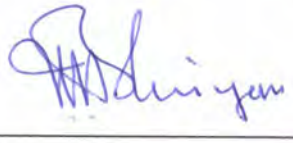

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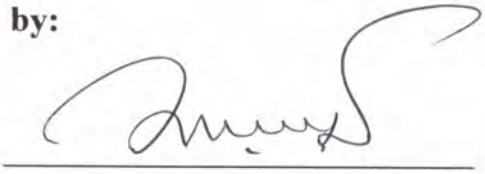

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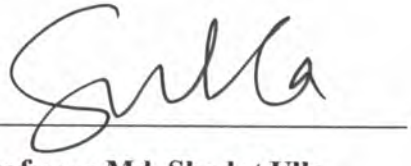

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CERTIFICATE

This is to certify that the thesis entitled, "Adoption of Selected T. Aman Production Technologies by the Farmers" submitted to the Faculty of Agriculture, Sher-e-Bangla Agricultural University, Dhaka, in partial fulfillment of the requirements for the degree of MASTER OF SCIENCE in AGRICULTURAL EXTENSION AND INFORMATION SYSTEM embodies the result of a piece of bonafide research work carried out by Muhammad Humayun Kabir, Registration No.00475 under my supervision and guidance. No part of the thesis has been submitted for any other degree or diploma.

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

Dated:
Place: Dhaka, Bangladesh

(Prof. Mohammad Hossain Bhuiyan)
Supervisor

Dedicated to

My

Beloved Parents

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Researcher

LIST OF ABBREVIATIONS OF SYMBOLS AND TERMS

Full Word	Abbreviation
And others (at elli)	*et al.*
Bangladesh Rice Research Institute	BRRI
Degrees of Freedom	df
Coefficient of Variation	CV
Kilometer	Km
Etcetera	etc.
Example	e.g.
Recommended fertilizer dose	RFD
Hectare	ha
Integrated Pest Management	IPM
Kilogram	kg
Taka	Tk.
Namely	viz.
Percent	%
Ton	t
Metric ton	Mt
Adoption Quotient	AQ
Government Organization	GO
Non-Government Organization	NGO
Department of Agricultural Extension	DAE
Focus Group Discussion	FGD
Sub Assistant Agricultural Officer	SAAO

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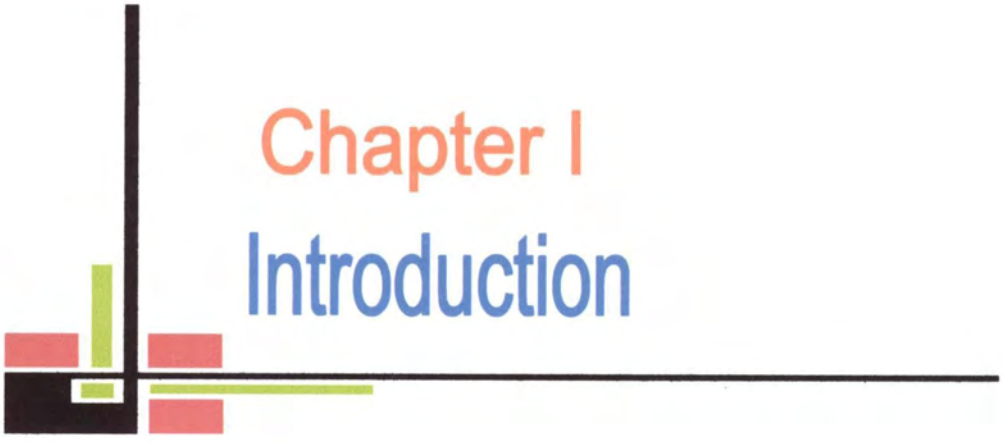
ABSTRACT

The main purpose of the research work was to determine the extent of adoption of selected T. Aman production technologies by the farmers of Sarishabari upazila. Attempt was also made to explore the relationship between selected characteristics namely age, level of education, family size, farm size, annual family income, organizational participation, innovativeness, extension media contact, commercialization and cosmopoliteness of the farmers and their composite adoption of selected T. Aman production technologies. Data were collected from randomly selected 130 farmers of Pingna union under Sarishabari upazilla of Jamalpur district by using an interview schedule. Data were collected during 12th August to 18th October, 2006. Appropriate scales were developed in order to measure the variables. Correlation test was used to ascertain the relationships between the concerned dependent and independent variables of the research work. Majority (43 percent) of the farmers had medium adoption while 37 percent had high adoption and 20 percent had low adoption of selected T. Aman production technologies. Among the selected characteristics, level of education, farm size, annual family income, organizational participation, innovativeness and extension media contact showed significant and positive relationships with their adoption of selected T. Aman production technologies. On the other hand age, family size, commercialization and cosmopoliteness did not show any significant relationship with their composite adoption of selected T. Aman production technologies.



Chapter I

Introduction

Chapter I

INTRODUCTION

1.1 General Background

Bangladesh is mainly an agro-based country with an area of 1, 47,570 sq. kilometers. About 76.61 percent of its population lives in rural areas and two-third of her labor forces (68.6 percent) are engaged in agriculture (BBS, 2004). The predominance of agriculture in the country's economic life becomes all the evident if one looks at the magnitude of its contribution to Gross Domestic Product (GDP) in the country. According to BBS report, agriculture output at current prices has been found to contribute 21.91 percent to the GDP (BBS, 2005). So, agriculture plays a vital role through employment generation, poverty alleviation, food security, enhance standard of living by increasing income level of rural population.

Rice is the major food crop in Bangladesh. It is the people's main food and energy source. About 90 percent of the population in the country depends on rice as their major food (IRRI, 1981). Rice covers about 80 percent of the total cultivable land and is the only source of cash income for most of the farmers. It grows under irrigated, rainfed and deep water conditions in three different seasons. Rice alone constitutes 95 percent of the food grain production in Bangladesh (Julfiquar *et al.* 1998).

Bangladesh has three main rice growing seasons which are Aus, Aman and Boro. Among these three types of rice, Aman comprised about 52.46 percent of our gross cropped area of rice production. Boro and Aus cover about 36.43 percent and 11.11 percent of our gross cropped area of rice production respectively (BBS, 2004). The cultivation of T. Aman rice shows an increasing trend since several years with rapid intensification of land. It shares about 47.48 percent of total rice production (BBS, 2004).

The T. Aman is transplanted from July to September and harvest from November to January. All indigenous Transplanted Aman rice is sensitive to photoperiod while modern varieties are sensitive to slightly sensitive to photoperiod. However this characteristic is needed to increase yields of this crop when cropping pattern dictates late planting. About 4.71 million hectare are cultivated with Transplanted Aman which produced 9.46 million metric ton with an average yield is 2.08 ton per hectare and an average yield of rice is about 2.42 ton per hectare. In 2004-05 the total production of rice was about 25.18 million metric ton (BBS, 2005). The area, production and average yield of T. Aman in Bangladesh from 2001 to 2005 are shown in table 1.1.

Table 1.1. The area, production and average yield of T. Aman in Bangladesh

Year	Area (in '000' ha)			Production (in '000' M ton)			Average yield (ton/ha)
	Local	HYV	Total	Local	HYV	Total	
2001-02	2051.4	2864.8	4916.2	3018.0	6810.0	9828.0	2.00
2002-03	2048.0	2938.2	4986.2	3133.4	7142.1	10275.6	2.06
2003-04	2067.9	2985.8	5053.7	3205.4	7529.3	10734.7	2.12
2004-05	1808.0	2906.0	4714.0	2668.0	6693.0	9461.0	2.08

Source: BBS, 2005

Production may be increased by using modern technologies properly. Accordingly efforts are being made to encourage farmers to accept and make use of the research findings. Nevertheless, the technologies are not being used by all farmers at an equal rate. Some of them respond to an innovation quickly while other delay or sometimes don't adopt at all.

It is, therefore, necessary that the concept and benefits of the modern technologies should be disseminated to the farmers in a convincing and attractive manner. So that farmers response quickly to adopt those technologies. This is undoubtedly an educative process and is possible through extension education system, concerned mainly with increasing agricultural production and improving living standards of farmers. Recently the government has taken a new agricultural extension policy to reach the desired goal (Agricultural Extension Manual, 1999).

An individual usually does not adopt a new technology unless he finds the benefit of it by himself. Even if he is convinced about its benefit still he may not use the same due to lack of financial capability. Sometimes he may have means to use the technology but his social norms and traditions do not encourage him to use it for prestigious factors. All these personal, socio-economic, socio cultural and psychological factors work in an individual when he is confronted with a new situation or with a changed programme.

The majority of the farmers of Sarishabari Upazila are illiterate. They have little communication facilities with developed areas. Reasonably they do not have well exposure with modern agricultural technologies except some HYV of rice varieties such as BR-11, BR-25. Infact only the HYV of rice seeds can not ensure high production. Cultivation of HYV of rice consists of a package of technologies such as quality seeds, raising of seedling, balance dose of fertilizers, insect and disease control, irrigation etc. Unless the farmers of Sarishabari Upazila adopt the entire package of T. Aman production technologies the yield may not be equal to the national average. The per hectare T. Aman production in Sarishabari is below the national average. So the farmers of Sarishabari are very poor and live hand to mouth. There is an urgent need to adopt selected T. Aman production technologies along with HYV of rice by the farmers of Sarishabari Upazila.

According to Rogers (1995), "Adoption is a decision to make full use of an innovation as the best course of action available". Ray (1995) also said that when an individual takes up a new idea as the best course of action and practices it, the phenomenon is known as adoption. The adoption of selected T. Aman production technologies by the farmers of Sarishabari Upazila must be in the line of definition.

The present study of adoption is the only one piece of a complex puzzle, but the findings of this study can be a key in extending the adoption of modern T. Aman production technologies in the country. This will be helpful for planning adoptive research, formulating extension messages and production plans. This will help to understand the picture of modern T. Aman production technologies adopted by the farmers of Sarishabari area in particular. With this end in view, the author became keenly interested to investigate the characteristics of the farmers related to adoption of selected modern T.Aman production technologies at Sarishabari upazila under Jamalpur district.

1.2 Statement of the Problem

The success of any technology depends on its dissemination among the potential users which ultimately is measured by the level of adoption of that technology. It is assumed that notable improvements can take place in Bangladesh agriculture, if the available technologies are accepted and adopted by the farmers. Among various technologies, use of recommended variety, use of line transplanting method, use of balance fertilizer dose, use of IPM (Integrated Pest Management) practices and use of supplementary irrigation are quite suitable for our sustainable agriculture.

Very little is known about the adoption of above mentioned technologies by the farmers in the country. Generalization from studies conducted home and abroad regarding the adoption of other technologies may not be always applicable due to considerable variation in attributes of the technologies and for other factors.

When an innovation is introduced among the farmers it may be fully or partly accepted. It may so happen that the adoption of innovation is discontinued or totally stopped. These happenings are certainly due to a number of factors. Adoption of selected T. Aman production technologies is influenced by the farmers demographic and socio economic condition. There is an argent need to identify the T. Aman production technologies, along with demographic and socio-economic factor of farmers that influence them to adopt those technologies.

In view of the forgoing discussion, the researcher undertook this piece of research entitled "Adoption of Selected T. Aman Production Technologies by the Farmers." The main purpose of the study was to have an understanding on the adoption of selected T. Aman production technologies by the farmers and about some selected characteristics contributing in the adoption of selected T. Aman production technologies. For conducting the research in a planned and appropriate way, the researcher put forwarded the following questions:

- What are the T. Aman production technologies that have been adopted by the farmers of Sarishabari upazila?
- What are the characteristics of the T. Aman farmers that influenced them to adopt those technologies?
- At what extent the T. Aman production technologies were adopted by the farmers?
- Are there any relationships between the extent of adoption of selected T. Aman production technologies and selected characteristics of the farmers?

1.3 Specific objectives

Keeping in view the questions stated above the following specific objectives were formulated for giving proper direction to the study-

1. To identify and describe the selected T. Aman production technologies used by the farmers.

2. To determine and describe selected personal and socio-economic characteristics of the farmers.

3. To determine the extent of adoption of selected T. Aman production technologies by the farmers.

4. To explore the relationship between the extent of adoption and farmers selected characteristics.

1.4 Justification of the Study

Bangladesh has three main rice growing season. Among them T. Aman is the most important rice crop. At present, there is a significant gap between the target and achievement of T. Aman production. The country also facing the deficit of food grains. So to ensure adequate food supply it is necessary to give thrust to increase T. Aman production using selected agricultural technologies. Minimize food shortage and maximize self-sufficiency in food production is possible only when adoption of selected T. Aman production technologies and their application create positive impact of the users.

A good number of modern agricultural technologies have developed by several research institutes but the farmers have adopted a few of them. Technical, biological, environmental and socio-economic barriers are the main hindrances of technology transfer and adoption of modern agricultural technologies. Modern agricultural technologies must be simple, demand driven, locally available, economically feasible and socially acceptable to bring desirable changes in attitude of the users for their adoption. At present per hectare yield of HYV is comparatively higher than that of local variety. HYV is now available for increasing the adoption of selected T. Aman production technologies.

It is obviously true that farmers are the key elements of adoption of selected T. Aman production technologies. At present, there is a lack of adequate understanding as to how the characteristics of the farmers influence their adoption of selected T. Aman production technologies. These facts indicate the need for an investigation to ascertain the relationships of the characteristics of the farmers with their adoption of selected T. Aman production technologies. Findings of this study, therefore, are helpful to the planners and extension workers in planning and execution of programmes for enhancing the yield as production of rice.

1.5 Assumptions of the Study

An assumption is the supposition that an apparent fact or principle is true in light of the available evidence (Goode and Hatt, 1952). An assumption is taken as a fact or belief to be true without proof. In this study the researcher had the following assumptions in mind while carrying out this study.

1. Views and opinions furnished by the farmers included in the sample were representative of the whole population of the study area.

2. The respondents included in the sample were competent to furnish proper responses to the items included in the interview schedule.

3. The responses furnished by the respondents were reliable and they expressed their opinion on adoption of selected T. Aman technologies and their selected characteristics.

4. The respondents included in the sample for this study were competent enough to furnish proper responses to the queries included in the interview schedule.

5. The findings of the study would be useful for planning and execution of the progroammes in connection with diffusion of selected T. Aman production technologies.

6. The measure of the adoption of selected T. Aman production technologies by the farmers are normally and independently distributed with their respective means and standard deviation. The process of measurement of dependent and independent variables were justified and reasonable.

7. The adoption of selected T. Aman production technologies by the farmers were linearly related with their selected characteristics.

1.6 Scope of the Study

The findings of the present study will be useful for the nation in general and for the study area in particular. However the findings may also have implications to other areas of Bangladesh where the physical, socio-economic, cultural and geographical conditions are similar with those of the study area. The Deputy Director of Agricultural Extension (DDAE) and Upazila Agriculture Officer (UAO) are the responsible for the diffusion of T. Aman production technologies. They prepare local agricultural development program. There is an ample scope for them to use the findings of the study when they prepare transfer of technology program. Moreover, the findings of the research will add some new information in the body of knowledge.

1.7 Limitations of the Study

In order to conduct the research in a meaningful and manageable way it became necessary to impose some limitation with regard to certain aspects of the study. Considering the time, money and other necessary resources available to the researcher the following limitations have been observed throughout the study:

1. The study was confined in two villages of Sarishabari upazila under Jamalpur district.

2. The study focused on adoption of selected T. Aman production technologies which included recommended variety, line transplanting method, balance fertilizer dose, IPM (Integrated Pest Management) practices and supplementary irrigation.

3. Only T. Aman growers were selected as respondents for this study.

4. There are many attributes or characteristics of the farmers such as farming experience, agricultural knowledge, attitudes towards modern technology etc. which are always varies but only ten characteristics 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. 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 T. Aman production technologies.

6. The researcher relied on the data furnished by the farmers from their memory during interview.

7. Facts and information collected by the investigator were applicable to the present situation in the selected area.

1.8 Definition of Terms

In order to avoid confusion and misunderstanding, certain terms were used throughout the study that has been stated below:

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 practice it, the phenomenon is known as adoption (Ray, 1991).

T. Aman

T. Aman is Transplanting Aman rice grown in Aman season during July to September. The term Transplanting Aman stems from the idea that first of all seedlings are raised in a seed bed and after certain period they are transplanted in the main field.

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, technologies refer to the combination of knowledge, inputs and manage mental practices, which are used together with productive resources to gain a desired output (ILEIA, 1991: 3). In this study the actions that are related to T. Aman rice production were termed as technologies.

Respondent

People, who answered questions through an interviewer procedure in a face to face situation for a social survey, were considered to be the respondent. They are the people from whom social research workers usually get most data required for their research.

Variable

Measurable characteristics of a population that may vary from element to element either in magnitude or in quality are called variable (Ahmed *et al.* 2004). A general indication in statistical research of characteristics that occurs in a number of individual's objects, groups etc. and that can take on various values, for example the age of an individual.

Selected rice production technologies

Selected rice production technologies in respect of cultivation of rice crop refer to those practices, which are advocated by some competent authority. For example the selected rice production technologies are recommended variety, line transplanting method, balance fertilizer dose, supplementary irrigation and IPM practices.

Age

Age of an individual farmer was defined as the period of time in years from his birth to the time of interview.

Level of education

Level of education of an individual farmer was defined as the formal education received up to a certain level from an educational institute (e.g. school, college and university) at the time of interview.

Family size

Family size of farmer was defined as the number of individuals in his family including himself, his wife, children and other dependent members who live in the same homestead area and eat in the same kitchen.

Farm size

Farm size refers to the area of land possess by a farmer through different land tenure system such as own land under own cultivation, land given other as borga, land taken from other as borga, land taken as lease etc. Hectare was used as unit of farm size.

Annual family income

Annual income refers to the total earning of a respondent by himself and the members of his family from agriculture and non agriculture (services, business etc.) sources during last year. It was expressed in Taka.

Innovativeness

The term innovativeness refers to the degree to which an individual is relatively earlier in adopting new ideas than the other members of a social system (Rogers 1983). Innovativeness of a respondent was measured on the basis of year of adoption of selected rice production technologies i.e. adoption period of ten technologies.

Organizational participation

Organizational participation is referred to the degree to which a farmer takes part in different social organizations either as an ordinary member, executive committee member or executive officer within a specified year.

Extension media contact

The term extension media contact refers to an individual's exposure to or contact with different communication media, source and personalities being used for dissemination of new technologies among the farmers.

Cosmopolitenesss

Cosmopoliteness is the degree to which an individual respondent how frequent visits, travels to the places external to his own social system for the purpose of achieving new experience, new knowledge related to his farm business.

Commercialization

Commercialization is the process by which an individual farmer exploit for profit of the expense of quality out of his total produced crops value and sold out crops value. Commercialization of a respondent was measured on the basis of his sold crops out of the total value of his produced crop in a year. It was expressed in percentage.

Modern variety

Modern varieties are those varieties which possess the quality for better performance in respect of yields, quality, insect and disease resistance. Here modern varieties are those which recommended by BRRI for T. Aman.

Line transplanting method

It refers to the line transplanting of seedling of T. Aman which causes better production due to the maintain of proper spacing and easy intercultural operation.Line transplanting refers to a technology of crop production which maintains recommended space from plant to plant and row to row. In this study line transplanting method was meant for T. Aman.

Balance fertilizer

Fertilizer refers to chemical products which are applied to the soil for supplying plant nutrients. Balance fertilizer refers to that dose of fertilizer which includes all types of nutrient element in adequate amount needed by a particular crop.

Supplementary irrigation

Supplementary irrigation refers to the use of irrigation water at the time of shortage of water or drought in cropping period. For example, at the time of panicle initiation of T. Aman, if there is no rain supplementary irrigation is essential.

Integrated pest management (IPM)

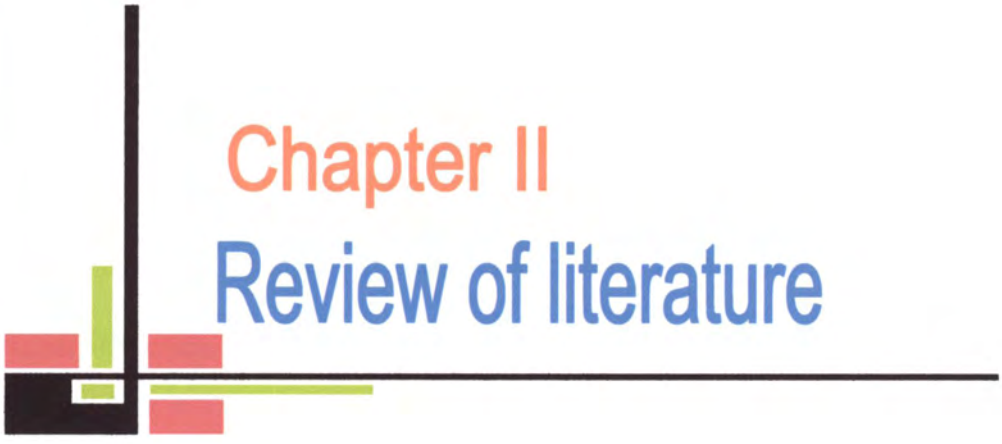
Smith (1978) has defined it as "a multidisciplinary, ecological in the management of pest populations which utilities a variety of control tactics compatibly in a coordinated pest management." In simple terms, IPM aims at combining all available methods or tools of insect pest control in a judicious manner that minimize insecticide use and disturbance to the ecosystem (environment). Obviously the method does not remain a single system but becomes a multidisciplinary one.

Innovation

An innovation is an idea, practice or object that is perceived as new by an individual or other unit of adoption (Ray, 1991). In this study selected T. Aman technologies are treated as innovations.

Extent of adoption

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



Chapter II
Review of literature

Chapter II

REVIEW OF LITERATURE

The purpose of this chapter is to review the literatures having relevancy to the present study. The researcher made an elaborate search of available literature for the above purpose. The researcher searched a good number of literatures of similar studies. This Chapter is divided into four major sections, the first section deals with the concept of diffusion and adoption of innovations, the second section deals with the review of literature on general context of adoption, the third section deals with the relationship between farmer's characteristics and their adoption of selected T. Aman production technologies and the fourth section deals with the conceptual framework of the study.

2.1 Concept of Diffusion and Adoption of Innovation

This section is divided into the following two sub sections:

2.1.1 Adoption, Diffusion and Adoption process

Adoption is decision to use and continue to use for a certain period of time. Adoption is a decision to make full use of innovation as the best course of action available (Ray 1991). When an individual takes up a new idea as the best course of action and practices it, the phenomenon is known as adoption.

Diffusion is the process by which an innovation is communicated through certain channels overtime among the members of social system (Ray, 1991). Rogers and Shoemaker (1971) stated the adoption process as the traditional view of the innovation-decision process. Adoption process was postulated by a committee of rural sociologists in 1955 as consisting of five stages:

Awareness stage: The individual learns of the existence of the new idea but lacks detailed information about it.

Interest stage: The individual develops interest in the innovation and seeks additional information about it.

Evaluation stage: The individual makes mental application of the new idea to his present and anticipated future situation and decides whether or not to try it.

Trial stage: The individual applies the new idea on a small scale in order to determine its utility in his own situation.

Adoption stage: The individual uses the new idea continuously on a full scale.

2.1.2 Innovation-decision process

The innovation decision process is the process through which an individual (or other decision making unit) passes from first knowledge of an innovation, to forming an attitude towards the innovation, to a decision to adopt or reject, to implementation of new idea and to confirmation of this decision (Rogers, 1983). This process consists of series of actions and choices over time through which an individual or organization evaluates a new idea into ongoing practices. The behavior consists essentially of dealing with the uncertainty that is inherently involved in deciding about a new alternative to those previously in existence. It is the perceived newness of the innovation and the uncertainty associated with the newness that is a distinctive aspect of innovation decision making.

An individual's decision about an innovation is not an instantaneous act. Rather, it is a process that occurs overtime and consists of a series of actions (Rogers, 1983). The present conceptualization consists of five stages (Rogers, 1983):

Knowledge occurs when an individual (or other decision making unit) is exposed to the innovation's existence and gains some understanding of how it functions.

Persuasion occurs when an individual (or other decision making unit) forms a favorable or unfavorable attitude towards the innovation.

Decision occurs when an individual (or other decision making unit) engages in activities that leads to choice either adoption or rejection of the innovation.

Implementation occurs when an individual (or other decision making unit) puts an innovation into use.

Confirmation occurs when an individual (or other decision making unit) seeks reinforcement of an innovation-decision already made but he or she may reverse his or her previous decision if exposed to conflicting messages about the innovation.

2.2. Review of Literature on General Context of Adoption

Various studies have been conducted on adoption throughout the world as well as in Bangladesh. The key findings of some of these studies are presented below:

Karim (1974) carried out a study on the adoption of fertilizers by transplanting Aman growers in former Keyotkhali union of Mymensingh district. He investigated the adoption of three fertilizers- urea, triple super phosphate (TSP) and muriate of potash (MP). He expressed that 4 percent of the respondent growers had high level of adoption of the fertilizers, 9 percent had medium adoption and 41 percent had low adoption. Fourty six percent (46) of the remaining respondent growers were non adopters.

Rahman (1974) carried out a research study on the adoption of IR-20 vatiety of paddy in Bhabakhali union of Mymensingh district. The study revealed that 29 percent of the rice growers had medium adoption of IR-20 where 21 percent had low adoption and 19 percent had high adoption of IR-20. The thirty one percent of the respondent growers were non-adopters.

Razzaque (1977) studied on the extent of adoption of HYV rice in the three villages of Agriculture University Extension Project area. He observed that among the respondent growers, 6.6 percent of the farmers had high adoption of HYV rice, 53.3 percent had medium adoption and 40 percent had low adoption.

Hossian (1983) carried out the research study on the extent of adoption of HYV rice as transplanted Aman and other related aspects in Bhabakhali union of Mymensimgh district. He observed that among the respondent farmers, 54 percent had high adoption of HYV rice and 46 percent had medium adoption of HYV rive as transplanted Aman.

Rahman (1986) carried out a research study on the extent of adoption of four improved practices namely, use of fertilizers, line sowing, irrigation and use of insecticides in transplanted Aman rice cultivation in two village of Mymensingh district. It revealed that 22 percent of the respondent farmers adopted all the four practices in combination against 49 percent adopted three practices, 22 percent adopted two practices, 5 percent adopted one practices and only 2 percent had no adoption of those practices.

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

Hoque (1993) conducted a study on the adoption of BR-14 during Boro season. The findings indicated that 70.2 percent of the respondents had medium adoption, 16.8 percent high adoption and only a few percent had low adoption of BR-14 rice variety.

Khan (1993) carried out a research study on adoption of insecticides and related issues in the village of Pachon union, Madaripur district. He observed that among the respondent farmers, 7 percent had no adoption, 57 percent had low adoption, 32 percent had medium adoption and only 4 percent had high adoption of insecticides.

Rahman (1993) conducted a research on the adoption of improved farm practices in Boro rice cultivation by the farmer in three villages of Mirzapur union of Gazipur district. His findings revealed that 76 percent of the farmers had medium adoption of improved farm practices on Boro cultivation whereas 11 percent had low and 13 percent o f the participants had high adoption.

Choudhury (1996) conducted a research on the adoption behavior of Boro rice growers in Nowabgonj thana of Dhaka district. He found that 50 percent farmers had high adoption of improved technologies as compared to 35 percent having medium adoption and 15 percent with low adoption.

Roy (1997) conducted a study on the adoption of IPM practices by the Boro rice growers in Sadar thana of Magura district. He found that 55 percent Boro rice growers had medium adoption of IPM technology, while 25 percent had high and only 20 percent with low adoption.

Alam (1998) carried out an investigation on the adoption of HYV rice cultivation in Gazipur district. His study revealed that 40 percent had medium adoption, 32 percent had low and 28 percent had high adoption.

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

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

Hoque (2005) carried out a research study on the adoption of selected modern rice varieties by the farmers in three selected villages of Sadar upazila of Mymensing district. He observed that majority (63 percent) of the rice grower's had medium adoption while 20 percent and 17 percent rice growers had low and higher adoption of selected modern rice varieties.

Rahman (2005) found in his study that the majority (60.50 percent) of the respondents had medium adoption while 15.14 percent had low and 24.36 percent had high adoption in respect of modern rice variety cultivation.

2.3 Relationships of Farmers' Adoption of Innovations with their Selected Characteristics

Literature dealing with the relationships of characteristics of farmers with their adoption of innovation have been presented in this sections.

2.3.1 Age and adoption of innovations

Hossain (1991) conducted a study to determine the relationship of farmers' characteristics with their adoption behaviour of improved farm practices in Sadar thana of Jamalpur district. He reported that age of the wheat growers significantly inflienced the adoption of improved farm 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 age of the farmers had no significant relationship with their adoption regarding Aalok 6201 hybrid rice.

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

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

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

Haque (2005) conducted a study to determine the relationship of farmers' characteristics with their adoption of modern rice varieties in Sadar thana of Mymensing district. He reported that age of the rice growers were not related with the adoption of rice varieties.

Rahman (2005) found that there was no relationship between ages of the farmers with their adoption of modern rice varieties.

2.3.2 Education and adoption of innovations

Hossain (1981) in his study found no significant relationship between education of the farmer and their adoption of improved farm practices.

Hossain (1983) in his study found a significant and positive relationship of education of the farmers with their adoption of the selected four improved farm practices.

Rahman (1986) in his study found that education had significant and positive relationship with the adoption of improved practices.

Mustafi *et al.* (1987) reported that education had no significant effects on the adoption of HYV varieties of rice in Bangladesh.

Bavalatti and Sundaraswamy (1990) observed no significant relationship between education of the farmers and their adoption of dry land farming practices.

Khan (1993) studied on the adoption of insecticides and related issues in the village of Pachon union, Madaripur district. He observed that education had a significant positive relationship with the adoption of insecticides.

Hasan (1996) conducted a study on adoption of some selected agricultural technologies among the farmers perceived by the frontline GO and NGO workers. He observed that education have no significant relationship with the perceived adoption of selected agricultural technologies. Similar results were found by Kher (1992), Ali (1993), Islam (1996) and hossain (1999).

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 Halim (1985), Islam (1993), Haque (1993), Khan (1993), hossain *et al.* (1997), Pal (1995) and Ali *et al.* (1986).

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

Rahman (2001) conducted a study on knowledge, attitude and adoption of the farmers regarding Aalok 6201 hybrid rice in sadar upazilla of Mymensing district. He found that academic qualification of the farmers had a significant and positive relationship with their adoption regarding Aalok 6291 hybrid rice.

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

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

Haque (2005) revealed that education of the farmers had a significant and positive relationship with their adoption of modern rice varieties.

2.3.3 Family size and adoption of innovations

Hossain (1983) in his study in Bhabakhali union of Mymensingh distract observed that family size of the farmers had no relationship with their adoption of HYV rice as transplanted aman.

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

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. Similar findings were observed by Barkatullah (1985), Okoro and Obibauka (1992), pathak and Sasmal (1992), Ali (1993) and Sarkar (1997).

Islam (1996) conducted a study on farmers' use of indigenous technical knowledge (ITK), in the context of sustainable agricultural development. He found the significant and negative relationship between the family size of the farmers and their extent of use of ITK. Similar results were found by Haque (1993), Hasan (1996), Igodan *et al.* (1988) and Asaduzzaman (1979).

Rahman (2001) conducted a study on knowledge, attitude and adoption of the farmers regarding Aalok 6201 hybrid rice in Sadar upazilla of Mymensingh district. He found that family size of the farmers had no significant relationship with their adoption regarding Aalok 6201 hybrid rice.

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

Haque (2005) conducted a study to determine the relationship of farmers' characteristics with their adoption of modern rice varieties in Sadar thana of Mymensing district. He reported that family size of the rice growers were not related with the adoption of rice varieties.

Rahman (2005) found that there was no significant relationship between family size of the farmers with their adoption of modern rice varieties.

2.3.4 Farm size and adoption of innovations

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

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

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.

Pal (1995) conducted a research study on adoption of sugarcane cultivation practices by the farmers. He observed the significant and positive relationship between the farm size of the respondent farmers and their adoption of sugarcane cultivation practices.

Islam (1996) undertook a study on the extent of farmers' use of indigenous technical knowledge (ITK) in the context of sustainable agricultural development. He found that there was significant and negative relationship between the farm size of the farmers and their extent of use of ITK.

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

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

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

Haque (2005) conducted a study to determine the relationship of farmers' characteristics with their adoption of modern rice varieties in Sadar thana of Mymensing district. He reported that farm size of the rice growers had significant and positive relationship with the adoption of modern rice varieties.

Talukder (2006) conducted a study to determine the relationship of farmers' characteristics with their adoption of selected rice cultivation practices in Char-land of Gomoti River. He reported that farm size of the rice growers had significant and positive relationship with the adoption of selected rice cultivation practices.

2.3.5 Annual family income and adoption of innovations

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

Singh (1989) in a study found that income of the farmers was significantly associated with the level of adoption of plant protection measures.

Chowdhury (1997) found that the annual income of the respondents had a positively significant relationship with their adoption of selected BINA technologies. Similar findings were reported by Sarkar (1997) and Alam (1997) about relationship between annual income and adoption of improved technologies.

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

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 relationship between annual income and adoption of integrated homestead farming technologies.

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

Rahman (2003) conducted a study on environmental impacts of modern agricultural technology diffusion in Bangladesh: an analysis of farmers' perception and their determinations. He found that annual income of the farmers had a positive relationship with their modern agricultural technologies diffusion in Bangladesh.

Haque (2005) conducted a study to determine the relationship of farmers' characteristics with their adoption of modern rice varieties in Sadar thana of Mymensing district. He reported that annual income of the rice growers had significant and positive relation with the adoption of modern rice varieties.

Rahman (2005) found that annual income of the rice growers had significant positive relation with their adoption of modern rice varieties.

Kamal (2006) conducted a study to determine the relationship of farmers' characteristics with their adoption of selected high yielding varieties of rice. He reported that annual income of the rice growers had significant and positive relationship with the adoption of selected high yielding varieties of rice.

2.3.6 Organizational participation and adoption of innovations

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

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

Chowdhury (1997) observed that there was a significant positive relationship between farmers' organizational participation and their adoption of selected BINA technologies. Pal (1995), Karim (1973), Halim (1985), Rahman (1986), Bashar (1993), Islam (1992), Khan (1993), and Haque (1993) observed the similar findings.

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

Sarder (2002) observed that the organizational participation of the farmers had no significant relationship with their adoption of IPM practices.

Rahman (2005) found that the organizational participation of the farmers had no significant relationship with their adoption of modern rice varieties.

2.3.7 Innovativeness and adoption of innovations

Rogers (1983) reviewed 2,376 past research studies and postulated 31 generalization of innovativeness. This include among others are personal characteristics and socio-economic characteristics of the farmers. He stated that innovative farmers had more years of education, larger farm size, higher income, more cosmopoliteness, higher organization participation, lower degree of fatalism and higher knowledge in farming. However, age did not yield a consistent relationship with innovation proneness. Hossain *et al* (1992) indicated similar results.

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

Jamal (1996) found no relationship between innovativeness of dropout rural youth with their preference in selected agricultural and non-agricultural entrepreneurship. Similar findings were obtained by Rahman (1995) and Rahu (1989).

Hossain (1999) found a positive significant relationship between innovativeness of the farmers and their adoption of fertilizer and observed no relationship with adoption of pesticides.

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 relationship between innovativeness and adoption of integrated homestead farming technologies.

Rahman (2005) found that the innovativeness of the farmers had no significant relationship with their adoption of modern rice varieties.

2.3.8 Extension contact and adoption of innovations

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

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

Alam (1997) studied use of improved farm practices of rice cultivation by the farmers of Anwara thana of Chittagong district. The study indicated no significant relationship between extension contact and farmers with their use of improved rice cultivation practices.

Rahman (1999) found that extension contact of the Boro rice farmers had a significant positive relationship with their adoption of balanced fertilizers in Boro rice cultivation.

Rahman (2001) found that extension contact of the farmers had a significant and positive relationship with their adoption regarding Aalok 6201 hybrid rice.

Haque (2005) conducted a study to determine the relationship of farmers' characteristics with their adoption of modern rice varieties in Sadar thana of Mymensing district. He reported that extension contact of the rice growers had significant and positive relation with the adoption of modern rice varieties.

2.3.9 Commercialization and adoption of innovations

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

Ahaduzzaman (1999) conducted a study on the adoption of modern T. Aman technologies among the rice growers in sadar thana of Rangpur district. He found that commercialization of the farmers had an insignificant but positive relation with their adoption of modern T. Aman technologies.

2.3.10 Cosmopoliteness and adoption of innovations

Pal (1995) conducted a research on the adoption of recommended sugarcane cultivation practices by the farmers. He observed that the cosmopoliteness of the farmers had significant positive relationship with their adoption of recommended sugarcane cultivation practices. Similar results were found by Halim (1985), Khan (1993), Haque (1993) and Islam (1996).

Chowdhury (1997) conducted a study on the adoption of selected BINA technologies by the farmers of Boira union in Mymensingh district. He found that there was no significant relationship between the cosmopoliteness of the farmers and their composite adoption of selected BINA technologies. Similar findings were observed by Mannan (1972), Muhammad (1974), Sobhan (1975), Hossan(1991) and Islam (1996).

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

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 relationship between cosmopoliteness and adoption of integrated homestead farming technologies.

Sarder (2002) concluded that the cosmopoliteness of the farmers had positively significant relationship with their adoption of IPM practices.

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

2.4 The Conceptual Framework of the Study

The conceptual framework of Rosenberg and Hoveland (1960) was kept in mind while framing the structural arrangement for the dependent and independent variables. The present study tried to focus two concepts: first, farmer's selected characteristics; and the second, adoption of selected T. Aman production technologies. Adoption of an individual may be influenced and affected through interacting of many characteristics in his surroundings. It is difficult to deal with all characteristics in a single study.

Related literature, discussion with the experts and research fellows in the relevant field and available resources at hand helped the researcher in selecting ten variables which include age, level of education, family size, farm size, annual income, organizational participation, innovativeness, extension media contact, commercialization and cosmopoliteness to asses the adoption of selected technologies of T. Aman by the growers. The conceptual model of the study has been presented below:

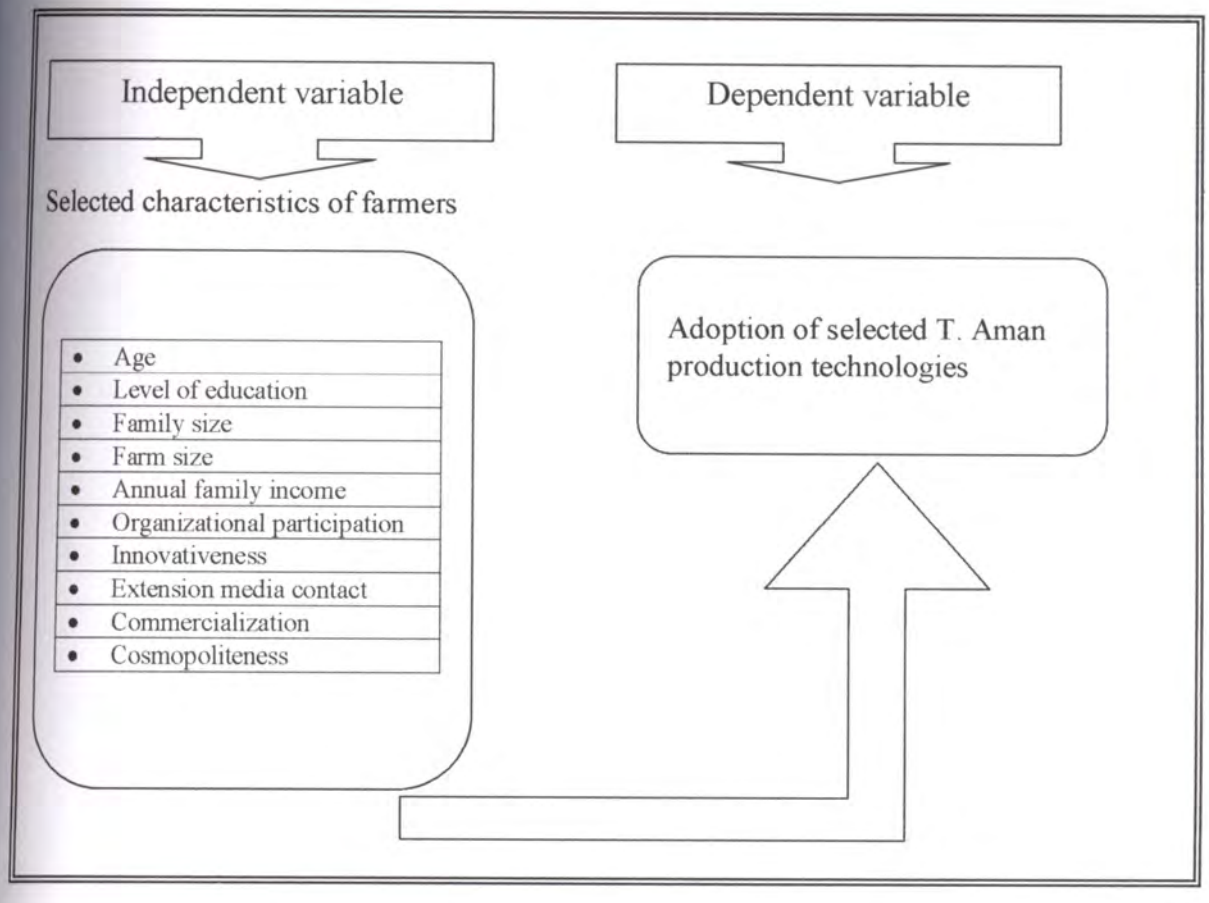
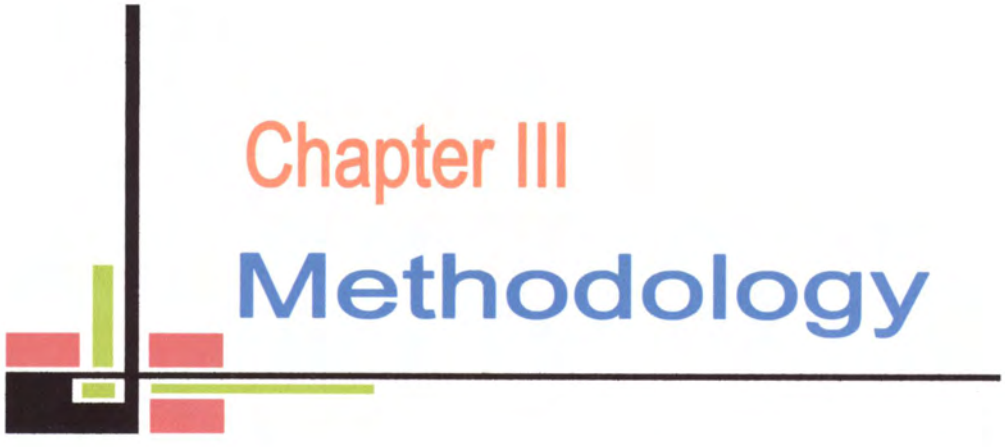


Figure 2.4. The Conceptual model of the study.



Chapter III

Methodology

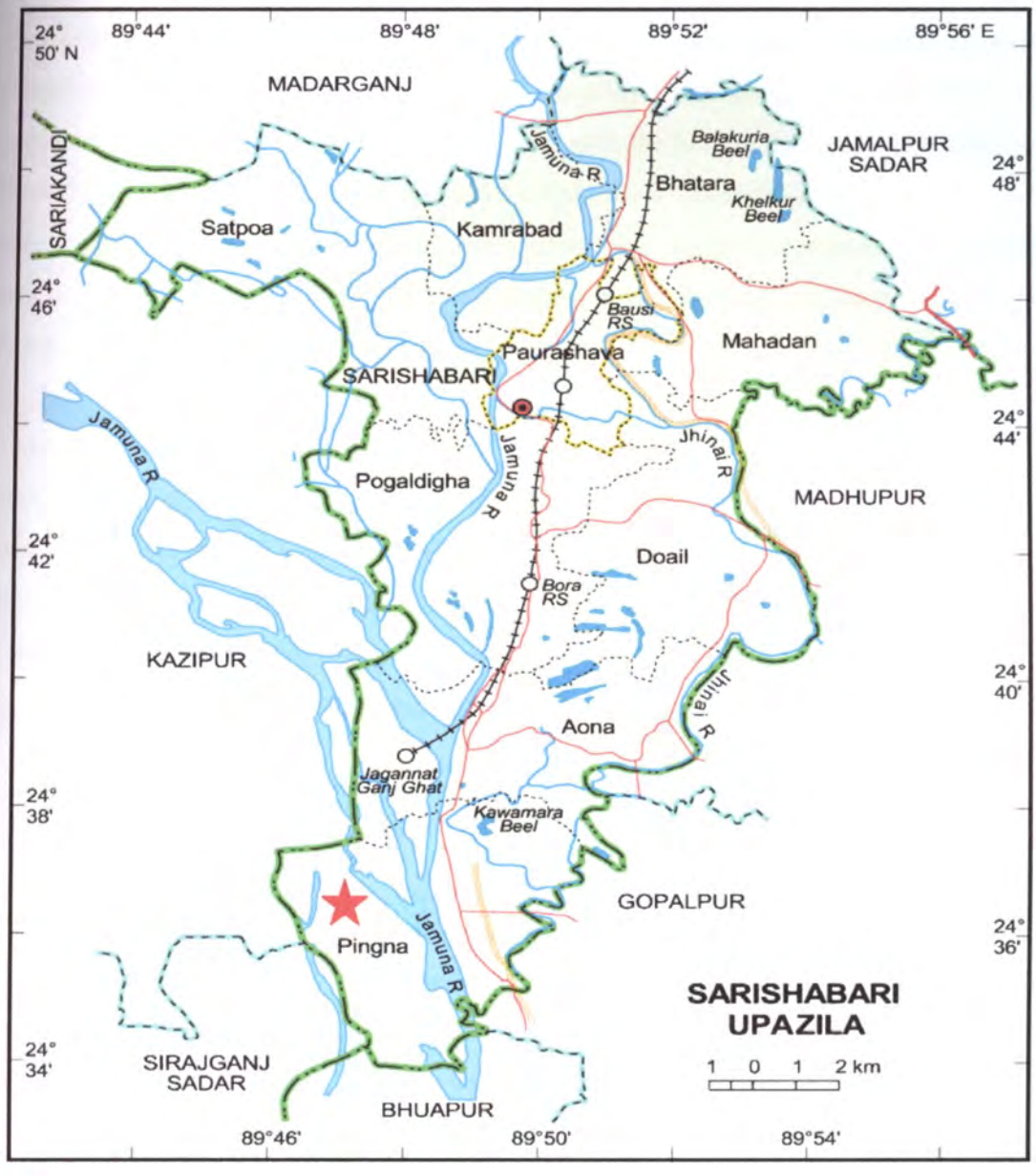
Chapter III

METHODOLOGY

Methodology refers to the methods and procedures in the research work. For any scientific investigation methods and procedures are very important and require a very careful consideration. The researcher was very much careful for using proper methods in all aspects of the investigation. The methods and procedures used in conducting this research are presented below:

3.1 Locale of the Study

The study was conducted in two villages namely Kawamara and Medhur in Pingna union of Sarishabari upazila of Jamalpur district. In Sarishabari upazila there were eight (8) unions. Pingna union is 12 kilometers away from upazila headquarter and situated at the last southern part of the upazila. The Sarishabari upazila stands on an area of about 263 square kilometers. Pingna union is well communicated from upazila headquarter. Transplated Aman rice is the main crop of the farmers of this union. Sarishabari upazila is located in AEZ No.9. A map of Sarishabari upazila showing the study areas was shown in the figure 3.1.



★ = Study area

Fig: 3.1. A map of Sarishabari upazila showing Pingna union of the study area.

3.2 Population and Sampling Design

Two villages namely Kawamara and Medhur of Pingna union under Sarishabari upazila of Jamalpur district was selected purposively for the study. Then an update list of all T. Aman rice growers of the selected villages was prepared with the help of Sub-Assistant Agricultural Officer (SAAO). The list comprised a total of 650 farmers' constituting the population of this study. Twenty percent (20%) of the population was randomly selected as sample of population by using a Calculator Random Numbers. Thus, the total sample size of this study area was about one hundred and thirty (130) farmers.

In addition to that, two (2) percent of the population was selected randomly and proportionately of the selected villages to make a reserve list. Thus, the additional sample, so drawn stood thirteen (13) farmers, which were included in the reserve list. In case the individuals included in the original sample were not available at the time of data collection, the farmers from the reserve list were used for the purpose. The distribution of the farmers included in the population, sample and those in the reserve list appears in Table3.2.

Table 3.2. Distribution of population, sample and the reserve list of the respondents

Sl. No.	Name of villages	Total number of farmers	Sample size	Number of farmers in the reserve list
1	Kawamara	380	76	8
2	Medhur	270	54	5
	Total	650	130	13

3.3 Development of the Instrument

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

3.4 Pilot testing and Final Version

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

3.5 Variables of the Study:

In a descriptive social research, the selection of variables constitutes an important task. In this connection, the investigator looked into the literature to widen his understanding about the nature and scope of the variables involved in the research studies.

Ezekiel and Fox (1959) stated variable as any measurable characteristics, which can assume varying or different values in successive individual cases. A research hypothesis contains at least two elements, independent variables and a dependent variable.

The researcher keeping in mind took adequate care in selecting the dependent and independent variables of the study. Before selecting variables, the researcher himself visited the study area and talked to the local farmers intimately and he was able to observe the various factors of the farmers, which might have influence on their adoption of selected rice

production practices. Based on this experience, literature for the study, discussion with relevant experts and academicians and also with the research supervisor, the researcher selected the variables for this study.

Two types of variables were concerned with the study such as

i. Independent variables and
ii. Dependent variables

i. **Independent variables**: An independent variable is that factor which is manipulated by the experimenter in his attempt to ascertain the relationship to an observed phenomenon. The respondents' selected characteristics viz. age, education, family size, farm size, annual family income, organizational participation, innovativeness, extension media contact, commercialization and cosmopoliteness are selected as independent variables.

ii. **Dependent variable**: A dependent variable is that factor which appears, disappears or varies as the experimenter introduces, removes or varies the independent variables (Townsand, 1995). In this study adoption of selected T. Aman production technologies is selected as dependent variable. It was not possible to measure all the technologies. So, several technologies were considered in this study. These were recommended variety, line transplanting method, balance fertilizer dose, supplementary irrigation, and integrated pest management.

3.6 Measurement of Variables

In order to conduct the study in accordance with the objectives, it was necessary to measure the selected variables. This section contains procedures for measurement of both independent and dependent variables of the study. The procedures followed in measuring the variables are presented below.

3.6.1 Measurement of independent variables

The selected characteristics of the respondent farmers constituted the independent variables of the study. To keep the research manageable, twelve independent variables were selected for the study. The procedures of measurement of the selected variables were as follows:

Age

The age of individual is one of the important factors pertaining to his personality make up (Smith and Zope, 1970) which can play an important role in his adoption behavior. The age of a respondent farmer was measured by counting the actual years from his birth to the time of interview on the basis of his statement. It was measured in terms of actual years. No fractional year was considered for the study.

Level of education

Education of a respondent was measured on the basis of his ability to read and write or received formal education up to a certain standard. It was expressed in terms of year of schooling. One score was given for passing each level in the educational institution. For example, if the respondent passed the final examination of HSC class, his educational score was given as 12. Similarly if the respondents passed the final examination of class X, his educational score was given as 10. If the respondents did not know how to read and write, his educational score was given as zero. A score of 0.5 was given to a respondent who could sign his name only.

Family size

Family size of a respondent was measured in terms of actual number of dependent members in his family (including himself, his wife, sons, daughters and other dependent member of his family) during interview. Family size was measured by assigning a score of one (1) for each member of the family who jointly lived and ate together. For example if a respondent had five members in his family then his score was 5.

Farm size

Farm size of the respondent was measured as the size of his farm (including rice and other crops) on which he continued his farm practices during the period of study. Each respondent was asked to mention the homestead area, the area of land under his own cultivation, own land given to others on borga (share cropping) system, land taken from others on borga system, land given to others on lease system, land taken from others on lease system, own pond, own garden and miscellaneous fallow land. The area was estimated in terms of full benefit to the farmers or his family. The following formula was used in measuring the farm size:

Farm size= $A_1 + A_2 + 1/2(A_3 + A_4) + A_5 + A_6 + A_7 + A_8$

Where,

A_1 = homestead area

A_2= Own land under own cultivation

A_3= Own land given to others on share cropping system

A_4= Land taken from others on share cropping system

A_5= land taken from others on lease system

A_6= Own pond

A_7= Own garden

A_8= Miscellaneous fallow land.

The unit of measurement was hectares.

N. B In share cropping the landowner of selected two villages get half of the total production.

Annual family income

Annual family income of a respondent was measured on the basis of total yearly earning from agricultural and non-agricultural sources (business, service etc) earned by the respondent himself and other family members. The incomes from different sources were ascertained in three phases.

1. In the first phase, the yield of the entire crop in the previous year was noted, and then the entire yield was converted into cash income according to the prevailing market price.

2. In the second phase, the cash income by selling cattle heads, milk and milk products, poultry and its products, fisheries etc. according to prevailing market price.

3. In the third phase, earnings of each respondent himself and other members of his family from different sources (like service, business, labor) in the last year from farming and others sources were added together to obtain total family annual income of the respondent.

* Total annual family income = A+B+C

Where,

A =Annual income from agricultural crops

B = Annual income from livestock, poultry & fisheries

C = Annual income from service, business & labor

Organizational participation

Organizational participation of a respondent was measured by his membership in different organizations for a particular period of time. This was measured by participation of a respondent in an organization. For participation, weight was assigned as 0, 1, 2 and 3 for no participation, general member, executive member and executive officer respectively. Then these scores were multiplied by number of years, the respondent participated in the respective organization. If a respondent is a general member of a cooperative society, executive member of a social committee and executive officer of a sports club for subsequent two years, his score of the organizational participation would be: 1x2+2x2+3x2= 12

Innovativeness

Innovativeness is the degree to which an individual adopts an innovation relatively earlier than other members in a social system (Rogers; 1995). In this study, innovativeness of a respondent was measured on the basis of the earlier or later adoption of 10 improved agricultural practices (Appendix A: item no.7). The scores were assigned on the basis of time required by an individual to adopt each of the practices in the following manner:

Period of adoption	Assigned score
Within One year after hearing	3
Within Two to three years after hearing	2
Above three years after hearing	1
Not at all	0

Innovativeness score of a respondent farmer was obtained by adding his scores for adoption of all the 10 selected improved agricultural practices. Innovativeness score of a respondent farmer could range from 0 to 30, where, 0 indicating no innovativeness and 30 indicating very high innovativeness.

Extension Media Contact

Extension media contact refers to one's exposure to the influence of extension program through different communication media and sources. The extension media contact of a respondent was measured by computing an extension contact score on the basis of his extension contact with thirteen selected extension media. The respondents mentioned the nature of his contact by putting a tick mark against any one of the four responses –not at all, rarely, occasionally and frequently. The score for each respondent was determined by adding his response to all the items on the basis of his frequency of contact with a score of 0, 1, 2 and 3 respectively. The extension media contact score of the respondents could range from 0 to 39, where 0 indicating no extension media contact and 39 indicating very high extension media contact.

Commercialization

The term commercialization was used to refer to the percentage of the value of crops sold out of the total value of crop produced. The score was measured by the following formula:

$$\text{Commercialization} = \frac{\text{Total value of crop sold}}{\text{Total value of crop produced}} \times 100$$

The Commercialization score of the respondents could range from 0 to 100, where 0 indicating no commercialization and 100 indicating very high commercialization.

Cosmopoliteness

Cosmopoliteness refers to the degree to which a respondent's orientation is external to his own social system. Cosmopoliteness of a respondent was measured in terms of his nature of visits to the seven different types of places as shown in item number 10 in the interview schedule. The cosmopoliteness was measured by assigning score 3 for regular visit, 2 for occasional visit, 1 for rarely visit and 0 for not at all. The cosmopoliteness score of the respondents could range from 0 to 21, where 0 indicating no cosmopoliteness and 21 indicating very high cosmopoliteness.

3.6.2 Measurement of dependent variable

Adoption of selected T. Aman production technologies was my dependent variable. The procedure followed in measuring the dependent variable is presented below:

Adoption of selected T. Aman production technologies

Adoption of selected T. Aman production technologies was measured by computing Adoption Quotient (AQ). It was calculated by asking the farmers i) area used for the technology ii) potential area for the technology iii) number of technologies and iv) years of technology use. Adoption of selected T. Aman production technologies was measured by Adoption Quotient as the following formula suggested by Bhuiyan (2005):

$$AQ = \frac{\sum u/p}{y \times n} X \ 100$$

Where,

u = Used area

P = Potential area

y = Years of technology use

n = Number of technologies

Using above formula, adoption of selected T. Aman production technologies score of a respondent could range from 0-100, while 0 indicating no adoption and 100 indicating highest adoption

3.7 Method of Selection of T. Aman Production Technologies:

The term T. Aman production technologies referred to the technologies related to T. Aman production namely, cultivation of modern variety of T. Aman (BR-11/ BR-25), use of line transplanting method, use of compost, use of granular urea, use of mixed fertilizer, use of power tiller, use of irrigation, methods used for controlling diseases and insects in rice field etc. In a broad sense, T. Aman production technologies refer to the production technologies of T. Aman by judicious use of the resources of nature and different innovations.

For identifying T. Aman production technologies by the farmers, the researcher arranged a Focus Group discussion (FGD) with the local farmers and DAE personal including the researcher himself.

3.8 Statement of Hypothesis

As defined by Goode and Hatt (1952), "A hypothesis is a proposition which can be put to a test to determine its validity. It may seem contrary to, or in accord with common sense. It may prove to be correct or incorrect. In any event, however, it leads to an empirical test". A hypothesis simply means a more assumption or some supposition to be proved or disproved. But for a researcher, hypothesis is a normal question that he intends to resolve. According to kerlinger (1973), "A hypothesis is a conjectural statement of the relation between two or more variables. Hypotheses are always in declarative statements form, and they relate either generally or specifically variables to variables". Hypotheses may be broadly divided into two categories, namely, research hypothesis and null hypothesis. In studying relationships between variables, an investigator first formulates research hypotheses which states anticipated relationships between the variables. However, for statistical test it becomes necessary to formulate null hypothesis. A null hypothesis states that there is no relationship between concerned variables.

The null hypotheses were developed in this study to explore the relationship between dependent and independent variables. The following null hypotheses were formulated to explore the relationships of the selected characteristics of the farmers with their adoption of selected T. Aman production technologies.

"There were no relationships between the farmers' selected characteristics and their adoption of selected T. Aman production technologies."

The characteristics were: age, level of education, family size, farm size, annual income, organizational participation, innovativeness, extension media contact, commercialization and cosmopoliteness.

3.9 Collection of Data

Data were collected personally by the researcher himself through face to face visit to all the selected farmers of Kawamara and Medhur villages of Sarishabari upazilla to obtain valid and pertinent information. The researcher made all possible efforts to explain the purpose of the study to the farmers. Rapports were established with the farmers prior to interview and the objectives were clearly explained by using local language to the extent possible. So he did not hesitate to furnish proper responses to the questions and statements which were collected during 12th August to 18th October, 2006. At the time of data collection, the researcher was also aware of side talking and tried to avoid that problem tactfully. The researcher sought the help of the local Sub Assistant Agricultural Officer (SAAO) for this purpose. Excellent co-operation and co-ordination were obtained from all the respondents.

The interview schedule was prepared both in Bengali and English version. The Bengali version of interview schedule was multiplied as per requirements to collect data from the respondents. The English version of interview schedule is enclosed in appendix- A.

3.10 Processing of Data

The collected raw data were examined thoroughly to find out the errors and omissions. For this, the researcher made a careful scrutiny of the completed interview schedule to make sure that they were entered as complete as possible and well arranged to facilitate coding and tabulation. Very minor mistakes were detected by doing this, which were corrected promptly.

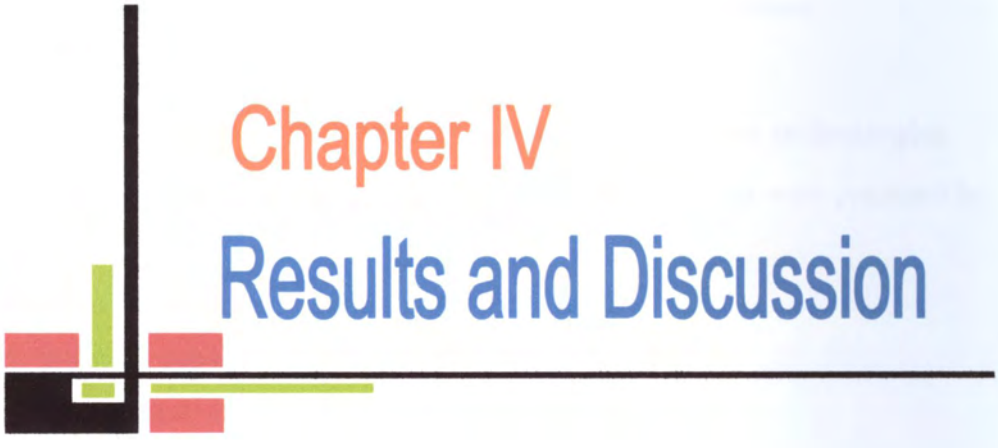
Having consulted with research supervisor, the investigator prepared a detailed coding plan. All responses in the interview schedule were given numerical coded values. Local units were converted into standard units. All the individual responses to the questions of the interview schedule were transferred to a master sheet to facilitate tabulation.

In case of qualitative data, appropriate scoring technique was followed to convert the data into quantitative forms. These were then tabulated according to the objectives of the study.

For describing the various independent and dependent variables, the respondents were classified into various categories and arranged in simple table for description. These categories were developed for each of the variable by considering the nature of distribution of the data and the general consideration prevailing in the social system. The procedure and the effect of categorization of a particular variable were discussed while describing the variable in the subsequent sections.

3.11 Statistical Analysis

The collected data were compiled, coded tabulated and analyzed in accordance with the objectives of the study. Qualitative data were quantified by means of suitable scoring techniques. The statistical measures such as range, mean, standard deviation, percentage distribution and were used to describe both the dependent and independent variables. Tables were also used in presenting data for clarity of understanding. In order to explore the relationships between the selected characteristics of the farmers with their adoption of selected T. Aman rice production technologies, the Pearson Product Moment Correlation Co-efficient was computed. Correlation matrix were also computed to determined the inter relationship among the variables. Five (0.05) percent level of significance with relevant the degrees of freedom considered to reject or accept any null hypothesis.



Chapter IV

Results and Discussion

Chapter IV

RESULTS AND DISCUSSION

Procedure of using data for the measurement needed some discussion for clarity of understanding. Data obtained from respondents by interview were compiled, analyzed, tabulated and statistically treated according to the objectives of the study. This Chapter deals with the findings of the study which have been discussed under the following headings: Identification and selection of the T. Aman production technologies used by the farmers, selected characteristics of the farmers, extent of adoption of selected T. Aman production technologies by the farmers and the relationships between the extent of adoption of selected T. Aman production technologies and the selected characteristics of the farmers.

4.1. Section I: Identification and Selection of T. Aman production technologies

After thorough discussion the following technologies were identified that were practiced by the farmers of the study area-

1. Recommended T. Aman varieties (BR-11 / BR-25)
2. Line transplanting method
3. Balance fertilizer dose
4. Supplementary irrigation
5. Integrated Pest Management

These technologies were selected for the present study.

4. 2. Section II: Selected Characteristics of the Farmers

Ten characteristics of the farmers were selected for investigation in this study and also tried to determine whether they influenced respondent's adoption of modern T. Aman technologies. The selected characteristics included their age, level of education, family size, farm size, annual income, organizational participation, , innovativeness, extension media contact, commercialization and cosmopoliteness. These characteristics of the farmers have been described in this section. Distribution of the farmers according to their different characteristics has been presented in Table 4.2

4.2.1. Age

Age of the farmers was determined by the number of years from his birth to the time of interview. It was found that the age of the respondents ranged from 18 to 75 years, the average being 43.57 years and the standard deviation was 12.19. On the basis of age, the farmers were classified into three categories: "young aged" (up to 35), "middle aged" (36-50) and "old aged" (51 and above). Table 4.2.1 contains the distribution of the respondents according to their age.

Data presented in Table 4.2.1 indicated that the highest proportion (47.7 percent) of the respondents fell in the middle-aged category compared to 23.8 percent young and 28.5 percent old aged category. It was also revealed that 71.5 percent of the respondents comprised of either young or middle-aged categories. Islam (2002), Hossen (2001) and Bashar (1993) also found the similar findings in their studies.

Table 4.2.1 Distribution of the respondents according to their age

Category	Frequency	Percent	Observed range	Mean	Standard deviation
Young aged (up to 35)	31	23.8			
Middle aged (36-50)	62	47.7	18-75	43.57	12.19
Old aged (51 & above)	37	28.5			
Total	130	100			

Conclusion can be drawn that young and middle-aged farmers are generally receptive to new ideas and things. They have a favorable attitude towards trying of new ideas. However, the older farmers because of their longer farm experience might have valuable opinions regard to adoption of modern T. Aman production technologies. The extension agents can make use of these views and opinions in designing their extension activities.

4.2.2 Level of education

Education of a respondent was measured by the level of his formal education i. e. highest grade (class) passed by him. The education score of the respondents ranged from 0 to 12, the average being 3.16 and the standard deviation was 3.71. Based on their level of education, the respondents were grouped into four categories, "no education" (0), "primary education" (1-5), "secondary education" (6-10), and above secondary education" (11 and above).

Data presented in Table 4.2.2 indicate that a large proportion (56.2 percent) of the respondents fell under category of "no education" compared to 29.3 percent "secondary education", 13 percent having "primary education" and 1.5 percent having "above secondary education".

Table 4.2.2 Distribution of the farmers according to the their level of education

Categories	Frequency	percent	Observed range	Mean	Standard deviation
No education (0)	73	56.2			
Primary education (1-5)	17	13			
Secondary education (6-10)	28	29.3	0-12	3.16	3.71
Above secondary education (11 and above)	2	1.5			
Total	130	100			

The above picture of education of study area is frustrating as compared to national average literacy. More than half (56.2 percent) of the respondents were illiterate. One should not be wondered if there is low adoption of selected T. Aman production technologies in study area. Considering the level of education the Department of Agricultural Extension should take necessary steps to increase the adoption of selected T. Aman production technologies in study area.

4.2.3 Family size

The family size of the farmers ranged from 2 to 14 members, the average being 5.23 with a standard deviation 1.88. On the basis of their family size, the respondents were classified into three categories: "small family" (up to 4 members), "medium family" (5-6 members) and "large family" (above 6). Table 4.2.3 shows the distribution of the respondents according to their family size.

Data presented in Table 4.2.3 indicate that the large proportion (42.3 percent) of the respondents belonged to the "small family" category compared to 38.5 percent belonged to "medium family" category and 19.2 percent to "large family" category.

Table 4.2.3 Distribution of the farmers according to their family size

Category	Frequency	percent	Observed range	Mean	Standard deviation
Small family (up to 4 members)	55	42.3			
Medium family (5-7 members)	50	38.5	2-14	5.23	1.88
Large family (8 and above)	25	19.2			
Total	130	100			

This finding indicates that more than three fourth (80.8 percent) of the respondents had either small or medium family size. The data also indicate that the average family size (5.23 people) of the respondents of the study area was about equal with the national average of 4.8 (BBS, 2005). This may be due to the consciousness of proper adoption of family planning measures in the study area.

4.2.4 Farm size

Farm size was measured on the basis of the cultivated area either owned by a farmer or cultivated on share cropping system, the area being estimated in terms of full benefit to the farmers. The farm size varied from 0.25 to 3.00 hectares. The average farm size was 0.86 hectares with a standard deviation of 0.48. Based on their farm size, the respondents were classified into three categories, "small farm" (up to 0.60ha), "medium farm" (.61-1.20 ha), and "large farm" (1.21 and above). The distribution of the respondents according to their farm size shown in Table 4.2.4

Data presented in the Table 4.2.4 show that the highest proportion (49.3 percent) of the farmers had medium farm compared to 31.5 percent had small farm and 19.2 percent having large farm. It may also be revealed that 90.8 percent of the respondents comprised of either small or medium farm. Ahmed (1977) also found the similar findings in his study.

Table 4.2.4 Distribution of the farmers according to their farm size

Categories	Frequency	percent	Observed range	Mean	Standard deviation
Small farm (up to .60 ha)	41	31.5			
Medium farm (.61-1.20 ha)	64	49.3	0.25-3.00	0.86	0.48
Large farm (1.21ha and above)	25	19.2			
Total	130	100			

The average farm size of the respondent farmers was 0.86 hectares, which is higher than the national average (0.81 hectares). The Government extension agencies and Non- Government Organization (NGO) should pay attention to initiate programme for small and medium farm holders on priority basis because those two categories were combined the major section of the farmers in the study area.

4.2.5 Annual family income

Annual family income was estimated on the basis of total receipt of money, goods and services during a year and expressed in taka. Annual income of the respondent ranged from TK.18.62 thousand to TK. 148.40 thousand. The average annual income was TK 48.176 thousand and standard deviation 29.175. On the basis of annual income, the respondents were classified into three categories: "Very low income" (up to TK. 30 thousand), "Low income" (TK. 30.1-60 thousand) and "Medium income" (above 60 thousand). The distribution of the respondents according to their annual income is shown in Table 4.1.5

Data shown in Table 4.2.5 revealed that highest proportion (46.9 percent) of the respondents had Low annual income compared to 30 percent having very low and 23.1 percent under medium annual income.

4.2.5 Distribution of the respondents according to their annual family income

Category	Frequency	percent	Observed range	Mean	Standard Deviation
Very low income (up to 30000)	39	30	18620-148400	48176	29175
Low income (30001-60000)	61	46.9			
Medium income (above 60000)	30	23.1			
Total	130	100			

The average annual family income of the farmers of the study area was less and none of the farmer was found high income. This might be due to the fact that the farmers of the study area were engaged in agriculture only. They also not earn from other sources such as service, business etc. Farmers of low income generally hesitate to adopt innovation in their own farm because of their lower risk bearing ability and their inability to make necessary financial investment. It is, therefore, likely that a large proportion of the farmers might face difficulties in adopting selected T. Aman production technologies.

4.2.6 Organizational participation

Organizational participation scores of the respondents were computed on the basis of the extent of participation in different organizations. Organizational participation of the respondents ranged from 0 to 34. The average was 6.29 with a standard deviation 5.9. On the basis of organizational participation, the farmers were classified into four categories: "no participation" (o), "low participation" (1-5), "medium participation" (6-10) and "high participation" (11 and above).

Data presented in the Table 4.2.6 show that the highest proportion (36.2 percent) of the respondents had low participation in organizations. A mentionable number (24.6 percent) having no organizational participation, while 21.5 percent had medium and 17.7 percent of the respondent had high organizational participation.

Table 4.2.6 Distribution of the respondents according to their organizational participation

Category	Frequency	percent	Observed range	Mean	Standard Deviation
No participation (0)	32	24.6			
Low participation (1-5)	47	36.2			
Medium participation (6 -10)	28	21.5	0-34	6.29	5.9
High participation(11&above)	23	17.7			
Total	130	100			

The findings indicate that more than half of the farmers (60.8 percent) had almost no or low participation. Ahmed (1974) also found 89 percent of the farmers had either no participation or low participation. It is to be mentioned that the two villages- Kawamara and Medhur stands on the bank of Jamuna River and there is a few existence of government and non-government organization. So, GO and NGO should come forward for the socio-economic development of the study area.

4.2.7 Innovativeness

Innovativeness scores of the respondents were computed on the basis of their extent use of new ideas. The maximum innovativeness score of the respondents was 22 and the minimum was 8 against the possible range of 0 to 30. However, the average was 17.02 and the standard deviation 2.70. Based on their innovativeness scores, the respondents were classified into three categories: "low innovativeness" (up to 14), "moderate innovativeness" (15-18) and high innovativeness (19 and above). The distribution of the respondents according to their innovativeness is shown in Table 4.2.7

Data contained in Table 4.2.7 indicate that the highest proportion (57.7 percent) of the farmers had medium innovativeness as compared to 25.4 percent high innovativeness and only 16.9 percent low innovativeness.

Table 4.2.7 Distribution of the respondents according to their innovativeness

Categories	Frequency	percent	Observed range	Mean	Standard deviation
Low innovative (up to 14)	22	16.9			
Moderate innovative(15-18)	75	57.7	8-22	17.02	2.70
High innovative (19 & above)	33	25.4			
Total	130	100			

Data also revealed that majority (83.1 percent) of the respondents of the study area had medium to high level of innovativeness. It may be concluded that all the respondents of the study area had the innovativeness. These two results would help the extension planners to chalk out future extension programme for transfer of new ideas to the potential farmers.

4.2.8 Extension media contact

Extension contact scores of the farmers were computed on the basis of their extent of contact with 13 sources of extension information. To compute extension media contact scores of the respondents ranged from 1 to 16 with an average 7.12 and the standard deviation of 2.86 against the possible range of 0 to 39. On the basis of extension media contact scores, the respondents were classified into three categories: "Very low extension contact" (up to 4), "low extension contact" (5-10) and "medium extension contact" (11 and above). The distribution of the respondent according to their extension media contact is shown in Table 4.2.8

Table 4.2.8 Distribution of the respondents according to their extension media contact

Categories	Frequency	percent	Observed range	Mean	Standard deviation
Very low contact (up to 4)	46	35.4			
Low contact (5-10)	71	54.6	0-17	7.12	2.86
Medium contact (11 and above)	13	10			
Total	130	100			

Data presented in Table 4.2.8 indicate that the highest proportion (54.6 percent) farmers of the study area had low extension media contact, while 35.4 percent had very low extension media contact and 10 percent had medium extension media contact.

The findings of the study indicate that most of the respondents (90 percent) had very low to low extension media contact with various information sources for getting necessary agricultural information. It may also be concluded that all the respondents of the study area had not the extension media contact.

4.2.9 Commercialization

The commercialization of the respondents was quantified by computing scores from their produced crop and sold crop. The commercialization scores ranged from 0 to 82.80 against the possible score 0 to 100 with an average of 26.77 and the standard deviation of 26.09. Based on the observed commercialization scores, the respondents were classified into four categories: "no commercialization" (0), "low commercialization" (1-30), "medium commercialization" (31-60) and "high commercialization" (above 60). The distribution of the respondents according to their commercialization is shown in Table 4.2.9.

Table 4.2.9 Distribution of the respondents according to their commercialization

Categories	Frequency	Percent	Observed range	Mean	Standard deviation
No commercialization (0)	44	33.8			
Low commercialization (1 - 30)	39	30			
Medium commercialization (31-60)	25	19.3	0 - 82.80	26.77	26.09
High commercialization (above 60)	22	16.9			
Total	130	100			

From Table 4.2.9, it is observed that the highest proportion (33.8 percent) of the respondents had no commercialization of their produced crop while 30 percent had low commercialization, 19.3 percent had medium and only 16.9 percent had high commercialization.

The findings indicate that more than half of the farmers (63.8 percent) had almost no or low commercialization of their produced crop. It may also be concluded that all the respondents of the study area had not the commercialization. This might be due to the fact that the .majority of the farmers of study area cultivated crop for their own consumption only.

4.2.10 Cosmopoliteness

Cosmopoliteness scores of the respondents ranged from 3 to 12 against the possible range of 0 to 21 with an average 6.63 and standard deviation of 1.97. On the basis of their cosmopoliteness scores, the respondents were classified into three categories: "very low cosmopoliteness" (up to 5), "low cosmopoliteness" (6-9), "medium cosmopoliteness" (above 9). The distribution of the respondents according to their cosmopoliteness is shown in Table 4.2.10.

Table 4.2.10. Distribution of the respondents according to their cosmopoliteness

Categories	Frequency	percent	Observed range	Mean	Standard deviation
Very low cosmopoliteness (up to 5)	67	51.5			
Low cosmopoliteness (6-9)	53	40.8	3-12	6.63	1.97
Medium cosmopoliteness (above 9)	10	7.7			
Total	130	100			

Data contained in Table 4.2.10 indicate that the highest proportions (51.5 percent) of the respondents were "very low cosmopoliteness", while 40.8 percent of them being "low cosmopoliteness", and only 7.7 percent under "medium cosmopoliteness".

Data also revealed that majority (92.3 percent) of the respondents were low to very low in terms of their cosmopoliteness. Ahaduzzaman (1999), Hossain (2004) observed almost similar findings in their studies. It may be concluded that all the respondents of the study area had not the cosmopoliteness.

4.3 Section III: Adoption of selected T.Aman production technologies

There were many technologies in T. Aman rice production. In this study only five important dimensions were taken into consideration for determining adoption of T. Aman rice production technologies. The five dimensions were:

1. Recommended T. Aman varieties.
2. Use of line transplanting method.
3. Recommended doses of fertilizers.
4. Supplementary irrigation and
5. Use of IPM practices for controlling pests & disease of T. Aman rice

The adoption score of these five technologies ranged from 25.20 - 89.40 against the possible range of 0-100. The average adoption was 56.14 with a standard deviation of 19.19. Based on the adoption score, the farmers were classified into three categories: "low adopters" (up to 33), medium adopters" (34-66) and "high adopters" (67 and above).

Findings revealed that the highest proportion (43 percent) of the farmers fell under the medium adopter's category, while 37 percent had high adopters and only 20 percent had low adopters. Thus, an overwhelming majority of the farmers had medium to high adoption. For clarity of understanding, a bar diagram has been presented in Figure 4.3

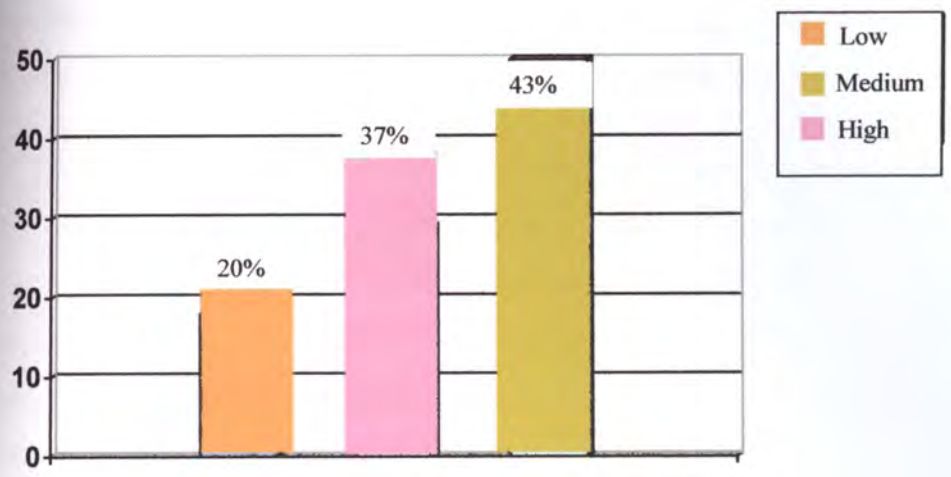


Figure 4.3 Farmers composite adoption of selected T. Aman production technologies.

4.4 Section IV: Relationships between the selected characteristics of the farmers and their adoption of selected T. Aman production technologies

This section deals with the relationships with ten selected characteristics of the farmers and their adoption of selected T. Aman production technologies. The selected characteristics constituted independent variables and the adoption of selected T. Aman production technologies by the farmers considered as dependent variable. Pearson's product moment correlation co-efficient "r" has been used to test the hypothesis concerning the relationship between two variables. Five percent level of significance was used as the basis for acceptance or rejection of any null hypothesis.

The summary of the results of the correlations co-efficient relationships between the selected characteristics of the respondents and their adoption of selected T. Aman production technologies is shown in Table 4.4.2

Table 4.4.2 Co-efficient of correlation of the selected characteristics of the farmers and their adoption of selected T. Aman production technologies

Dependent variable	Independent variable	Computed value of "r"	Table value of "r" at 128 degree of freedom	
			0.05%	0.01%
Adoption of selected T. Aman production technologies	Age	0.167 NS	0.172	0.226
	Level of education	0.177*		
	Family size	0.146 NS		
	Farm size	0.447**		
	Annual family income	0.396**		
	Organizational participation	0.370**		
	Innovativeness	0.397**		
	Extension media contact	0.357**		
	Commercialization	0.140 NS		
	Cosmopoliteness	0.166 NS		

NS = Non significant

* = Significant at 0.05 level of probability

** = Significant at 0.01 level of probability

4.4.1 Relationship between age of the farmers and their adoption of selected T. Aman production technologies

In order to determine the relationship between age of the farmers and their adoption of selected T. Aman production technologies, the following null hypothesis was tested:

"There was no relationship between age of the farmers and their adoption of selected T. Aman production technologies."

The co-efficient of correlation between the concerned variables was computed and found to be +0.167 as shown in table 4.4.2 which led to the following observation regarding the relationship between the two variables under consideration:

a) The relationship between the two variables was found to be positive.
b) The computed value of "r" (r= +0.167) was found to be smaller than the table value (r= 0.172) with 128 degrees of freedom at 0.05 level probability.
c) The co-efficient of correlation between the concerned variable was insignificant at 0.05 level of probability.
d) The null hypothesis could not be rejected.

The findings imply that the age of the farmers had an insignificant and positive relationship with their adoption of selected T. Aman production technologies. So, it might be concluded that the age of the farmers was not an important factor for adoption of selected T. Aman production technologies. Sobhan (1975), Rahman (1993) and Islam (1993) observed the similar findings in their studies.

4.4.2 Relationship between level of education of the farmers and their adoption of selected rice production practices

The relationship between level of education of the farmers and their adoption of selected T. Aman production technologies, the following null hypothesis was tested:

"There was no relationship between level of education of the farmers and their adoption of selected T. Aman production technologies."

Computed value of the co-efficient of correlation between the level of education of the farmers and their adoption of selected rice production practices was found to be +0.177 as shown in Table 4.4.2. The following observations were recorded regarding the relationships between the two variables on the basis of the co-efficient of correlation:

a) The relationship showed a positive trend between the concerned two variables.
b) The computed value of "r" (r= +0.177) was found to be greater than table value (r = 0.172) with 128 degrees of freedom at 0.05 level of probability.
c) The co-efficient of correlation between the concerned variables was significant at 0.05 level of probability.
d) The concerned null hypothesis was rejected.

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

Education enables individuals to gain knowledge and thus increase their power of understandings. Consequently, their out look is broadened and horizon of knowledge is expanded. Thus, adoption of selected T. Aman production technologies was higher of those farmers who had higher education.

4.4.3 Relationship between family size of the farmers and their adoption of selected T. Aman production technologies

In order to the relationship between family size of the farmers and their adoption of selected T. Aman production technologies, the following null hypothesis was tested:

"There was no relationship between family size of the farmers and their adoption of selected T. Aman production technologies."

The co-efficient of correlation between the concerned variables was found to be 0.146 as shown in Table 4.4.2. This led to the following observations regarding the relationship between the two variables under consideration:

a) The relationship showed a tendency in the positive direction between the concerned variables.
b) The computed value of "r" (r= 0.146) was smaller than the table value (r= 0.172) with 128 degrees of freedom at 0.05 level of probability.
c) The co-efficient of correlation between the concerned variable was not significant at 0.05 level of probability.
d) The null hypothesis could not be rejected.

The finding demonstrates that the family size of the farmers had no significant and positive relationship with their adoption of selected T. Aman production technologies. Haque (1993), Hossain (1991) and Islam (1993) had similar findings but Shipar (1998), Muttaleb (1995) found significant relationship.

4.4.4 Relationship between farm size of the farmers and their adoption selected T. Aman production technologies

In order to the relationship between farm size of the farmers and their adoption of selected T. Aman production technologies, the following null hypothesis was tested:

"There was no relationship between farm size of the farmers and their adoption selected T. Aman production technologies."

The calculated value of the correlation co-efficient between the two mentioned variables was found to be +0.447 as shown in Table 4.4.2. This led to the following observations regarding the relationship between the two variables under consideration:

a) A positive trend was observed between the two variables.
b) The computed value of "r" (r= +0.447) was larger than the table value (r=0.226) with 128 degrees of freedom at 0.01 level of probability.
c) The co-efficient of correlation between the concerned variable was significant at 0.01 level of probability.
d) The null hypothesis was rejected.

From the above observations, it might be concluded that there was significant positive relationship between farm size of the farmers and their adoption of selected T. Aman production technologies. The finding is quite rational, because adoption of selected rice production practices is relatively costly. Hence, large farmers get more scope than the small farmers as they can invest money for adoption of selected rice production practices. Many researchers (Hoque, 1993; Pal, 1995 and Islam, M.S., 2002) observed the similar significant and positive relationship between these two variables.

4.4.5 Relationship between annual family income of the farmers and their adoption of selected T. Aman production technologies

The relationship between annual family income of the farmers and their adoption of selected T. Aman production technologies was measured by testing the following null hypothesis:

"There was no relationship between annual income of the farmers and their adoption of selected T. Aman production technologies."

Computed value of the correlation co-efficient between the annual income of the farmers and their adoption of selected T. Aman production technologies was found to be +0.396 as shown in Table 4.4.2. The following observations were recorded regarding the relationship between the two variables under consideration:

a) The relationship showed a tendency in the positive direction between the concerned variables.

b) The computed value of "r" (r= +0.396) was larger than the table value (r=0.226) with 128 degrees of freedom at 0.01 level of probability.

c) The co-efficient of correlation between the concerned variable was significant at 0.01 level of probability.

d) The null hypothesis was rejected

On the basis of the observations, the researcher concluded that the annual income of the farmers had a highly significant and positive relationship with their adoption of selected T. Aman production technologies. This means that the farmers having higher annual income were likely to have more adoption of selected rice production practices. Islam (1993), Khan (1993), and Aurangozeb (2002) and many others found the similar results.

4.4.6 Relationship between organizational participation of the farmers and their adoption of selected T. Aman production technologies

In order to determine the relationship between organizational participation of the farmers and their adoption of selected T. Aman production technologies, the following null hypothesis was tested:

"There was no relationship between organizational participation of the farmers and their adoption of selected T. Aman production technologies."

To find out the relationship, the correlation co-efficient was computed and found to be 0.370 as shown in Table 4.4.2 which led to the following observations between the concerned variables under consideration:

a) The relationship showed positive trends between the two variables.
b) The computed value of "r" (r= 0.370) was higher than the table value (r=0.226) with 128 degrees of freedom at 0.01 level of probability.
c) The co-efficient of correlation between the two concerned variable was significant at 0.01 level of probability.
d) The null hypothesis was rejected.

From the above observations, it might be concluded that there was a significant and positive relationship between organizational participation of the farmers and their adoption of selected T. Aman production technologies. The possible reasons could be the exchange of various ideas increased the knowledge, which motivated the respondents for adoption of innovation. Shipar (1998), Rahman (1993) and Hossain (1991) had similar findings while Muttaleb (1995), Roy (1993) found insignificant relationship.

4.4.7 Relationship between innovativeness of the farmers and their adoption of selected T. Aman production technologies

The relationship between innovativeness of the farmers and their adoption of selected T. Aman production technologies, the following null hypothesis was tested:

"There was no relationship between innovativeness of the farmers and their adoption of selected T. Aman production technologies."

Computed value of the correlation co-efficient between the innovativeness of the farmers and their adoption of selected T. Aman production technologies was found to be +0.397 as shown in Table 4.4.2. The following observations were recorded regarding the relationship between the two variables under consideration

a) The relationship showed a tendency in the positive direction between the concerned variables.

b) The computed value of "r" (r = +0.397) was larger than the table value (r = 0.226) with 128 degrees of freedom at 0.01 level of probability.

c) The co-efficient of correlation between the concerned variables was significant at 0.01 level of probability.

d) The null hypothesis was rejected.

Considering the findings, the researcher concluded that innovativeness of the farmers had a significant and positive relationship with their adoption of selected T. Aman production technologies. It means that increased the innovativeness tendency of the farmers already increased the adoption of selected T. Aman rice production technologies. Chowdhury (1997), Podder (1999) and Islam (2002) also found the similar significant positive relationship between these two variables.

4.4.8 Relationship between extension media contact of the farmers and their adoption of selected T. Aman production technologies

The relationship between extension media contact of the farmers and their adoption of selected T. Aman production technologies was measured by the following null hypothesis:

"There was no relationship between extension media contact of the farmers and their adoption of selected T. Aman production technologies."

The co-efficient of correlation between the concerned variables was found to be +0.357 as shown in Table 4.4.2. This led to the following observations regarding the relationship between the two variables under consideration:

a) The relationship showed a positive trend between the two variables.
b) The computed value of "r" (r= +0.357) was found to be higher than table value (r = 0.226) with 128 degrees of freedom at 0.01 level of probability.
c) The co-efficient of correlation between the concerned variables was significant at 0.01 level of probability.
d) The concerned null hypothesis was rejected.

Thus, the researcher concluded that extension media contact of the farmers had significant and positive relationship with their adoption of selected T. Aman production technologies. It means that higher extension media contact of the farmers was more likely to have more adoption of selected T. Aman production technologies. Rahman (1999), Hussen (2001), Rahman ((2001) and Aurangozeb (2002) observed the similar significant and positive relationship between these two variables.

4.4.9 Relationship between commercialization of the farmers and their adoption of selected T. Aman production technologies

The relationship between commercialization of the farmers and their adoption of selected T. Aman production technologies, the following null hypothesis was tested:

"There was no relationship between commercialization of the farmers and their adoption of selected T. Aman production technologies."

The co-efficient of correlation between the concerned variables was computed and found to be +0.140 as shown in Table 4.4.2, which led to the following observations regarding the relationship between the two variables under consideration:

a) The trend of relationship between the two variables was positive direction and a very low relationship was found between the two variables.
b) The computed value of "r" (r= +0.140) was found to be smaller than the table value (r= 0.172) with 128 degrees of freedom at 0.05 level probability.
c) The co-efficient of correlation between the concerned variables was insignificant at 0.05 level of probability.
d) The null hypothesis could not be rejected.

Based on the above findings, the researcher concluded that there was no significant relationship between the commercialization of the farmers with their adoption of selected T. Aman production technologies. Thus, findings indicated that the commercialization does not influence significantly to adopt selected T. Aman production technologies, because in the context of Bangladesh most of the farmers produce crops for their home consumption only. Commercial crop growers are rare. Ahaduzzaman (1999) found similar findings in his study.

4.4.10 Relationship between cosmopoliteness of the farmers and their adoption of selected T. Aman production technologies

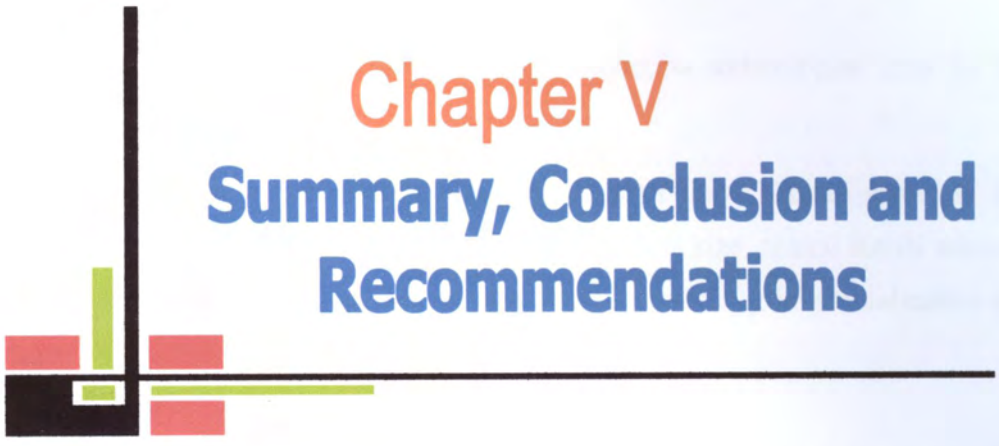
The relationship between cosmopoliteness of the farmers and their adoption of selected T. Aman production technologies was examined by testing the following null hypothesis:

"There was no relationship between cosmopoliteness of the farmers and their adoption of selected T. Aman production technologies."

The co-efficient of correlation (r) between the concerned variables was found to be 0.166 as shown in Table 4.4.2. This led to the following observations regarding the relationship between the two variables under consideration:

a) The trend of relationship between the two variables was positive direction.
b) The computed value of "r" (r= 0.166) was found to be smaller than the table value (r= 0.172) with 128 degrees of freedom at 0.05 level probability.
c) The co-efficient of correlation between the concerned variables was not significant at 0.05 level of probability.
d) The null hypothesis could not be rejected.

The researcher concluded that cosmopoliteness of the farmers had no singnificant relationship with their adoption of selected T. Aman production technologies. Thus, findings indicated that the cosmopoliteness does not influence significantly to adopt selected T. Aman production technologies, because most of the surroundings farmers had awareness regarding year round T. Aman yield production concept. Alam (1997) found that cosmopoliteness had no significant relationship with their use of improved farm practices in rice cultivation. Hossain (1991) had also similar findings.



Chapter V

Summary, Conclusion and Recommendations

Chapter V

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

5.1.1 Introduction

The adoption of selected T. Aman production technologies among the rice growers depend upon a number of factors including farmers' characteristics. An understanding of the factors that influence the adoption behavior of the farmers is necessary to design and implement the adoption and diffusion process in the country. Therefore, the present study was conducted in Sarishabari upazila of Jamalpur district to attain the following specific objectives:

1. To identify and describe the selected T. Aman production technologies used by the farmers.

2. To determine and describe the selected characteristics of the T. Aman growers. The selected characteristics include: age, education, family size, farm size, annual family income, organizational participation, innovativeness, extension media contact, commercialization and cosmopoliteness.

3. To determine the extent of adoption of the selected T. Aman production technologies. The selected technologies were: recommended variety, line transplanting method, balance fertilizer dose, supplementary irrigation and integrated pest management.

4. To explore relationship between the selected characteristics of the farmers with their extent of adoption of modern T. Aman technologies.

5.1.2 Methodology

The study was conducted in two villages namely, Kawamara and Medhur of Sarishabari upazila under Jamalpur district. From a population of 650, a total number of 130 T. Aman farmers were selected for interview. Data were collected by using a pre-tested interview schedule. Collected data were coded, compiled, tabulated and analyzed in accordance with the objectives of the study. Statistical measure such as percentage distribution, range, average, standard deviation and adoption quotient were used to determjine the extent of adoption of selected T. Aman production technologies by the farmers and their selected characteristics. Coefficient of correlation was calculated to explore the relationship between the selected characteristics of the farmers and their adoption of selected T. Aman production technologies.

5.1.3 Major findings

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

5.1.3.1 Section I: Selected T. Aman production technologies

The selected T. Aman production technologies were-

1. Recommended T. Aman varieties (BR-11 / BR-25)
2. Line transplanting method
3. Balance fertilizer dose
4. Supplementary irrigation
5. Integrated Pest Management

5.1.3.2 Section II: Selected characteristics of the farmers

Age: Age of the farmers ranged from 18 to 75 years. The average being 43.57 years with a standard deviation of 12.19. The highest proportions (47.7 percent) of the farmers were middle aged, while 28.5 percent were old aged and 23.8 percent were young.

Level of education: Level of education of the farmers ranged from 0 to 12. The average score being 3.16 and the standard deviation was 3.71. The highest proportion (56.2 percent) of the farmers had "no education" compared to 29.3 percent "secondary education", 13 percent having "primary education" and only 1.5 percent having "above secondary education".

Family size: The family member of the farmers ranged from 2 to 14 with the average of 5.23 and the standard deviation was 1.88. The highest proportion (42.3 percent) of the farmers had small family size compared to 38.5 percent medium and 19.2 percent large family size categories.

Farm size: Farm size of the farmers ranged from 0.25 to 3.00 hectares with an average of 0.86 and the standard deviation was 0.48. The highest proportion (49.3 percent) of the farmers had medium sized farm compared to 31.5 percent having small farm and 19.2 percent having large farm.

Annual family income: Annual family income scores of the farmers ranged from 18.62 thousand to 148.40 thousand with an average of 48.176 thousand and the standard deviation was 29.175 thousand. The highest proportion (46.9 percent) of the farmers had low income compared to 30 percent under very low income and 23.1 percent under medium income categories.

Organizational participation: Organizational participation scores of the farmers ranged from 0 to 34 against the possible range of 0 to 42 with an average of 6.29 and the standard deviation was 5.9. The highest proportion (36.2 percent) of the farmers had low participation in organization compared to 24.6 percent had no participation, 21.5 percent had medium participation and only 17.7 percent had high organizational participation categories.

Innovativeness: The innovativeness scores of the farmers ranged from 8 to 22, against the possible range of 0 to 30 with an average of 17.02 and the standard deviation of 2.70. The highest proportion (57.7 percent) of the farmers had moderately innovativeness as compared to 25.4 percent having high innovativeness and only 16.9 percent having low innovativeness.

Extension media contact: The Extension media contact scores of the farmers ranged from 1 to 16 against the possible range of 0 to 39. The average extension media contact score was found to be 7.12 with a standard deviation of 2.86. The highest proportion (54.6 percent) of the respondents had low extension contact compared to 35.4 percent having very low and only 10 percent having medium extension media contact.

Commercialization: The commercialization scores of the farmers ranged from 0 to 82.80, against the possible range of 0 to 100. The average commercialization scores were found to be 26.77 with a standard deviation of 26.09. The highest proportion (33.8 percent) of the farmers was no commercialization compared to 30 percent was low commercialization, 19.3 percent was medium commercialization and only 16.9 percent was high commercialization.

Cosmopoliteness: Cosmopoliteness scores of the farmers ranged from 3 to 12, against the possible range was found to be 0 to 21. The average cosmopoliteness scores were found to be 6.63 with a standard deviation of 1.97. The highest proportion (51.5 percent) of the farmers had very low cosmopoliteness compared to 40.8 percent having low cosmopoliteness and only 7.7 percent having medium cosmopoliteness.

5.1.3.3 Section III: Adoption of selected T. Aman production technologies

Adoption of selected T. Aman rice production technologies was the main focus of the study. It was quantified by computing scores. These scores of the respondent could range from 25.20 - 89.40, against the possible range of 0 to 100 with an average of 56.14 and the standard deviation of 19.19. The highest proportions (43 percent) of the farmers under the medium adopter's category, while 37 percent had high adopters and only 20 percent had low adopters of selected T. Aman rice production technologies.

5.1.3.4 Section IV: Relationship between the selected characteristics of the farmers with their adoption of selected T. Aman production technologies.

To explore the relationship of the ten selected characteristics of the farmers with their adoption of selected T. Aman production technologies, ten null hypotheses were formulated. For test hypothesis, co-efficient of correlation (r) was computed. Five (0.05) percent level of significance was the basis for rejecting a null hypothesis. The results of hypothesis testing are presented below in brief:

Correlation analysis indicated that age, family size, commercialization and cosmopoliteness of the farmers were found to have insignificant relationship with their adoption of selected T. Aman production technologies. Level of education, farm size, annual income, organizational participation, innovativeness and extension media contact were found to have positively significant relationships with the adoption of selected T. Aman production technologies.

5.2 Conclusions

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

1. The adoption of selected T. Aman production technologies of the farmers was moderate, as 80 percent of the farmers had medium to high adoption. However, to meet the ever-growing demand of food, there is a need to further enhance the rate and extent of adoption of selected T. Aman production technologies among the farmers. It may be concluded that the composite adoption of selected T. Aman production technologies is moderate and needs further improvement.

2. Level of education of the farmers showed a significant and positive relationship with their adoption of selected T. Aman production technologies. This means that high literacy and educational level among the farmers might have influenced high adoption of selected T. Aman production technologies.

3. Farm size of the farmers had highly significant and positive relationship with their adoption of selected T. Aman production technologies. It means that larger the farm size more the adoption, but most of the farmers were medium and small. So, conclusion can be drawn that large, medium, small – all farm size categories should be given equal opportunities by fixing target beneficiaries.

4. Findings of the study showed that annual family income of the farmers had positive and highly significant relationship with their adoption of selected T. Aman production technologies. It is an important factor for the adoption of improved seeds, line transplanting, balance fertilizer, supplementary irrigation and IPM (Integrated Pest Management) by the farmers for getting increased yield. It may be concluded that the availability of money is more essential to procure package of T. Aman production technologies.

5. Organizational participation of the farmers showed positive and highly significant relationship with their adoption of selected T. Aman production technologies. Participation of the farmers in organizations is helpful to increase their knowledge, thinking capacity and decision making ability which helps them to adopt the selected T. Aman production technologies. So it may be concluded that, if the farmers had more organizational participation then adoption would have been increased.

6. Innovativeness of the farmers had highly significant and positive relationship with their adoption of selected T. Aman production technologies. It may be concluded that the farmers of the study area had the positive attitude towards innovation. The farmers with high innovativeness use modern farm technologies and provide opportunity to others to see the advantages and disadvantages of those methods. This situation is quite favorable for the implementation of agricultural development programmes.

7. The findings revealed that extension media contact of the farmers had highly significant and positive relationship with their adoption of selected T. Aman production technologies. Extension media contact increases the outlook of the farmers which lead them to adopt selected T. Aman production technologies.

8. Age, family size, commercialization and cosmopoliteness of the farmers had insignificant relationship with their adoption of selected T. Aman production technologies. This means that these variables had no important influence on adoption of selected T. Aman production technologies.

5.3 Recommendations

5.3.1 Recommendations for policy implications

Based on the findings and conclusions of the study, the following recommendations are presented below:

1. The Department of Agricultural Extension (DAE) and Bangladesh Rice Research Institute (BRRI) should take congenial steps to encourage adequate linkage with the farmers in order to make their effort successful in developing and disseminating the selected T. Aman production technologies.

2. An increased rate and extent of adoption of selected T. Aman production technologies are vitally important for increasing the yield of T. Aman rice production. A considerable proportion (80 percent) of the farmers had medium to high adoption of the selected T. Aman production technologies. It is, therefore, recommended that the Department of Agricultural Extension (DAE) and Non-Government Organizations (NGOs) should strengthen their extension services in order to increase the extent and rate of adoption of the T. Aman rice growers.

3. It may be recommended that massive demonstration programmes, training programmes, field trips etc. should be executed to make desirable changes in the farmers' attitude and supply necessary inputs such as improve seed, fertilizer, IPM (Integrated Pest Management) tools, and irrigation facilities to be made available to the farmers at the right time and at a fair price.

4. Education of the farmers had significant relationship with their adoption of selected T. Aman production technologies. It indicates the importance of education of the rice growers for rapid adoption of T. Aman technologies. The findings also indicate that 56.2 percent of the farmers had no education under the above situation; it may be recommended that arrangements should be made for increasing the literacy level of the T. Aman rice farmers by the concerned authorities through the establishment of night school, adult education and other extension methods.

5. Farm size of the farmers had positive significant relationship with their adoption of selected T. Aman production technologies. On the other hand, all the farmers had small and medium farms and they could give more attention to their farming operation as they generally work on the farm. Hence, extension workers should work with the small and medium farmers so as to increase the adoption of selected T. Aman production technologies on a significant scale.

6. Innovative farmers possess the modern idea, which compel them to use new ideas even in the face of various problems and difficulties. The farmers with high innovativeness use modern farm technologies and provide opportunity to others to see the advantages and disadvantages of those methods. It is therefore, recommended that extension workers should encourage innovative farmers and uses them as local leaders by introducing farmers to farmer's extension approach.

7. The concerned authorities should take necessary steps to increase the extension media contact of the farmers. For this, the SAAO (Sub Assistant Agricultural Officer) should frequently visit the farmers and advice them on the selected T. Aman production technologies. Therefore, it is recommended that the extension worker should organize farmers' extension club so that farmers themselves could come in contact with communication channels.

5.3.2 Recommendations for further study

The present study which mainly highlights some aspects of particular dimensions (adoption of selected T. Aman production technologies) of agricultural development. So, it is suggested that concerned agencies should undertake further studies in order to have a deeper insight into the various aspects of the adoption of technologies as well as agricultural development. The aspects for future study are presented below:

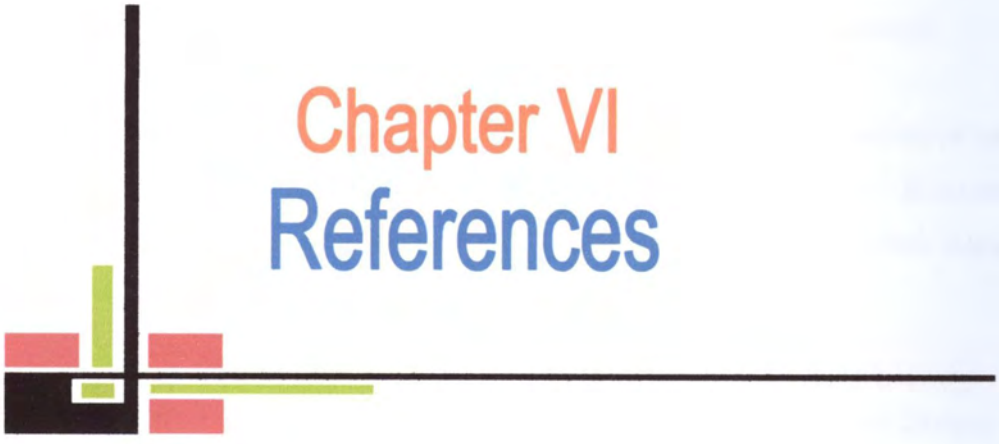
1. The present study was conducted in the two villages of Pingna union under Sarishabari Upazila. It is recommended that similar studies should be conducted in other parts of the country.

2. The present study was concern only with the extent of adoption of selected T. Aman production technologies. It is therefore suggested that future studes should include attributes of innovations, adopter categories and use of information sources in relation to adopter stages and adopter categories.

3. The study was based on the farmers' adoption of selected T. Aman rice production technologies. Further studies may be conducted in respect of adoption of other crop production technologies.

4. The relationships of ten important characteristics of the farmers with their adoption of selected T. Aman production technologies have been investigated in this study viz. age, level of education, family size, farm size, annual income, organizational participation, innovativeness, extension media contact, commercialization and cosmopoliteness. But besides these ten characteristics of the farmers, there might be other factors such as farming experience, agricultural knowledge, attitude towards technology etc. which influence the adoption of selected T. Aman production technologies. Therefore, further research should be conducted to explore the relationships of other characteristics of the farmers with their adoption of selected T. Aman production technologies.

5. Adoption is the measurement of implementation by the farmers as well as vital indicator of agricultural development. It is a continuous process due to change of social system, change of technologies, change of human behavior, change of cropping patterns, change of adoption patterns etc. So, it is suggested that there should be continuous adoption research in various aspects for agricultural development.



Chapter VI
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Chapter VI

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(English Version of the Interview Schedule)

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AN INTERVIEW SHEDULE
ON
Adoption of Selected T. Aman Production Technologies by the Farmers

Name of the respondent---------- Sample No. ----------
Village---------- ---------- Union----------
Upazilla----------District----------

(Please answer the following questions)

1. Age:
How old are you? ---------- Years

2. Level of education:
Please indicate your educational qualification.
a. Can't read and write ----------
b. Can sign only ----------
c. Studied up to---------- class

3. Family size:
Please mention the number of your family members----------

4. Farm size:
Please mention your farm size.

Sl.No.	Types of land	Area of land	
		Local unit	Hectare
01	Homestead area		
02	Own land under own cultivation		
03	Land given to others on share cropping		
04	Land taken from others on share cropping		
05	Land taken from others on lease		
06	Others (fruit garden, pond etc.)		
07	Total		

5. Annual family Income:
Please mention your annual family income from different sources

A. Income from agricultural crops:

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

B. Income from domestic animals and Fisheries:

Sl. No.	Source of income	Total production (Kg/Mounds)	Price/ Kg or Mound	Total Price (Tk)
1	Livestock (Sales of milk, cattlehead, cowdung)			
2	Poultry(Layer,Broiler,Litter)			
3	Fisheries			
	Sub-total (B)			

C. Income from non-agricultural sources:

Sl. No.	Sources of income	Total Price (Tk)
1	Job	
2	Business	
3	Day labor	
4	Other family members	
5	Others (if any)	
	Sub-total (C)	

Total income = (A+B+C) = ---------- Taka

6. Organizational participation

Please mention the Organization that you are associated with:

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

7. Innovativeness:

Please indicate the extent of use of the following modern agricultural practices:

Sl. No.	Name of innovation	Do not use	Application Period		
			1 year after hearing	2-3 years after hearing	Above 3 years after hearing
01.	Use of hybrid rice seed				
02.	Use of Compost				
03.	Use of Bio-fertilizer				
04.	Use of Gypsum				
05.	Use of Gutee urea				
06.	Use of green manure in crop cultivation				
07.	Use of herbicide/weedicide				
08.	Use of light-trap				
09.	Use of modern agricultural machineries(Power tiller/Pump/Seed driller/Drum seeder)				
10.	Use of Pesticide				

8. Extension media contact:
Please indicate you're frequently of contact with the following media

Name of the Extension media	Nature of communication			
	Frequently	**Occasionally**	**Rarely**	**Not at all**
a. Individual contact:				
1. Sub-asstt. Agri. officer	6 or more times/month	3-5 times /month	1-2 times /year	Never
2. NGO workers	6 or more times/month	3-5 times /month	1-2 times /year	Never
3. Friends/Relatives/ Neighbors	6 or more times/month	3-5 times /month	1-2 times /year	Never
4. Upazilla Agriculture Officer/Agriculture Extension Officer	At least 1 time/month	At least 1 time/2months	1-5 times/ year	Never
b. Group contact				
1. Participation in group discussion	4 or more times/month	2-3 times /month	1 time/month	Never
2. Participation in Result demonstration	3 or more times/year	1-2 times /year	1 time/2years	Never
3. Participation in Method demonstration	3 or more times/year	1-2 times / year	1 time/2years	Never
4. Participation in Field day/Farmers rally	4 or more times/year	1-3 times / year	3 times / 2years	Never
5. Participation in training	3 or more times/lifelong	2 times/ lifelong	1 time/ lifelong	Never
c. Mass media contact				
1. Listening Farm Radio Talk	4 or more times/month	2-3 times /month	1 time/month	Never
2. Watching agricultural program in Television	3 or more times/month	1-2 times /month	2 time/ 2months	Never
3. Reading agricultural magazine(Booklet/Leaflet/ Krishi Kotha etc.)	5 or more times/year	3-4 times /year	1-2 times /year	Never
4. Visiting in agriculture fair	3 or more times/year	2 times/year	1 time/year	Never

9. Commercialization:

What would be the approximate price of the crops produced by you in 2005? Please indicate if you sold any crop produced in that year.

Name of crop	Production			Sale			Remarks
	Total production (Maund)	Market price in 2005 (Tk.)	Total price of produced crop (Tk.)	Quantity sold (in maund)	Per maund selling price (Tk.)	Total selling price (Tk)	
1. Aus							
a) HYV							
b) Local							
2. Aman							
a) HYV							
b)Local							
3.Boro							
a) HYV							
b) Local							
4. Jute							
5. Sugarcane							
6. Mustard							
7. Maize							
8. Pulses							
9. Lentil							
10. kheshari							
11. Potato							
12. Brinjal							
13. Pepper							
14.Onion							
15. Garlic							
16.Others							

10. Cosmopoliteness:

Please indicate how frequently you visit the following places within a specific period.

Sl. No	Place of visit	Frequency of visit			
		Regularly	**Occasionally**	**Rarely**	**Not at all**
01.	Visit to market/relatives/ friends outside of your own village but within your own union	8 or more times/month	4-7 times /month	1-3 times /month	No visit
02.	Visit to other Union	5 or more times/month	3-4 times / month	1-2 times / month	No visit
03.	Visit to own Thana head quarter	4 or more times/month	2-3 times / month	1 time / month	No visit
04.	Visit to other Thana headquarter	4 or more times/year	2-3 times/ year	1 time/ year	No visit
05.	Visit to own district town/headquarter	3 or more times/year	2 times/ year	1 time/ year	No visit
06.	Visit to other district town/headquarter	3 or more times/year	2 times/ year	1 time/ year	No visit
07.	Visit to capital city or other metropolitan city	3 or more times/year	2 times/ year	1 time/ year	No visit

11. Adoption of selected T. Aman production technologies:

Sl. No	Name of technologies	2003		2004		2005	
		Potential area (p)	Used area (u)	Potential area (p)	Used area (u)	Potential area (p)	Used area (u)
1.	Recommended variety BR-11(Mukta) BR-25(Naya Pajam)						
2.	Line transplanting method						
3.	Balance fertilizer dose Urea 140-160 kg/ha TSP 80-100 kg/ha MP 60-80 kg/ha Gypsum 40-50 kg/ha $ZnSO_4$ 20-30 kg/ha						
4.	Supplementary irrigation						
5.	Integrated pest management (IPM)						

Thanks for your cooperation.

Dated ----------

Signature of the Interviewer

APPENDIX –B

Correlation Matrix

Variables code	A	B	C	D	E	F	G	H	I	J	K
A	1.000	-	-	-	-	-	-	-	-	-	-
B	-0.354**	1.000	-	-	-	-	-	-	-	-	-
C	0.456**	0.038	1.000	-	-	-	-	-	-	-	-
D	0.490**	-0.033	0.432**	1.000	-	-	-	-	-	-	-
E	0.499**	0.080	0.571**	0.794**	1.000	-	-	-	-	-	-
F	0.347**	0.092**	0.163	0.428**	0.531**	1.000	-	-	-	-	-
G	0.163	0.201*	0.154	0.404**	0.379**	0.358**	1.000	-	-	-	-
H	0.238**	0.253**	0.107	0.430**	0.381**	0.346**	0.406**	1.000	-	-	-
I	-0.108	0.308**	-0.066	0.088	0.132	0.154	0.217*	0.315**	1.000	-	-
J	0.407**	0.112	0.524**	0.487**	0.589**	0.305**	0.227**	0.200*	0.084	1.000	-
K	0.167	0.177*	0.146	0.447**	0.396**	0.370**	0.397**	0.357**	0.140	0.166	1.000

*Correlation is significant at 0.05 level of probability
** Correlation is significant at 0.01 level of probability

A= Age
B= Level of Education
C= Family Size
D= Farm Size
E= Annual family Income
F= Organizational Participation
G= Innovativeness
H= Extension media contact
I= Commercialization
J= Cosmopoliteness
K= Adoption of T. Aman