

ADOPTION OF IMPROVED PRACTICES IN SUGARCANE CULTIVATION IN JAMALPUR DISTRICT

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**ADOPTION OF IMPROVED PRACTICES IN
SUGARCANE CULTIVATION IN
JAMALPUR DISTRICT**

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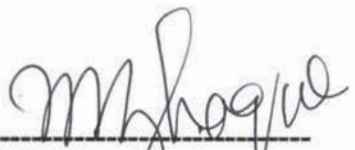


CERTIFICATE

This is to certify that the thesis entitled, “**Adoption of Improved Practices in Sugarcane Cultivation in Jamalpur District**” 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** embodies the result of a piece of bonafide research work carried out by **HOSSAIN MOHAMMAD JAHANGIR, Registration No.00546** 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. M. Zahidul Haque)
Supervisor



Dedicated to
My
Beloved Parents who laid the
foundation of my success

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ABBREVIATIONS AND ACRONYMS

BARI	:	Bangladesh Agricultural Research Institute
BINA	:	Bangladesh Institute of Nuclear Agriculture
BBS	:	Bangladesh Bureau of Statistics
cm	:	Centimeter
DAE	:	Department of Agricultural Extension
d.f.	:	Degrees of Freedom
e.g.	:	Example
EPB	:	Export Promotion Bureau
<i>et al.</i>	:	And others
GDP	:	Gross Domestic Product
Km	:	Kilometer
No.	:	Number
SD	:	Standard Deviation
Sq	:	Square
%	:	Percentage

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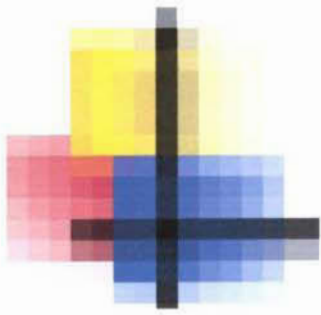
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ADOPTION OF IMPROVED PRACTICES IN SUGARCANE CULTIVATION IN JAMALPUR DISTRICT

ABSTRACT

The major purpose of the study was to find out the extent of adoption of improved practices in sugarcane cultivation by the growers in some selected areas of the Jamalpur district. Attempts were also made to describe some of the selected characteristics of the sugarcane growers and their relationship with their adoption of improved practices in sugarcane cultivation. One hundred and ten (110) growers were selected randomly from a total of 550 growers under two Unions of Sarishabari Upazila of Jamalpur district. An interview schedule was used for collection of data, which took 40 days from 20 July to 30 August 2006. The findings of the study indicate that (47 percent) of the growers had medium adoption while 30 percent had low adoption and 23 percent had high adoption of improved practices in sugarcane cultivation. Correlation analyses indicate that among the selected characteristics, education, farm size, annual income, cosmopolitanism and credit availability showed significant relationship with their adoption of improved practices in sugarcane cultivation. On the other hand, age, family size and extension contact of the growers did not show any significant relationship with their adoption of improved practices in sugarcane cultivation.



CHAPTER I

INTRODUCTION

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INTRODUCTION

1.1 General Background

Traditionally and predominantly Bangladesh is an agro based country with an area of 147570 sq. km. The country produces different type of crops such as cereal crops, cash crops, beverage crops, narcotic crops etc. Sugarcane is one of the most important cash crops in Bangladesh and it is produced in most regions of the country.

Sugarcane is a tropical crop. Its cultivation is concentrated around the world between 35⁰ North and 35⁰ south of the latitude. It is a long durational vegetative propagated plant. In Bangladesh, it is generally cultivated in low rainfall belt (below 1500 mm) of southwest and northwest part. It is the major sugar or 'gur' producing crop of the country.

Sugarcane, the most important sources of sucrose, the cheapest form of energy giving food, needs less land per unit of energy produced than any other crops grown. According to Ali and Ali (1990), 13 kg sugar is required for each individual in a year and sugarcane is also the main source of sucrose. Among the major crops in Bangladesh, sugarcane stands third and among the cash crops it occupies the second position.

In 2000-2001, the area and production of Sugarcane cultivation was 417 thousand acres and 6742 thousand M. ton respectively but in 2004-2005 it has been increased at 422 thousand acres and 6857 thousand M. ton respectively. The area, production and yield of sugarcane in Bangladesh for the last five (5) years are shown in Table 1.1.

Table 1.1 Area, production and yield of sugarcane from 2000-2001 to 2004-2005 in Bangladesh

Year	Area (000 ac)	Production (000 M. ton)	Yield (ton/ac)
2000-2001	417	6742	16
2001-2002	402	6502	16
2002-2003	410	6838	16
2003-2004	428	6982	17
2004-2005	422	6857	17

Source: (BBS, 2005)

Sugarcane is cultivated almost in all the districts of Bangladesh. There are two well-defined zones of sugarcane cultivation, one is mill zone and the other is non-mill zones. Sixteen (16) sugar mills are situated mainly in the greater districts of Rajshahi, Kushtia, Rangpur, Dinajpur, Bogra, Pabna, Faridpur, Dhaka and Mymensingh.

Sugarcane and sugar mills of the country are significantly contributing to the development of rural areas by providing the rural employment, improvement of the rural infrastructure and saving valuable foreign exchange, which are adding directly and indirectly to the national exchequer. The government of Bangladesh is emphasizing the attainment of self-sufficiency in sugar and gur production by stabilizing sugarcane area and increasing yield (BSFIC).

Sugarcane is the basic raw material for the sugar industry, a subsidiary raw material for chemical plant, a very important source of cash income to its growers and an important foreign exchange saver for the Government. The sugar industries are also contributing considerable amount of revenue to the national exchequer in the form of excise duty. During the year 1998-99 total value added from agricultural crops at constant prices 1,86,454 million Taka where 4,019 million Taka value added from sugar crops (BBS, 2001). Sugar mills turn out as well as valuable wastes like molasses and bagassees, which are partly being used as raw materials in paper industry and distilleries.

Bangladesh is considered as one of the original homes of sugarcane production. The per hectare yield of sugarcane in Hawaii is 222 tons and 74 tons in Australia. However the climatic conditions in sugarcane growing areas in Bangladesh support yield increase as high as 200-300 tons cane per hectare (TCPH). So, there exists ample prospect and potentiality to increase the yield of sugarcane. In spite of this, average cane yield in Bangladesh for the last five years (shown in Table 1.1) is only 40-43 (TCPH), which are one of the lowest in the world (BBS, 2001) and the country suffers from chronic shortage of sweetener (sugar and gur) and raw material for sugar mills.

Increasing sugarcane production depends on raising the yield as no additional lands are planned for cane cultivation. The research effort, led by the Bangladesh Sugarcane Research Institute (BSRI) is devoted to producing more cane per hectare as well as increasing cropping intensity. It is, therefore, urgently necessary to devise ways and means to increase sugarcane production for attainment of self-sufficiency in sweetener (sugar and gur). A very little research has been undertaken

in non-mill zone and mill zone areas to determine the adoption of improved farming practices by the farmers in sugarcane cultivation. Studies in non-mill zone and mill zones showed that the modern technology for cane production have not been accepted up to the desired level to raise per hectare production of sugarcane. Even, the extent of adoption of recommended technology and its impact on the yield of sugarcane is not exactly known to us.

Hence the present study was designed to assess the level of adoption of modern practices in sugarcane cultivation by the cane growers in Jamalpur district. This study has also been undertaken to know and isolate the factors significantly correlated to the adoption of modern cane production practices.

The researcher felt that the study would be of much useful to the Government, foreign donors, international development agencies, private enterprises, banks, universities and to the intellectuals of the country including the key decision makers at different tiers of the government to get a clear picture and up to date information about sugarcane growers of the country. This will also be helpful to formulate a pragmatic welfare biased dynamic sugarcane policy/program for the country.

1.2 Statement of the Problem

The success of any practice depends on its dissemination among the potential users which ultimately is measured by the level of adoption of that practice. It is assumed that notable improvements can take place in Bangladesh agriculture, if the available practices are accepted and adopted by the farmers. Among various practices, use of modern variety, use of space transplanting, use of recommended fertilizer dose, use of inoculums, relay cropping and use of plant protection measure are quite suitable for our sustainable agriculture.

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

In view of the forgoing discussion, the researcher undertook this piece of research entitled “Adoption of Improved Practices in Sugarcane Cultivation in Jamalpur District.” The main purpose of the study was to have an understanding on the adoption of selected improved Sugarcane Cultivation Practices by the farmers of the Jamalpur District and about some selected characteristics contributing in the adoption of selected Sugarcane Cultivation Practices. For conducting the research in a planned and appropriate way, the researcher put forwarded the following questions:

- What are the characteristics of the Sugarcane growers that influenced them to adopt those Practices?
- At what extent the Sugarcane Cultivation Practices were adopted by the farmers?
- Are there any relationships between the extent of adoption of selected Sugarcane Cultivation Practices and selected characteristics of the farmers?

1.3 Specific objectives of the Study

The following specific objectives were set forth in order to give proper direction of the study.

1. To determine and describe the individual characteristics of the sugarcane growers. The characteristics are age, education, family size, farm size, annual income, extension contact, cosmopolitaness and credit availability
2. To determine the extent of adoption of improved sugarcane cultivation practices by the farmers and
3. To explore the relationships of the individual characteristics of the sugarcane growers with their extent of adoption of improved sugarcane cultivation practices.

1.4 Justification of the Study

With a view to have an understanding on the extent of adoption of the improve practices in the cultivation of sugarcane by the farmers, the researcher undertook a research study entitled “Adoption of improved sugarcane cultivation practices in Jamalpur district”. The purpose of the study was to determine the extend of adoption of improved sugarcane cultivation practices and also to ascertain the relationships of the selected characteristics of the sugarcane growers with their adoption of improved sugarcane cultivation practices. The study was concerned with the adoption of improved practices, which was a major concern to increase sugarcane production and to save the sugar industries of the country as well as to develop the sugar/gur sector, a promising rural industry.

1.5 Scope and limitations of the Study

The purpose of the study was to have an understanding of the extent adoption of improved sugarcane cultivation practices by the sugarcane growers. However, from the research point of view, it was necessary to impose certain limitations as follows:

1. The study was confined to Sharishabari upazila of Jamalpur district.
2. Characteristics of the cane growers are many and varied but only eight were selected for investigation in this study as stated in the objectives. This is done to complete the study within limited resources and time.
3. Population for the present study was kept confined within the heads of the sugarcane growing farm families. Because they were the major decision makers and knowledgeable family members in the adoption of improved sugarcane cultivation practices.
4. The investigator applied the situation prevailing during the year 2005-2006 (collected facts and figures).
5. For information about the study the researcher depended on the data as furnished by the selected sugarcane growers during their interview with him.

The findings of the study will be especially applicable to Sharishabari upazila area. However, the findings will also have the implications for other areas of the country having similarities with the study area. Thus the findings are expected to be useful to the extension workers and planners for preparation of programs for rapid adoption of improved sugarcane cultivation practices by the farmers. The findings may also be helpful to the field workers of different nation building departments/organizations to improve their technique and strategy of action for

effective working method with the rural people to generate rural employment and to improve rural economy.

1.6 Assumptions of the Study

“An assumption is the supposition that an apparent fact or principle is true in light of the available evidence” (Good, 1945). The researcher had the following assumptions in mind while undertaking this study.

1. The respondents included in the sample for this study were competent enough to furnish proper responses to the queries made in the interview schedule.
2. The researcher who acted as interviewer was adjusted to social and environmental conditions of the study area. Hence, the data collected by him from the respondents were free from bias.
3. The responses furnished by the respondents were reliable. They expressed the truth about their convictions and opinions.
4. Views and opinions furnished by sugarcane growers included in the sample were representative views and opinions of the whole population of the study area.
5. The findings of the study will have general application to other parts of the country with similar personal, socio-economic and cultural condition of study area.

1.7 Hypotheses of the Study

As defined by Good and Hatt (1953) “a hypothesis is a proposition, which can be put to a test to determine the 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 empirical test. Hypothesis may be broadly divided into two categories, namely, research hypothesis and null hypothesis. In studying relationship between variables, an investigator first formulates research hypothesis 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 the concerned variables.

The following null hypothesis was formulated to explore the relationships of the selected characteristics of the growers with their adoption of improved sugarcane cultivation practices.

“There are no relationships between the selected characteristics of the growers and their adoption of modern sugarcane cultivation practices”.

1.8 Definition of the Terms

Certain key terms used throughout the study are defined in this section for clarity of understanding.

Age: It is defined as the period of time from the birth of the sugarcane growers to the time of interview. It was measured in terms of year.

Education: Education is defined as the ability if an individual to read and write or, formal education was measured in terms of actual year of successful schooling.

Family size: Farm size refers to the actual number of member in his family.

Farm size: Farm size refers to the cultivated area either owned by a farmer or obtained from others on ‘Borga’ (sharecropping) system the area being estimated in terms of full benefit and benefit to the farmer respectively. The self –cultivated land as well as mortgaged land from others was full benefit.

Annual income: The term annual income refers of the total earnings of the respondent himself from agricultural and non agricultural sources (services business etc) during a year. It was expressed in Taka.

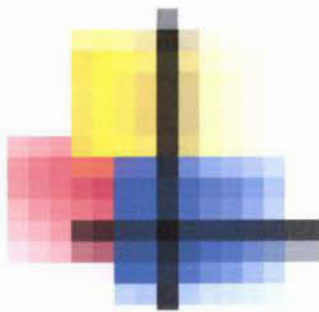
Extension media contact: Extension media contact refers to an individual exposure to or contact with different information sources and personalities being contacted for technology dissemination among the farmers.

Cosmopolitaness: Cosmopolitaness is the degree to which on individual orientation is external to his own social system.

Credit availability: Credit availability of a respondent refers to the degree to which his credit requirement was fulfilled by the amount of credit actually received (whether it was received from institutional or non-institutional sources).

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

Improved practices: Improved practices in respect of cultivation of any crop refer to those practices, which are recommended by some competent authority. These practices, if used, are helpful for improving the yield and/or quality of the crop. In this study, five improved practices of sugarcane cultivation were considered namely, use of modern varieties, spaced transplanting (STP), relay cropping, recommended dose of fertilizer, inoculums and use of plant protection measures.



CHAPTER II

REVIEW OF LITERATURE

CHAPTER II

REVIEW OF LITERATURE

The researcher made an elaborate search of available literature for the research. Available literature was extensively reviewed to find out work in Bangladesh as well as abroad. The reviews are conveniently presented passed on the major objectives of the study. This chapter is divided into three major sections. The first section deals with the farmers' adoption of innovation. The second section deals with the relationships between farmers' characteristics and adoption of innovation. . The third section deals with the conceptual framework of the study.

2.1 Review of Literature on General Context

Hossain (1971) carried out a research study on the adoption of improved practices in Gouripur of Mymensingh district. The practices were (i) plant protection measure, (ii) recommended variety of paddy, (iii) line transplanting and (iv) recommended dose fertilizer. It revealed that among the responded farmers 57.40 percent adopted plant protection measure, 35.51 percent adopted recommended variety of paddy, 25.36 percent adopted line transplanting and 11.52 percent adopted recommended dose of fertilizers.

Karim (1973) conducted a study on the adoption of fertilizers by transplanting aman growers in former keyotkhali union of Mymensingh district. He studied on the adoption of three fertilizers-urea, Triple super phosphate (TSP) and Muriate of potash (MP). He found that 4 percent of the respondent growers had high adoption of the fertilizer while 9 percent had medium adoption and 41 percent low adoption. Forty six percent (46 percent) of the remaining respondent growers did not use any of the three fertilizers.

Muhammad (1974) studied that extent of adoption of insect control measures by the farmers in Khamar union of Rajshahi district. He found that among the respondent farmers, 25 percent did not adopt insect control measures, 28 percent had high level of adoption, 32 percent had medium level of adoption and 25 percent had low level of adoption.

Sobhan (1975) studied on the extent of adoption of ten winter vegetables namely, tomato, radish, lettuce and potato in Boilor union of Mymensingh district. Overall winter vegetable adoption scores of the farmers could range from 0 to 140. Overall adoption scores indicated that 27 percent of the farmers did not adopt winter vegetables cultivation while 48 percent had low adoption and 25 percent high adoption.

Ahmed (1977) studied on the extent of adoption of the three specific practices of jute cultivation in Noapara union of Faridpur district. He observed among the respondent farmers that 98 percent adopted the recommended varieties of jute, 72 percent adopted plant protection measures and 49 percent adopted recommended dose of fertilizers.

Hossain (1981) studied on the relationships of the farmers (jute growers) with their adoption of improved practices of jute cultivation. He found that more than half (54 percent) of the respondents had medium adoption of the improved practices compared to 31 percent having high adoption and 15 percent low adoption.

Gogoi and Gogoi (1983) conducted a study on adoption of recommended plant protection practices in rice varieties in Jorhat district of Asam state in India. The recommended practices were seed selection, seed treatment, growing of tolerant or

resistant variety, prophetic measures and chemical protection measures. The study revealed that among the respondent 5 percent had low-level low adoption, 36.36 percent had medium level of adoption and 13.64 percent had high level of adoption of recommended plant protection practices.

Haque (1984) investigated the research of the extent of adoption of improved practices in sugarcane cultivation in selected areas of Jessore district. He observed that 62.75 percent respondent growers adopted early time of planting 60.75 percent of the respondent growers adopted recommended dose of fertilizer and 54.9 percent respondent growers adoption trench method.

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

Karim and Mahboob (1986) studied on HYV wheat in Kushtia union of Mymensingh district. They found that among the respondent wheat farmers 74 percent adopted HYV wheat cultivation and 26 percent farmers were non-adopters.

Rahman (1986) studied on the adoption of improved practices namely, use of fertilizers, line sowing, irrigation and use of insecticides in transplanted aman rice cultivation in two village of Mymensingh districts. It revealed that 22 percent of the respondent farmers adopted all the four practices in combination against 49 percent adoption three practices 22 percent adopted two practices, 5 percent adopted one practices and only 2 percent adopted none of the four practices.

Razzaque (1987) studied on the extent of adoption of HYV rice in three villages Agricultural University Extension project area. He observed that among the respondent growers, 6.6 percent of the farmers had high adoption of HYV rice, 33.3 percent had medium adoption and 40 percent had low adoption.

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

Kher (1992) conducted a study on of improved wheat cultivation practices in selected villages of Rajouri block. He found that 72 percent of respondent had medium level of adoption, 17 percent had low level of adoption and 11 percent had high level of adoption.

Singh *et al.* (1992) undertook a research study in India on factors affecting the adoption of improved sugarcane production technology. They observed that majority of sugarcane growers had the medium level of adoption and were partial adopters of scientific recommendations of sugarcane production technology.

Khan (1993) carried out a research study on adoption of insecticides and related issues in the village of Pachar 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.

Nikhade *et al.* (1993) observed in their study on adoption of improved practices of soybean cultivation that more than 82 percent had complete adoption of package practices like line showing, spacing and intercultural operations. Partial adoption was observed in majority of the soybean growers (74.6 percent) with regard to recommended seed rate.

Hasan (1996) found in his study that the highest proportion (44 percent) of the respondents perceived the existence of medium adoption, compared to 26 percent low adoption and 30 percent high adoption in respect of selected agricultural technologies.

Podder (1999) concluded a research study on the adoption of Mehersasgar banana by the farmers. He found 47 percent of the respondents had medium adoption compared to 14 percent having low and 39 percent having high adoption.

Hussen (2001) in his study found that the highest proportion (91 percent) of the respondents had medium adoption of modern sugarcane cultivation practices compared to 7 percent had low and only 2 percent had high adoption.

Rahman (2001) observed in his study that the highest proportion (75 percent) of farmers fell under medium adoption category while 18 percent had high adoption 7 percent had low adoption.

Islam (2002) conducted a study on adoption of modern agricultural technologies by the farmers of Sandip. The study revealed that 69 percent of the farmers had medium adoption while 13 percent had low adoption and 18 percent had high adoption of modern agricultural technologies

2.2 Relationship between Farmers' Characteristics and Adoption of Innovation

2.2.1 Age and adoption of Innovation

Pathak and Sasmal (1992) observed that there was a positive and significant relationship between the age of the marginal farmers and their adoption of jute technology. Similar findings were observed by Ali *et al.* (1986) Singh and Rajendra (1990), Okoro and Obibuaka (1992) and Kashem and Hossain (1992).

Pal (1995) conducted a study on adoption of recommended sugarcane cultivation practices by the farmers. He found that age had significant and negative relationship with the adoption of recommended sugarcane cultivation practices. Similar findings were also found by Khan (1993), Haque (1993) and Hasan (1996).

Sarker (1997) observed that there was no significant relationship between age and adoption of improved potato cultivation practices. Similar findings were observed by Karim and Mahboob (1986), Rahman (1986), Sing (1989) and Chowdhury (1997).

Hussen (2001) conducted a study, which concluded that age of the sugarcane growers had a significant negative relationship with their adoption of modern sugarcane cultivation practices.

Rahman (2001) observed that there was no significant relationship between age and adoption of Aalok-6201 hybrid rice cultivation practices. Podder (1999) and Hossain (1999) have found similar results in their respective studies.

He found that academic qualification of the farmers had a significant positive relationship with their adoption regarding Aalok-6201 hybrid rice.

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

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

Islam (2003) conducted a study on adoption of organic manures. He found that there was a positive and significant relationship between education of the farmers and adoption of organic manures.

2.2.3 Family size and adoption of innovation

Haque (1993) in his study found that family size of the growers had negative and significant relationship with their adoption of improved practices sugarcane cultivation.

Pal (1995) carried out a research study on adoption of recommended sugarcane cultivation practices by farmers in two selected centers of North Bengal Sugar Mills. He showed in his findings that family size of the respondent farmers had no significant relationship with their adoption of recommended sugarcane cultivation practices. Similar findings observed by Hossain (1991), Basher (1993) and Islam (1993).

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

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 a positive and significant relationship with their adoption of selected BINA technologies. Similar findings were observed by Okoro and Obibuaka (1992), and Sarkar (1997) in their respective studies.

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 family size of the farmers had no significant relationship with their adoption of Aalok-6201 hybrid rice.

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

2.2.4 Farm size adoption of innovation

Basher (1993) conducted a study on the adoption of intercropping of sugarcane. He observed that there was no relationship between farm size of the respondent farmers and their adoption of sugarcane intercropping. Similar findings were also observed by Subhan (1975) and Hossain (1991).

Haque (1993) conducted a research study on adoption of improved practices in sugarcane cultivation by the sugarcane growers of Sreepur thana under Gazipur district. His study revealed that farm size had a negative significant relationship with the adoption of improved practices in sugarcane cultivation.

Chowdhury (1997) conducted a research on adoption of selected BINA technologies by the farmers. He indicated that farm size had positive significant relationship with the adoption of selected BINA technologies.

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

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

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

Rahman (1986), Okoro *et al.* (1992), Haque (1993), Khan (1993) and Sarkar (1997) observed similar findings.

2.2.5 Annual income and adoption of innovation

Hossain (1991) conducted a research study on the adoption behaviour of contract wheat growers. In the study, he found that there was no relationship between the income of contact growers and the adoption on improved farm practices in wheat cultivation. Beal and Sibley (1967) found the similar finding in their study.

Hoque (1993) in his study found a negative relationship between annual income of the growers and their adoption on improved practices in sugarcane cultivation.

Chowdhury (1997) found significant positive relationship between annual income and adoption of selected BINA technologies.

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

Rahman (1986), Okora *et al.* (1992) Islam (1993) Khan (1993) and Sarkar (1997) observed that similar result.

2.2.6 Extension contact and adoption of innovation

Ali *et al.* (1986) observed that there was no relationship between extension contact of the farmers and their adoption of improved sugarcane cultivation technologies. Basher (1993) found similar findings.

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

Sarker (1997) observed a positive and significant relationship between extension contact and adoption of improved potato cultivation practices.

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

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

Karim (1973), Kashem et al. (1990), Pathak et al. (1991), Kher (1992), Islam (1993), Hoque (1993) and Pal (1995) also found the similar results.

2.2.7 Cosmopolitanism and adoption of innovation

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

Rahman (2001) conducted a study on knowledge, attitude and adoption of the farmers regarding Aalok 6201 hybrid rice. He found that cosmopolitanism of the farmers had a significant and positive relationship with their adoption of Aalok 6201 hybrid rice.

Islam (2002) conducted a study on adoption of modern agricultural technologies by the farmers of Sandip. He found that cosmopolitaness of the farmers had significantly positive relationship with their adoption of modern agricultural technologies.

Pal (1995) conducted a research study 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), Hoque (1993) and Islam (1996).

Chowdhury (1997) conducted 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 cosmopolitaness and their adoption of selected BINA technologies practices. Similar findings were observed by Mannan (1972), Muhammad (1974), Sobhan (1975), Hossain (1991) and Islam (1996).

2.2.8 Credit availability and adoption of innovation

Haque (1984) conducted a study on the adoption of improved practices in sugarcane cultivation in some selected areas of Jessore district and found a significant positive relationship between credit availability and adoption of improved cane cultivation technologies. However, Basher (1993) conducted a study on the adoption of intercropping in sugarcane cultivation and found a significant positive relationship between credit availability and adoption of intercropping in sugarcane cultivation. This observation is very much in agreement with that of Beal and Sibly (1967).

Hossain (1991) conducted a study to determine the relationship of selected characteristics of jute cultivation in Suti union of Tangail district. He found a significant relationship between credit availability and adoption of improved farm practices. However, Reddy and Kivlin (1968) from a study of three Indian villages concluded that credit availability was not significantly related to adoption of HYV. Padder (1999) conducted a study on the adoption of Methersagar banana cultivation by the farmers of Gazaria union under Sahkipur thana of Tangail district. He found a significant positive relationship between credit availability and adoption of Mehersagar banana.

2.3 Conceptual Framework of the Study

The present study will attempt to focus two concepts; first the farmer's selected characteristics and the second, their adoption of improved practices in sugarcane cultivation. Adoption of improved practices in sugarcane cultivation of an individual may be influenced and affected through interacting forces in his surrounding.

Adoption of improved practices in sugarcane cultivation and individual farmer may also be influenced by these personal, economic, social and physiological characteristics. In this study, eight characteristics of farmer have been taken into consideration. Moreover, it is quite impossible to deal with all the characteristics. Selected characteristics are: age, education, family size, farm size, annual income, extension contact, cosmopolitaness, credit availability. These eight characteristics are the independent variables of this study, while adoption of improved practices in sugarcane cultivation being the main focus of the study constituted the only dependent variables. A sample conceptual framework in this connection has been given below:

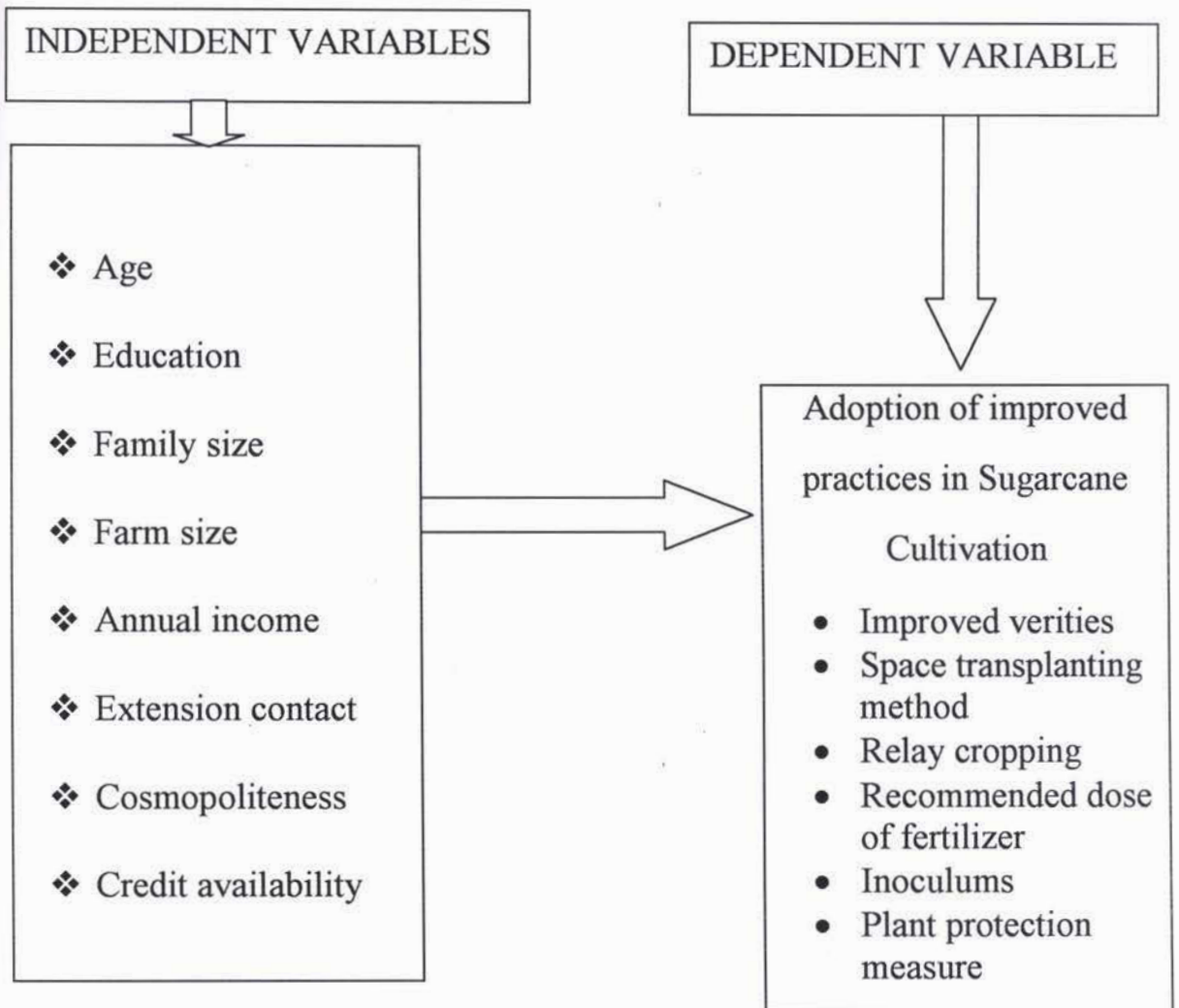
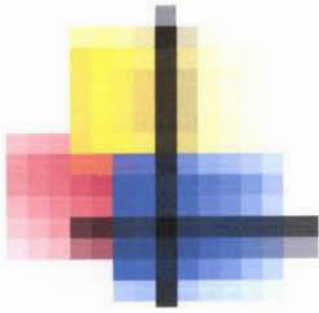


Figure 2.1 Conceptual framework of the study



CHAPTER III

METHODOLOGY

CHAPTER III

METHODOLOGY

This Chapter deals with the presentation of methods and procedures followed to operationlize the study, specifically measurement of variables. The discussion also contains the method of collecting information and statistical analysis of the data.

3.1 Locale of the Study

Considering the Sugarcane growing area, the study was conducted in four villages namely Mirkutia, Nolsanda, Sisua and Rouha in Pingna and Satpoa unions of Sarishabari upazila under Jamalpur district. In Sarishabari upazila there are eight (08) unions. Pingna and Satpoa are two of them. The Sarishabari upazila stands on an area of about 263 square kilometers. Pingna and Satpoa unions is well communicated from upazila headquarter. Sugarcane is an important crop of the farmers of these two unions. Sarishabari upazila is located in AEZ No.9. The map of Jamalpur district showing Sarishabari Upazila and a map of Sarishabari Upazila showing the study area have been shown in the Fig. 3.1 and 3.2

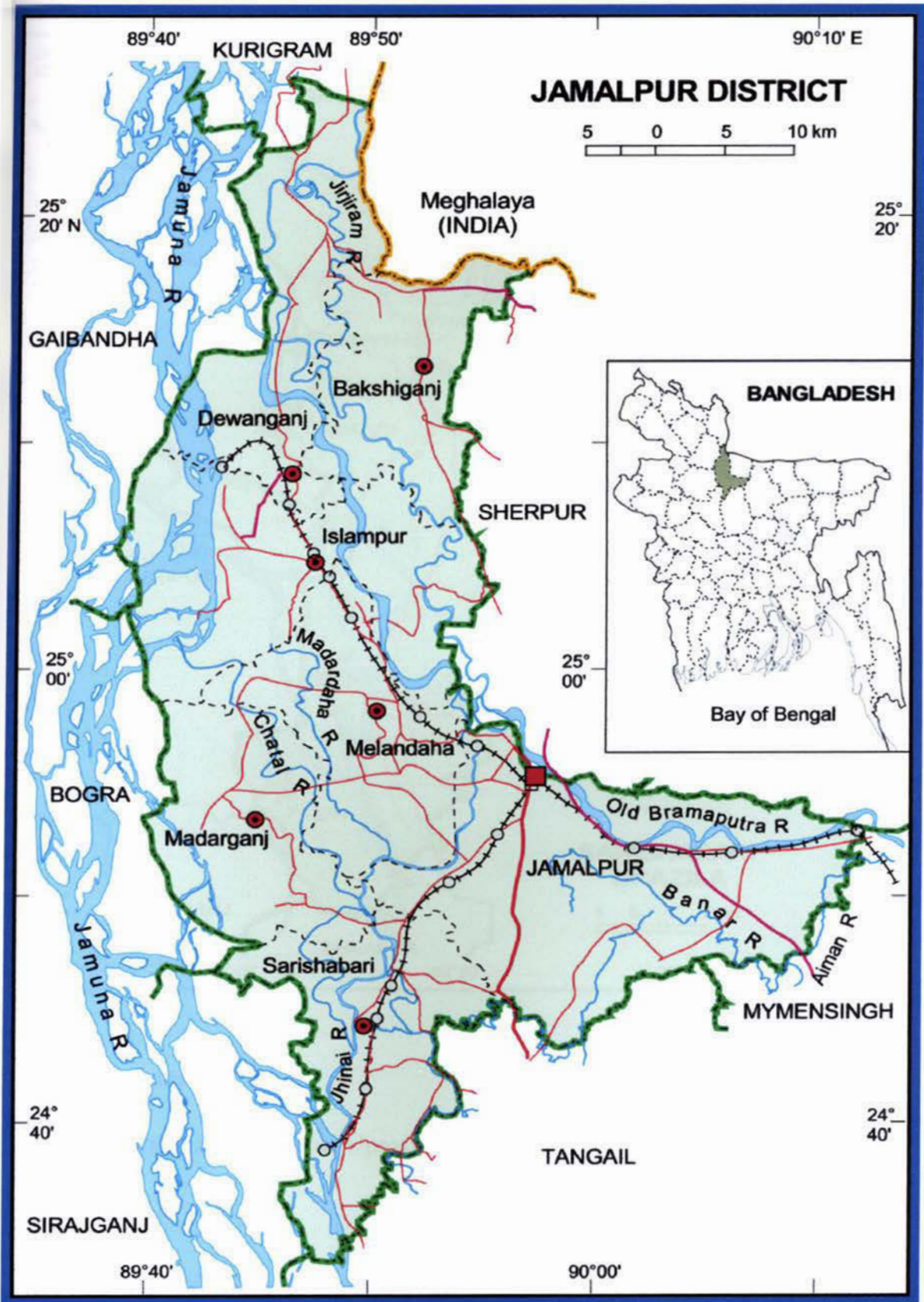
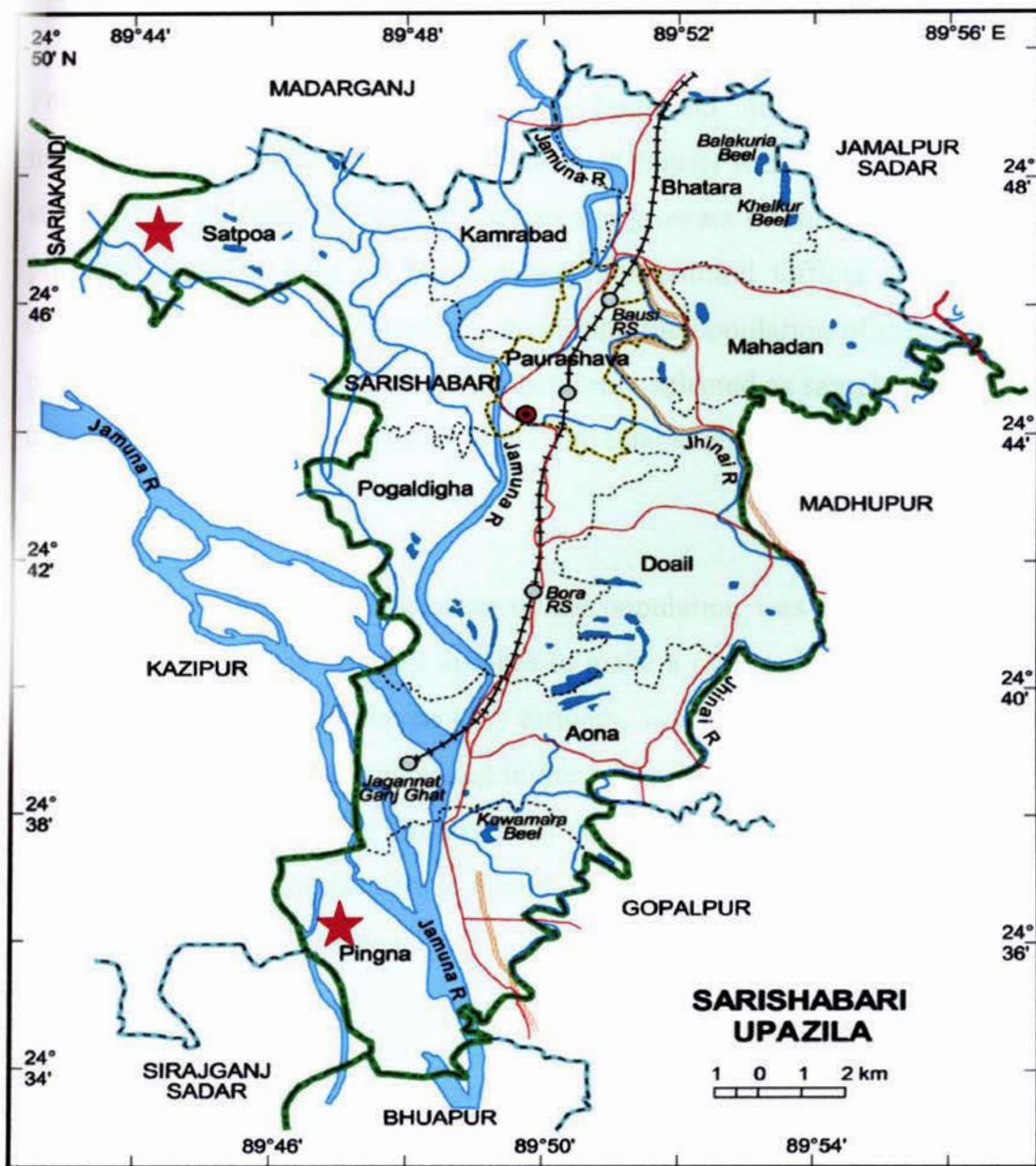


Fig. 3.1 A map of Jamalpur district showing Sarishabari Upazila



★ = Study area

Fig. 3.2 A map of Sarishabari Upazila showing the study area.

3.2 Population and Sampling Design

Four villages namely Mirkutia, Nolsanda, Sisua and Rouha in Pingna and Satpoa unions of Sarishabari upazila under Jamalpur district was selected randomly for the study. Then an update list of all Sugarcane growers of the selected villages was prepared with the help of Sub-Assistant Agricultural Officer (SAAO). The list comprised a total of 550 farmers' constituting the population of this study. Twenty percent (20%) of the population was randomly selected as sample of population by using Random sampling method. Thus, the total sample size of the study area was one hundred and ten (110) 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 eleven (11) 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 Table3.1.

Table 3.1 Distribution of Sugarcane growers constituting the population, sample and reserve list

Name of the Union	Name of the villages	Number of Sugarcane growers	Sample	Reserve list
Pingna	Mirkutia	145	29	3
	Nolsanda	125	25	2
Satpoa	Sisua	182	36	4
	Rouha	98	20	2
Total		550	110	11

3.3 Variables of the Study

In a descriptive social research, selection and measurement of the variables is an important task. In this connection, the researcher reviewed literature as far as possible to widen his understanding about the nature and scope of the variables relevant to his research. A variable is, any measurable characteristic which can assume varying or different values in successive individual Cases (Ezekiel and Fox 1959). The hypothesis of a research, when constructed properly contains at least two important elements, viz. an independent variable and a dependent variable. An independent variable is that factor which is manipulated by the experimenter in his attempt to ascertain its relationship to an observed phenomenon. A dependent variable is that factor which appears, disappears or varies as the experimenter introduces, removes or varies the independent variable (Townsend, 1953). The dependent variable is often called the 'criterion' or 'predicted variable' where as the independent variables are called treatment, experimental or antecedent variable (Deobold, 1973).

3.4 Independent Variables

The selected individual characteristics of the Sugarcane growers were the independent variables for this study, namely, age, education, family size, farm size, annual income, extension contact, cosmopolitaness, and credit availability.

3.4.1 Measurement of independent variables

The measurement of the independent variables is also an important task as well as their selection. In accordance with the objectives it was necessary to measure the eight selected independent variables.

3.4.1.1 Age

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

3.4.1.2 Education

Education was measured as the ability of an individual Sugarcane grower to read and write or formal education received up to a certain standard. Education of a respondent was measured on the basis of classes he has passed in formal educational institution. For example, if a respondent passes class 5, his education score was 5. If a respondent did not know how to read and write his education score was taken as zero '0'. A score of 0.5 was given to that respondent who could only sign his name. If a respondent passed the SSC examination, his educational score was given as 10.

3.4.1.3 Family size

Family size of a respondent was determined in terms of actual number of members in his family including himself, his wife, sons, daughters, brothers, sisters, parents and any other person who jointly lived and ate together at the time of interview. The scoring was done by the actual number as mentioned by the respondent. For example, if a respondent had five (5) members in his family then the family size score would be five (5). This variable appears item no. 3 in the interview schedule as presented in Appendix-A.

3.4.1.4 Farm size

Farm size of a respondent was determined as the total area of his farm (including Sugarcane and other crops) on which he continued his farming operations during the period of this study. It included the area of farm owned by him as well as those obtained from others as barga, lease or mortgage. The area was being estimated in terms of full benefits to the farmers and the unit of measurement in hectare. The farm size of a respondent was measured by using the following formula.

$$FS = F_1 + F_2 + F_3 + \frac{1}{2}(F_4 + F_5)$$

Where,

FS = Farm size

F₁ = Homestead (including pond)

F₂ = Own land under own cultivation

F₃ = Land taken from other on lease

F₄ = Land taken from other on barga

F₅ = Own land given to others on barga.

3.4.1.5 Annual income

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

3.4.1.6 Extension contact

Extension contact may be defined as one's extent of exposure to different extension methods. The extent of contact was determined against four (4) point rating scales as Not at all, Rarely, Occasionally and frequently and score was assigned as 0, 1, 2 and 3 respectively. For all the 12 selected extension contact, it has been described as follows:

Extent of contact	Assigned score
Not at all	0
Rarely	1
Occasionally	2
Frequently	3

The extension contact of a respondent was, therefore, determined by adding the total responses against 12 selected extension personnel. The extension contact score

could range from 0 to 36, where 0 indicating no extension contact and 36 indicating very high contact.

3.4.1.7 Cosmopolitaness

Cosmopolitaness is defined as the degree to which an individual's orientation is external to a particular social system. A cosmopolitaness score was computed for each respondent to determine the degree of his exposure on the basis of his number of visit to different types of places. Each respondent was asked to indicate the number of visit to six different types of places by checking any one of four responses, not at all, rarely, occasionally and frequently. Weights assigned to his responses were 0, 1, 2 and 3 respectively according to the extent of visits as presented below:

Place of visit	Weighting system
1. Visit to other village	0 = 0 time per month 1 = 1-4 times per month 2 = 4-5 times per month 3 = 6 times or more per month
2. Visit to other union	0 = 0 time per month 1 = 1 times per month 2 = 2-3 times per month 3 = 4 times or more per month
3. Visit to other Upazila sadar	0 = 0 time per month 1 = 1-2 times per month 2 = 3-5 times per month 3 = 6 times or more per month
4. Visit to own Upazila Sadar	0 = 0 time per month 1 = 1-2 times per month 2 = 3-5 times per month 3 = 5 times or more per month
5. Visit to own zila Sadar	0 = 0 time per month 1 = 1-2 times per month 2 = 3-4 times per month 3 = 5 times or more per month
6. Visit to capital city	0 = 0 time in life 1 = 1 times in life 2 = 2 times in life 3 = 3 times or more in life

Cosmopolitanism score of a respondent was obtained by summing the weights for his visit to the 6 types of places. The cosmopolitanism score could be ranged from 0 to 18, while 0 indicating no cosmopolitanism and 18 indicating highest level of cosmopolitanism.

3.4.1.8 Credit availability

Credit availability of a respondent refers to the degree to which his credit requirement was fulfilled by the amount of credit actually received (weather it was received from mills authority, bank, society, money lender, relatives and others) and it was expressed in taka. However, a score of one (1) was assigned for each thousand taka of credit.

3.5 Measurement of dependent variable

Adoption of improved practices in Sugarcane cultivation was the dependent variable of this study. The procedure followed in measuring the dependent variable is presented below:

Adoption of improved practices in Sugarcane cultivation

Adoption of improved practices in Sugarcane cultivation was measured by computing Adoption Quotient (AQ). It was calculated by asking the farmers i) area used for the practices ii) potential area for the practices iii) number of practices and iv) years of practices use. Adoption of improved practices in Sugarcane cultivation was measured by Adoption Quotient as the following formula suggested by Bhuiyan (2005):

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

Where,

u = Used area

p = Potential area

y = Years of practices use

n = Number of practices

Using above formula, adoption of improved practices in Sugarcane cultivation score of a respondent could range from 0-100, while 0 indicating no adoption and 100 indicating highest adoption

3.6 Statement of the Hypothesis

In order to guide relevant data collection, analysis and interpretation of data, a set of hypothesis would be formulated for empirical testing. As defined by Goode and Hatt (1952), "Hypothesis is a proposition which can be put to test to determine its validity. It may seem contrary to, in accord with common sense. It may prove to be correct or incorrect. In any event, however, it leads to an empirical test." In broad sense, hypothesis may be divided into two categories, namely, research hypothesis (H_1) and null hypothesis (H_2). In studying relationships between variables an investigator first formulates research hypothesis which states anticipated relationships between the variables. On the other hand, for statistical test, it becomes necessary to formulate null hypothesis. A null hypothesis states that there is no relationship between the concerned variables. The following null hypothesis would be formulated to explore the relationship of the selected characteristics of the growers with their adoption of improved practices in Sugarcane cultivation. "There is no relationship between the selected characteristics of the growers and their adoption of improved practices in Sugarcane cultivation."

3.7 Instrument for Collecting of Data

In order to collect relevant information an interview schedule was carefully designed keeping the objectives of the study in mind. The interview schedule was designed in Bangla to ensure easy communication between the researcher and the respondent. The interview schedule initially prepared was pre-tested by administering the same to ten Sugarcane growers of the study area. The pre-test was helpful to identify faulty questions and statements in the draft schedule. Necessary additions, corrections alterations and adjustments were made in the schedule on the basis of the pre-test experience. The schedule was multiplied in its final form for the collection of data. An English version of the interview schedule has been presented in the Appendix A. The Bangla version of the interview schedule was used during final data collection.

3.8 Collection of Data

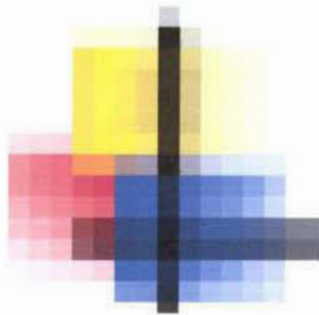
The researcher himself collected data from the Sugarcane growers by using the interview schedule. The interviews were conducted individually in the houses of the respondents during their leisure period. Only ten Sugarcane growers of the original list were not available during interview and hence ten Sugarcane growers were replaced from the reserve list. Prior information was given to the respondents before going to them for interviewing. The researcher took all possible care to establish rapport with them. While any respondent faced difficulty in understanding any question, the researcher took utmost care to explain the issue. He obtained excellent cooperation from the respondents and others concerned during the time of interview. The entire process of collecting data took 40 days from July 20 to August 30, 2006.

3.9 Data Processing

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

3.10 Statistical Analysis

After completion of data collection the responses were coded, tabulated and analyzed according to the objectives of the study. Local units of measurement were converted in to standard units. The responses to the questions in interview schedule were transferred to a master sheet to facilitate tabulation. The analysis was performed using statistical treatment with SPSS computer package programme (Statistical Package for Social Sciences).



CHAPTER IV

FINDINGS AND DISCUSSION

CHAPTER IV

FINDINGS AND DISCUSSION

In this Chapter, the findings of the study and the interpretations of their meaning are presented. These are conveniently presented in three sections in accordance with the objectives of the study. In the first section the selected characteristics of the sugarcane growers have been discussed. The second section deals with grower's adoption of improved practices. The third section deals with the relationships between sugarcane growers' selected characteristics and their adoption of improved practices of the growers have been discussed.

4.1 Selected Characteristics of the Sugarcane Growers

Behavior of an individual is determined to a large extent by his personal characteristics. The characteristics of an individual are an important factor in developing mental make up for making decisions about various issues of livelihood. More particularly decisions related to farming activities are being influenced largely by different characteristics of an individual. The characteristics of the growers were selected to find out their relationship with the adoption of improved practices. The selected characteristics included their age, education, family size, farm size, annual income, extension contact, cosmopolitaness and credit availability. These characteristics of the growers have been described in this section.

4.1.1 Age

Age of the growers was found to range from 22 to 66 years. The average age was 40.96 years with the standard deviation 9.22. On the basis of age, the farmers were classified into three categories as shown in Table 4.1.1

Data presented in Table 4.1.1 indicate that the highest proportion (59 percent) of the respondents was in medium aged category compared to 29 percent young age and 12 percent old aged category. However, data also revealed that 78.18 percent of the growers in the study area were young to middle aged. Sarker (1997), Hussen (2001), Islam (2002) and Hossain (2003) also found the similar findings in their studies.

Table 4.1.1 Distribution of the respondents according to their age

Category	Number of farmers	Percent	Observed range	Mean	Standard deviation
Young aged (up to 35)	32	29			
Middle aged (36-50)	63	59	22-66	40.96	9.22
Old aged (51 & above)	15	12			
Total	110	100			

The findings indicate that a large proportion of 78.18 percent of the growers were young to middle aged. The young growers are generally receptive to new ideas and things. They have a favourable attitude towards trying new ideas. The middle aged growers are the most productive group in the adoption of innovation. The extension agents can make use of these views and opinions in designing their extension activities among young and middle aged growers.

4.1.2 Education

Education scores of growers ranged from 0 to 12. The average score was 4.77 with the standard deviation 3.67. Based on their score, the growers were classified into four categories as shown in Table 4.1.2

Data presented in Table 4.1.2 indicate that a large proportion (42 percent) of the respondents fell under category of "primary education" compared to 28 percent "secondary education", 23.5percent "No education" and only 5.5 percent above "Secondary education",. Thus almost 75.5 percent of the respondents had at least some education.

Table 4.1.2 Distribution of the farmers according to the their level of education

Categories	Number of farmers	Percent	Observed range	Mean	Standard deviation
No education (0)	26	23.5	0-12	4.77	3.67
Primary education (1-5)	45	42			
Secondary education (6-10)	31	28			
Above secondary education (11 and above)	8	5.5			
Total	110	100			

The findings indicate that 75.5 percent of the respondents were educated that varied from primary to higher levels. The literacy rate of the country is 65.5 percent (Anonymous, 2003). Thus the findings indicate that in the study area, the literacy seems to be greater than the national average.

4.1.3 Family size

The family size of the growers ranged from 3 to 15. The average score was 4.45 with the standard deviation 1.82. On the basis of their family size, the growers were classified into three categories as shown in Table 4.1.3.

Data presented in Table 4.1.3 reveal that the highest proportion (61 percent) of the growers fell under the medium family category compared to 29 percent small family and 10 percent large family category respectively. These findings indicate that about three fourth (43 percent) of the respondents had either medium or large family size.

Table 4.1.3 Distribution of the farmers according to their family size

Category	Number of farmers	Percent	Observed range	Mean	Standard deviation
Small family (up to 4 members)	32	29			
Medium family (5-8 members)	65	61	3-15	4.45	1.82
Large family (9 and above)	13	10			
Total	110	100			

The data also indicate that the average family size (4.45 percent) of the respondents in the study area was lower than the national average of 4.9 (BBS, 2003). This may be due to the effect of proper adoption of family planning measures and knowledge about family planning among the respondents or the prevalence of joint family planning among area. Another reason was that the national average of 5.4 persons per family was concerned with rural and urban families, but the present study is concerned with the rural families only.

4.1.4 Farm size

The farm size of the growers in the study area ranged from 0.08 to 5.28 hectares (ha). The average farm size was 1.27 ha with the standard deviation 1.22. Based on their farm size, the growers were classified into three categories as shown in Table 4.1.4.

Data presented in the Table 4.1.4 show that the major portion of the respondents (57 percent) fell under small farm category while 33 percent medium farm and 10 percent were large farm.

Table 4.1.4 Distribution of the farmers according to their farm size

Categories	Number of farmers	Percent	Observed range	Mean	Standard deviation
Small farm (up to .60 ha)	60	57			
Medium farm (.61-2.20 ha)	37	33	0.08-5.28	1.27	1.22
Large farm (2.21ha and above)	13	10			
Total	110	100			

Data also revealed that majority (90.00 percent) of the growers of the study area small to medium farms. Thus, most of the growers were in possession of medium and small farms.

4.1.5 Annual income

Annual income of a respondent was determined on the basis of his total earnings from agriculture and non agriculture scores. Annual income of the growers ranged from Tk. 24.00 to 332.00 (Taka in thousand) with the mean of Tk. 101.05 thousand and standard deviation 60.510. On the basis of the annual income the growers were classified into three categories as shown in Table 4.1.5

Data presented in Table 4.1.5 indicated that the highest proportion (37 percent) of the respondents had low annual income compared to 35 percent having medium income and 28 percent having high income. Thus, the majority (68 percent) of the respondents had medium to high annual income, indicating that adoption of improved practices in sugarcane cultivation are usually done by the growers having comparatively higher economic standings.

4.1.5 Distribution of the respondents according to their annual income

Category	Number of farmers	Percent	Observed range	Mean	Standard Deviation
Low income (up to 40000)	41	37	24000-332000	101.05	60.510
Medium income (40001-160000)	38	35			
High income (above 160000)	31	28			
Total	110	100			

The average income of the growers of the study area is much higher than the average per capita income of the country i.e. 474 US dollar (BBS, 2005). This might be due to the fact that the growers in the study area were not only engaged in agriculture. They also earned from other sources, such as service, business etc. Generally higher income gives an individual better status in the society.

4.1.6 Extension contact

Extension contact scores of the respondents ranged from 5 to 25 with an average 12.93 and standard deviation 3.89. On the basis of extension contact scores, the respondents were classified into three categories as shown in the Table 4.1.6

Data presented in Table 4.1.6 indicated that highest proportion (64.5 percent) of the respondents of the study area had the medium extension contact, while 12.5 percent had low extension contact and 24 percent had high extension contact.

Table 4.1.6 Distribution of the respondents according to their extension contact

Categories	Number of farmers	Percent	Observed range	Mean	Standard deviation
Low contact (up to 9)	15	12.5	5-25	12.93	3.89
Medium contact (10-17)	68	64.5			
High contact (18 and above)	27	24			
Total	110	100			

The findings of the study indicate that most of the respondents (88.5 percent) had medium to high extension contact. Hussien (2001) and Islam (2003) observed the similar findings of their study.

4.1.7 Cosmopolitanism

The observed cosmopolitanism scores of the growers ranged from 3 to 17 with an average 11.59 and standard deviation 3.60. On the basis of cosmopolitanism scores, the respondents were classified into three categories as shown in Table 4.1.7

Data presented in Table 4.1.7 indicate that the highest proportion (41.5 percent) of the respondents had low cosmopolitanism compared to 33.5 percent having high cosmopolitanism and 25 percent had medium cosmopolitanism.

Table 4.1.7 Distribution of the respondents according to their cosmopolitanism

Categories	Number of farmers	Percent	Observed range	Mean	Standard deviation
Low cosmopolitanism (up to 8)	45	41.5			
Medium cosmopolitanism (9-14)	28	25	3-17	11.59	3.60
High cosmopolitanism (above 14)	37	33.5			
Total	110	100			

Data also revealed that (58.00 percent) of the growers were under medium and high cosmopolitanism. Chowdhury (1997) also observed the similar findings of their study.

4.1.8 Credit availability

Credit scores of the growers ranged from 1 to 45. The mean score was 33.83 and standard deviation of 4.89. On the basis of credit scores, the respondents were classified into three categories as shown in Table 4.1.8

Data presented in Table 4.1.8 indicated that the highest proportion (63.5 percent) of the growers had medium credit compared to 25.5 percent low credit and only 11 percent high credit.

Table 4.1.8 Distribution of the respondents according to their credit availability

Categories	Number of farmers	Percent	Observed range	Mean	Standard deviation
Low credit (up to 30)	29	25.5			
Medium credit (31-40)	67	63.5	1 - 45	33.83	4.89
High credit (above 40)	14	11			
Total	110	100			

Data also revealed that majority (74.5 percent) of the respondents in study area had high to medium credit.

4.2 Adoption of Improved Practices in Sugarcane Cultivation

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

1. Use of modern varieties
2. Spaced transplanting (STP)
3. Relay cropping
4. Recommended dose of fertilizer
5. Inoculums
6. Use of plant protection measures.

The adoption scores of the growers ranged from 10 to 70 with an average of 15.85 and the standard deviation 5.43. Based on the observed scores, the growers were classified into three categories as shown in Table 4.3.

Table 4.2 Distribution of the growers according to their adoption of improved practices in sugarcane cultivation

Categories of adoption	Sugarcane growers		Mean	Standard deviation
	Number	Percentage		
Low adoption (up to 33)	23	30	15.85	5.43
Medium adoption (34-66)	61	47		
High adoption (67 to above)	26	23		
Total	110	100		

Data presented in Table 4.2 reveal that the highest proportion (57 percent) of the growers fell under medium adoption category while 23 percent had high adoption and 20 percent had low adoption. Thus, the overwhelming majority (80 %) of the growers had medium to high adoption. For clear understanding a bar graph was shown in figure 4.1.

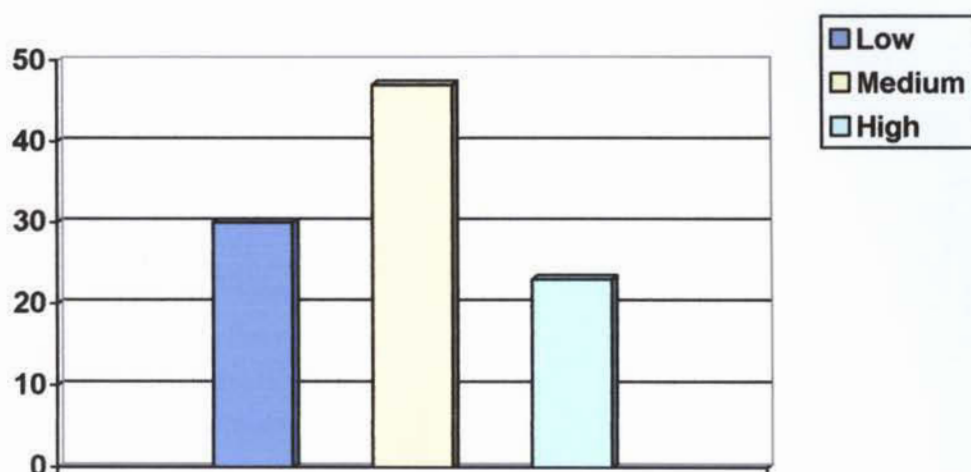


Figure 4.1 Farmers overall adoption of selected sugarcane practices

4.3 Relationships between the selected characteristics of the farmers and their adoption of selected sugarcane practices

This section deals with the relationships with eight selected characteristics of the farmers and their adoption of selected sugarcane practices. The selected characteristics constituted independent variables and the adoption of selected sugarcane practices 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 sugarcane practices.

Table 4.3 Co-efficient of correlation of the selected characteristics of the farmers and their adoption of selected Sugarcane practices

Dependent variable	Independent variables	Computed value of "r"	Table value of "r" at 108 degree of freedom	
			0.05%	0.01%
Adoption of improved practices in Sugarcane cultivation	Age	-0.039 ^{NS}	0.186	0.243
	Education	0.216 [*]		
	Family size	-0.018 ^{NS}		
	Farm size	0.327 ^{**}		
	Annual income	0.215 [*]		
	Extension contact	0.144 ^{NS}		
	Cosmopolitaness	0.220 [*]		
	Credit availability	0.438 ^{**}		

NS = Non significant

* = Significant at 0.05 level of probability

** = Significant at 0.01 level of probability

4.3.1 Age and adoption of improved practices in sugarcane cultivation

The relationship between age of the farmer and their adoption of improved practices in sugarcane cultivation was examined by testing the following null hypothesis.

“There was no relationship between age of the farmers and their adoption of selected Sugarcane cultivation practices.”

Co-efficient of correlation between the concerned variables was found to be $r = (-0.039)$ as shown in Table 4.7. This led to the following observation regarding the relationship between the variables under consideration:

- The relationship showed a negative trend.
- The computed value of $r = (-0.039)$ which was smaller than the table value ($r = 0.186$) with 108 degrees of freedom at 0.05 level probability.
- The co-efficient of correlation between the concerned variable was insignificant at 0.05 level of probability.
- The null hypothesis could not be rejected.

On the basis of above findings, the null hypothesis could not be rejected. Hence, the researcher concluded that age of the growers had no significant relationship with their adoption of improved practices in sugarcane cultivation. Similar findings were also observed by Chowdhury (1997), Rahman (2001), Islam (2002) and Hasan (2003).

4.3.2 Education and adoption of improved practices in sugarcane cultivation

The relationship between education of the growers and their adoption of improved practices in sugarcane cultivation was examined by testing the following null hypothesis.

“There was no relationship between education of the farmers and their adoption of selected Sugarcane cultivation practices.”

Co-efficient of correlation between the concerned variable was found to be $r = (0.016)$ as shown in Table 4.7. This led to the following observations regarding the relationship between the two variables under consideration:

- The relationship showed a positive trend.
- The computed value of $r = (0.216)$ which was greater than the table value ($r = 0.186$) with 108 degrees of freedom at 0.05 level probability.
- The co-efficient of correlation between the concerned variable was significant at 0.05 level of probability.
- The null hypothesis could be rejected.

On the basis of above findings, the null hypothesis could be rejected. Hence, the researcher concluded that education of the growers had significant and positive relationship with their adoption of improved practices in sugarcane cultivation. Similar findings were also observed by Chowdhury (1997), Rahman (2001), Islam (2002) and Hasan (2003).

4.3.3 Family size and adoption of improved practices in sugarcane cultivation

The relationship between family size of the growers and their adoption of improved practices in sugarcane cultivation was examined by testing the following null hypothesis.

“There was no relationship between family size of the farmers and their adoption of selected Sugarcane cultivation practices.”

Co-efficient of correlation between the concerned variables was found to be ‘r’ = (-0.018) as showed in Table 4.7. This led to the following observations regarding the relationship between the two variables under consideration.

- The relationship showed a negative trend.
- The computed value of ‘r’= (-0.018) which was smaller than the table value (r= 0.186) with 108 degrees of freedom at 0.05 level probability.
- The co-efficient of correlation between the concerned variable was insignificant at 0.05 level of probability.
- The null hypothesis could not be rejected.

On the basis of above findings, the null hypothesis could not be rejected. Hence, the researcher concluded that family size of the growers had insignificant relationship with their adoption of improved practices in sugarcane cultivation.

4.3.4 Farm size and adoption of improved practices in sugarcane cultivation

The relationship between farm size of the growers and their adoption of improved practices in sugarcane cultivation was examined by testing the following null hypothesis.

“There was no relationship between farm size of the farmers and their adoption of selected Sugarcane cultivation practices.”

Co-efficient of correlation between the concerned variables was found to be $r = (0.327)$ as shown in Table 4.7. This led to the following observation regarding the relationship between the two variables under consideration:

- The relationship showed a positive trend.
- The computed value of $r = (0.327)$ which was greater than the table value ($r = 0.243$) with 108 degrees of freedom at 0.01 level probability.
- The co-efficient of correlation between the concerned variable was significant at 0.01 level of probability.
- The null hypothesis could be rejected.

On the basis above findings, the null hypothesis could be rejected. Hence, the researcher concluded that farm size of the growers had highly significant relationship with their adoption of improved practices in sugarcane cultivation. Similar findings were also observed by Chowdhury (1997), Islam (2002) and Sardar (2002).

4.3.5 Annual income and adoption of improved practices in sugarcane cultivation

The relationship between annual income of the growers and their adoption of improved practices in sugarcane cultivation was examined by the following null hypothesis.

“There was no relationship between annual income of the farmers and their adoption of selected Sugarcane cultivation practices.”

Co-efficient of correlation between testing the concerned variables was found to be ‘r’ (0.215) as shown in Table 4.7. This led to the following observation regarding the relationship between the two variables under consideration:

- The relationship showed a positive trend.
- The computed value of ‘r’= 0.215 which was greater than the table value ($r=0.186$) with 108 degrees of freedom at 0.05 level probability.
- The co-efficient of correlation between the concerned variable was significant at 0.05 level of probability.
- The null hypothesis could be rejected.

On the basis of above findings, the null hypothesis was could be rejected. Hence, the researcher concluded that annual income of the growers had highly significant relationship with their adoption of improved practices in sugarcane cultivation. Similar findings were also observed by Sarker (1997), Hasan (2003) and Aurangozeb (2002).

4.3.6. Extension contact and adoption of improved of practices in sugarcane cultivation

The relationship between extension contact of the growers and their adoption of improved practice in sugarcane cultivation was examined by testing the following null hypothesis.

“There was no relationship between extension contact of the farmers and their adoption of selected Sugarcane cultivation practices.”

Co-efficient of correlation between the concerned variables was found to be ‘r’ = (0.144) as shown in Table 4.7. This led to the following observation regarding the relationship between the two variables under consideration:

- The relationship showed a positive trend.
- The computed value of ‘r’= (0.144) which was smaller than the table value (r= 0.186) with 108 degrees of freedom at 0.05 level probability.
- The co-efficient of correlation between the concerned variable was insignificant at 0.05 level of probability.
- The null hypothesis could not be rejected.

On the basis of above findings, the null hypothesis could not be rejected. Hence, the researcher concluded that extension contact of the growers had insignificant relationship with their adoption of improved practices. Similar findings were also observed by Chowdhury (1997) Podder (1999), Hussien (2001) and Aurangozeb (2002).

4.3.7 Cosmopolitanism and Adoption of Improved Practices in Sugarcane Cultivation

The relationship between cosmopolitanism of the growers and their adoption of improved practices in sugarcane cultivation was examined by testing the following null hypothesis.

“There was no relationship between cosmopolitanism of the farmers and their adoption of selected Sugarcane cultivation practices.”

Co-efficient of correlation between the concerned variable was found to be $r = 0.220$ as shown in Table 4.7. This led to the following observation regarding the relationship between the two variables under consideration:

- The relation showed a positive trend
- The computed value of $r = 0.220$ which was greater than the table value ($r = 0.186$) with 108 degrees of freedom at 0.05 level probability.
- The co-efficient of correlation between the concerned variable was significant at 0.05 level of probability.
- The null hypothesis could be rejected.

On the basis of above findings, the null hypothesis could be rejected. Hence, the researcher concluded that cosmopolitanism of the growers had significant relationship with their adoption of improved practice in sugarcane cultivation. Similar findings were also observed by Chowdhury (1997).

4.3.8 Credit availability and adoption of improved practices in sugarcane cultivation

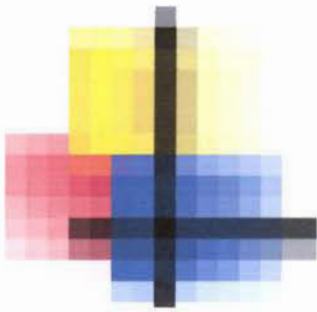
The relationship between credit availability of the growers and their adoption of improved practices was examined by testing the following null hypothesis.

“There was no relationship between credit availability of the farmers and their adoption of selected Sugarcane cultivation practices.”

Co-efficient of correlation between the concerned variable was found to be $r = (0.438)$ as shown in Table 4.7. This led to the following relationship between the two variables under consideration.

- The relationship showed a positive trend.
- The computed value of $r = (0.438)$ which was greater than the table value ($r = 0.243$) with 108 degrees of freedom at 0.01 level probability.
- The co-efficient of correlation between the concerned variable was significant at 0.01 level of probability.
- The null hypothesis could be rejected.

On the basis of above findings, the null hypothesis could be rejected. Hence, the researcher concluded that credit availability of the growers had significant relationship with their adoption of improved practices in sugarcane cultivation.



CHAPTER V

SUMMARY, CONCLUSION AND RECOMMENDATIONS

CHAPTER V

SUMMARY, CONCLUSION AND RECOMMENDATIONS

This Chapter presents the summary of findings, conclusion and recommendation of the study.

5.1 Summary of the Findings

The major findings of the study are summarized below:

5.1.1 Selected characteristics of the sugarcane growers

5.1.1.1 Age

Age of the growers was found to range from 22 to 66 years. The average age was 40.96 years with the standard deviation 9.22. The highest proportion (59 percent) of the respondents was in medium aged category compared to 29 percent young age and 12 percent old aged category.

5.1.1.2 Education

Education scores of growers ranged from 0 to 12. The average score was 4.77 with the standard deviation 3.67. A large proportion (42 percent) of the respondents fell under category of "primary education" compared to 28 percent "secondary education", 5.5 percent above "Secondary education", and 23.5 percent "No education". Thus almost 75.5 percent of the respondents had at least some education.

5.1.1.3 Family size

The family size of the growers ranged from 3 to 15. The average score was 4.45 with the standard deviation 1.82. The highest proportion (61 percent) of the growers fell under the medium family category compared to 29 percent small family and 10 percent large family category respectively.

5.1.1.4 Farm size

The farm size of the growers in the study area ranged from 0.08 to 5.28 hectares (ha). The average farm size was 1.27 ha with the standard deviation 1.22. Based on their farm size, 57 percent of the farmers had small farm, 33 percent had medium farm and 10 percent had small farm.

5.1.1.5 Annual income

Annual income of the growers ranged from Tk. 24.00 to 332.00 (Taka in thousand) with the mean of Tk. 101.05 thousand and standard deviation 60.51. The highest proportion (37 percent) of the respondents had low annual income compared to 35 percent having medium income and 28 percent having high income.

5.1.1.6 Extension contact

Extension contact ranged from 5 to 25 with an average 12.93 and standard deviation 3.89. The highest proportion (64.5 percent) of the respondents of the study area had the medium extension contact, while 12.5 percent had low extension contact and 24 percent had high extension contact.

5.1.1.7 Cosmopolitanness

The observed cosmopolitanness ranged from 3 to 17 with an average 11.59 and standard deviation 3.60. The highest proportion (41.5 percent) of the respondents had low cosmopolitanness compared to 33.5 percent having high cosmopolitanness and 25 percent had medium cosmopolitanness.

5.1.1.8 Credit availability

Credit ranged from 1 to 45. The mean score was 33.83 and standard deviation of 4.89. The highest proportion (63.5 percent) of the growers had medium credit compared to 11 percent high credit and 25.5 percent low credit.

5.1.2 Adoption of modern Practices in Sugarcane Cultivation by the Sugarcane growers

The adoption scores of the growers ranged from 10 to 70 with an average of 15.85 and the standard deviation 5.43. The highest proportion 47 percent of the growers fell under medium adoption category while 23 percent had high adoption and 30 percent had low adoption.

5.1.3 Relationship between Selected Characteristics of the Growers and their Adoption of Improved Practices in Sugarcane Cultivation

To explore the relationship of the eight selected characteristics of the farmers with their adoption of selected Sugarcane practices, eight 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, and extension contact of the farmers were found to have insignificant relationship with their adoption of selected Sugarcane practices. On the other hand level of education, farm size, annual income, cosmopolitaness and credit availability were found to have positively significant relationships with the adoption of selected Sugarcane cultivation practices.

5.2 Conclusion

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

1. Findings indicate that about 47 percent of the growers had medium adoption of improved practices in sugarcane cultivation, while 30 percent had low adoption and 23 percent had high adoption. Therefore, it may be concluded that the adoption behaviour of the growers in respect of cultivation of improved practices presents a promising picture, but low adoption is 30 percent therefore, there is a further scope for increasing the extent of adoption of improved practices in sugarcane cultivation.
2. Introduction of sugarcane in the farming system in a planned way has been a recent phenomenon. The negative significant relationship between age and adoption leads to a conclusion that relatively younger farmers are more innovative than older farmers. Most of the sugarcane growers were either middle or young aged, while age of the sugarcane growers had no significant relationship with their adoption. Therefore, it may be concluded that special attention need not be given to any particular age group.
3. Findings of the study showed a significant relationship of education with the adoption of improved practices in sugarcane cultivation. It may, therefore, be concluded that enhancement of formal and non-formal education among the growers may contribute positively towards the formation of favourable mental make up for the adoption of improved practices in sugarcane cultivation.
4. Findings of the study showed insignificant relationship of family size with the adoption of improved practices in sugarcane cultivation.
5. Farm size of the sugarcane growers showed positive and significant relationship with their adoption of improved practices in sugarcane cultivation. The growers having medium farm are generally economically solvent and they are able to

adopt improved practices in sugarcane cultivation. Considering the facts it may be concluded that growers with small and large farm size should be encouraged to produce sugarcane through supplying improved cultivar and credit supports.

6. Annual income of the sugarcane growers showed positive significant relationship with their adoption of improved practices in sugarcane cultivation in the study area about 53.6 percent of the sugarcane growers had medium to higher income. This means the more income of the growers; the higher be their adoption of improved practices in sugarcane cultivation.
7. Extension contact of the sugarcane growers had an insignificant and positive relationship with their adoption of improved practices in sugarcane cultivation. It is therefore, concluded that extension work is poor in the study area.
8. Credit availability of the sugarcane growers had a significant and positive relationship with their adoption of improved practices in sugarcane cultivation. This means that growers with high credit availability gain more scope for the adoption of improved practices in sugarcane cultivation.

5.3 Recommendations

Recommendations have been divided into two sub sections, viz. recommendations for policy implication and recommendation for further study.

5.3.1 Recommendations for policy implication

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

1. The level of adoption of improved practices in sugarcane cultivation was encouraging. However, there is a need of efforts for even wide adoption of improved practices in sugarcane cultivation by the growers.
2. In view of the absence of any relationship between ages of the growers and their adoption of improved practices in sugarcane cultivation, it is recommended that

the extension workers should work with the growers of all age groups to promote the adoption of improved practices in sugarcane cultivation.

3. Education of the sugarcane growers had significant and positive relationship with their adoption of improved practices in sugarcane cultivation. It indicates the importance of education of the sugarcane growers for rapid adoption of improved practices in sugarcane cultivation. The findings also indicate that 9.09 percent of the growers are all most illiterate. Under the above situation, it may be recommended that arrangements should be made for increasing the literacy level of the sugarcane growers by the concerned authorities through the establishment of night school or adult education centre.
4. The annual income of the growers had high significant and positive relationship with their adoption of improved practices in sugarcane cultivation. It leads to the recommendation that extension service should provide adequate farm management advice to the growers for increasing their farm income. It is a fact that if income were increased, growers receptive capacity to adoption of improved practices in sugarcane cultivation will be increased and thereby production will be increased.
5. Extension contact of the sugarcane growers showed insignificant influence on adoption of improved practices in sugarcane cultivation. Hence, the concerned authorities should take necessary steps to increase the frequency of extension contact of the farmers.

5.3.2 Recommendations for further study

A short term and sporadic study being conducted in some specific location can not provide all information for proper understanding about adoption of improved practices in sugarcane cultivation and other related matters. Further studies should be under taken covering more dimensions of improved practices in sugarcane cultivation.

1. The present study was conducted in Sarishabari upazila under Jamalpur district. It is recommended that similar studies should be conducted in other sugarcane growing areas of Bangladesh.
2. This study investigated the relationship of eight characteristics of the growers with their adoption of improved practices in sugarcane cultivation as dependent variable. Therefore, it is recommended that further study be conducted with other independent and dependent variables.
3. In the present study age and family size had no significant relationship with their adoption of improved practices in sugarcane cultivation. Moreover, cosmopolitaness had significant relationship with their adoption of improved practices in sugarcane cultivation. In this connection, further verification is necessary.
4. Research should also be undertaken to identify the factors causing hindrance towards the adoption of improved practices in sugarcane cultivation.

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APPENDICES

Appendix A

**Department of Agricultural Extension & information System
Sher-e-Bangla Agricultural University
Dhaka-1207**

An interview schedule on

“Adoption of improved sugarcane cultivation practices in jamalpur district”

Serial No.

Name of the respondent

Village

Union

Upazila

District

**Please answer the following questions
(Proper secrecy will be maintained)**

1. Age

How old are you?-----(years)

2. Educational Qualification

What is the extent of your education?

- a) Don't know reading and writing (-----)
- b) Don't know reading and writing but can sign only (-----)
- c) Passed -----class

3. Family Size

Please mention the number of your family members including yourself

- a) Male ----- members
- b) Female ----- members
- c) Total ----- members

4. Farm Size

Please furnish area of your land according to use

Sl No.	Type of land	Area	
		Local	Hectare
1.	Homestead (including pond)		
2.	Own land under own cultivation		
3.	Land taken from others on lease		
4.	Own land given to others on Lease		
5.	Own land taken given to others on borga		
6.	Others		
Total			

5. Annual Income

Please state the income of your family from different sources during the last one year.

a) Income from agricultural crops

Sl No.	Source of income	Total production (kg/unit)	Price per kg/unit (Tk.)	Total price (Tk.)
1.	Sugarcane			
2.	Rice			
3.	Coconut			
4.	Betel nut			
5.	Vegetables, Pulse crops			
6.	Others			
Sub total (a)				

b) Income from livestock and fisheries

Sl No.	Source of income	Total production (kg/unit)	Price per kg/unit (Tk.)	Total price (Tk.)
1.	Livestock			
2.	Poultry			
3.	Fisheries			
4.	Others			
Sub total (b)				

C. Income from non-agricultural sources

Sl No.	Source of income	Income	
		Monthly income (Tk.)	Annual income (Tk.)
1.	Service		
2.	Business		
3.	Daily labor		
4.	Others		
Sub total (c)			

Grand total = a + b + c = ----- Tk.

6. Extension Contact

Please state the extent your contact with the following agricultural extension media.

A) Personal media

Sl No.	Name of the information of sources	Extent of contact			
		Regularly	Occasionally	Rarely	Not at all
1.	Officer of DAE (UAO, AAO, AEO)	1-2 times/month	At least 1 time/2 month	1-5 times year	o times/year
2.	Officer of other extension agencies (ULO, UFO)	2-3 times/month	1-2 times/month	1-5 times year	o times/year
3.	Sub-Assistant Agriculture Officer (SAAO)	3-4 times/month	1-2 times/month	1-3 times/year	o times/year
4.	NGO workers	3-4 times/month	1-2 times/month	1-2 times/year	o times/year
5.	Retailers (fertilizer & insecticide dealers)	3 times or more/month	1-2 times/month	1-2 times/year	o times/year

B) Group media

Sl No.	Name of the information of sources	Extent of contact			
		Regularly	Occasionally	Rarely	Not at all
1.	Participation in group meeting/discussion	3 times/year or more	1-2 times/year	1-2 times/year	O times/year
2.	Participation in result demonstration	3 times/year or more	1-2 times/year	1 time/year	O times/year
3.	Field day	3 times/year or more	2 times/year	1 times/year	O times/year

C) Mass media

Sl No.	Name of the information of sources	Extent of contact			
		Regularly	Occasionally	Rarely	Not at all
1.	Listening to agricultural radio programmes	4-7 time/year	1-3 time/year	1-3 time/month	0 times/year
2.	Watching agricultural programmes of television	1-2 days/week	2-3 days/month	1-5 time/year	0 times/year
3.	Reading printed materials like leaflet, bulletin, magazines etc.	1 piece/month	3-5 pieces/year	1-2 pieces/year	0 times/year
4.	Watching agricultural posters, flip charts, advertisement (in newspaper)	1 piece/month	3-5 pieces/year	1-2 pieces/year	0 times/year

7. Cosmopolitaness

Please indicated the extent of your visits to the following places

Sl No.	Place of visit	Extent of visit			
		Frequently	Occasionally	Rarely	Not at all
1.	Other villages	6 times or more/month	4-5 times/month	1-4 times/month	0 times/year
2.	Other union	4 times or more/month	2-3 times/month	1 time/month	0 times/year
3.	Other upazila Sadar	6 times or more/month	3-5 times/year	1-2 times/year	0 times/year
4.	Own upazila Sadar	5 times or more/month	3-4 times/month	1-2 times/month	0 times/year
5.	Own zila Sadar	5 times or more/year	3-4 times/year	1-2 times/year	0 times/year
6.	Capital city	3 times or more/year	2 times in life	1 time in life	0 times/year

8. Credit availability

Did you require any credit for sugarcane cultivation during plantation season?

.....Yes/.....No

If you received credit, and then indicate the sources and amount of credit received.

Source	Required credit	Credit received	Fullfilment	Of credit	required	% of interest	Problems in receiving credit
			Full	Partial	Little		
1.Mills authority							
2.Bank							
3.Farmers committee							
4. Money lender							
5. Relatives							
6. Others							

9. Adoption of improved practices in Sugarcane cultivation

Sl. No	Name of technologies	2004		2005		2006	
		Potential area (p)	Used area (u)	Potential area (p)	Used area (u)	Potential area (p)	Used area (u)
1.	Modern variety Ishawardi -16 Ishawadi -18						
2.	Space transplanting method						
3.	Relay cropping						
4.	Recommended dose of fertilizer						
5.	Inoculums						
6.	Plant protection measure						

Thank you for your kind co-operation

Date: -----

(Signature of the interviewer)

Appendix B. Correlation matrix of farmers characters on the study area

	<i>Age</i>	<i>Education</i>	<i>Family size</i>	<i>Farm size</i>	<i>Annual income</i>	<i>Extension Contact</i>	<i>Cosmopoliteness</i>	<i>Credit</i>
Age	1.0000							
Education	0.0801	1.0000						
Family size	0.1032	0.0466	1.0000					
Farm size	-0.0239	-0.1094	-0.0543	1.0000				
Annual income	-0.0472	-0.0155	-0.0648	0.0024	1.0000			
Extension Contact	-0.0342	0.0179	0.1199*	0.0356	0.0281	1.0000		
Cosmopoliteness	0.0954	-0.0962	0.0239	0.1128	0.0702	-0.0359	1.0000	
Credit	-0.0383	0.0127	-0.0550	0.0863	0.1179	0.0907	0.1146	1.0000
Adoption	-0.0398	-0.2163	-0.0183	0.3273**	0.2150*	0.1444	0.2203*	0.4381**

** Means significant at 1% level

* Means significant at 5% level