

**ADOPTION OF SELECTED SUGARCANE CULTIVATION
TECHNOLOGIES BY THE FARMERS**

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**ADOPTION OF SELECTED SUGARCANE CULTIVATION
TECHNOLOGIES BY THE FARMERS**

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CERTIFICATE

This is to certify that the thesis entitled “**ADOPTION OF SELECTED SUGARCANE CULTIVATION TECHNOLOGIES BY THE FARMERS**” submitted to the Department of Agricultural Extension and Information System, Faculty of Agriculture, Sher-e-Bangla Agricultural University, Sher-e-Bangla Nagar, Dhaka in partial fulfillment of the requirements for the degree of Master of Science (M.S.) in Agricultural Extension, embodies the result of a piece of bona fide research work carried out by **MD. MONJUL AZOM, Registration No. 12-04941** under my supervision and guidance. No part of the thesis has been submitted for any other degree or diploma.

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

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DEDICATED
TO
MY BELOVED
PARENTS

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ABBREVIATIONS

Ag. Ext. Ed. - Agricultural Extension Education

Ag. Ext. and Info. Sys. - Agricultural Extension and Information System

BINA - Bangladesh Institute of Nuclear Agriculture

BBS - Bangladesh Bureau of Statistics

IPM - Integrated Pest Management

DAE - Department of Agricultural Extension

et al. - All Others

SPSS - Statistical Package for Social Sciences

FAO - Food and Agriculture Organization

AAEO - Additional Agriculture Extension Officer

UAO - Upazila Agriculture Officer

MOA - Ministry of Agriculture

MOF - Ministry of Food

SAAO - Sub-Assistant Agriculture Officer

HYV - High Yielding Variety

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ABSTRACT

The purpose of the study was to determine the extent of adoption of sugarcane cultivation technologies by the farmers to determine and describe the selected characteristics of the farmers and to explore the relationships of each of the selected characteristics of the farmers with their extent of adoption of sugarcane cultivation technologies. The study was undertaken purposively in Ishwardi upazila under Pabna district. Validated and well-structured interview schedule (questionnaire) was used to collect data from 81 farmers during 15 February, 2019 to 20 March, 2019. Descriptive statistics, Pearson Product Moment correlation were used for analysis. The majority (53.09 percent) of the respondents had into medium adoption while 17.28 percent had into low adoption category and 29.63 percent of the farmers had high adoption of sugarcane cultivation technologies. Sugarcane farm size, income from sugarcane cultivation, extension media contact, sugarcane cultivation experience and knowledge on sugarcane cultivation had significant positive relationships with the adoption of sugarcane cultivation technologies. Age, education, family size, cosmopolitaness and credit received had non-significant positive relationships with the adoption of sugarcane cultivation technologies. Therefore, it may be recommended that extension service providers by the relevant organizations like, BARI and DAE should arranged more learning events for the farmers, so that they could increase their knowledge to adopt sugarcane cultivation technologies.

Keywords: Sugarcane, Adoption, Sugarcane cultivation technologies.

CHAPTER I

INTRODUCTION

1.1 General Background of the Study

Sugarcane (In Bengali: *আঁশ*) is a tall tropical perennial plant of the genus *Saccharum*, a member of the grass family Gramineae. At present, sugarcane is cultivated in about 100 countries. In Bangladesh, it is generally cultivated in low rainfall belt of southwest and northwest part. Sugarcane is one of the major cash crops in Bangladesh and stands 2nd position among the cash crops. It is the major sugar or gur producing crop of the country. Total cane production area in our country is about 0.38 million acres of land and the annual production is about 5.5 million metric ton. It is estimated that 32.36 percent sugarcane is used for sugar production, 52.69 percent is used for molasses production and 14.39 percent is used for seed and juice production. Along with sugar and molasses (gur) production, sugar produces numerous valuable byproducts like, alcohol used in pharmaceutical industry, ethanol used as a fuel, bagasse used for paper and chip board manufacturing and press mud used as a rich source of organic matter and nutrients for crop production.

Sugarcane is grown in almost all the districts of Bangladesh. But, in commercial basis sugarcane is produced in Rajshahi, Natore, Kustia, Pabna, Panchagar, Chuadanga, Joupurhat and Thakurgoan districts. In Bangladesh there are 15 sugar mills. About 60% of the canes used in this mills and rest amount are supplied to the molasses producers. In our country sugarcane and sugar mills are significantly contributing to the development of the rural areas by producing the rural employment, improvement of the rural infrastructure and saving valuable foreign exchange. According to Siraj-Ud-Douhah et al., 2020 sugar requirement per capita/day is 29 g and Bangladesh requires 1-2 million tons of sugar/ year to meet the demand of domestic consumption. Because of sugarcane being an annual crop, sugarcane keeps the land occupied throughout the year. Bangladesh has a highly favorable climatic condition for sugarcane production. Sugarcane grows to the best advantage on a rich, moist soil under sunny skies in a tropic climate. Clay-loam soil with some proportion of sand and silt soil mixed with humus is among the best soil for sugarcane cultivation. Uniform high temperature, strong sunlight and frequent showers during the growing season are desirable. A soil pH 6-7.5 is suitable for plant growth. Irrigation is not necessary if the annual rainfall is 1250-1500 mm. High humidity during the growing period and dry weather at maturation is best for higher yield of the cane. Cane is harvested by cutting down the plant stalk. The harvesting season of cane in Bangladesh extends from October to March.

In our country, sugarcane production rate is lower than many other top cane production countries. Due to lack of knowledge and awareness about improved variety, modern technologies are very low in rural area. It has been observed that the

farm where production is low are cultivating in unscientific way, improper preparation of land, conventional planting methods, late planting, credit shortage, early and late harvesting, environmental resistance, pests, disease and weeds. Moreover, land fragmentation or small land size holding is one of the main barriers to use modern cultivation technologies like improved variety, sett treatment, trench method of sowing etc. Credit facility and subsidy remain in poor level and most of the case government subsidies don't reach to the farmers' level. Agricultural training or research centers are not available in rural area. The role of agricultural extension officer is not satisfactory because the offices do not visit the field area frequently. So, there is still a gap between the maximum level of production and actual level of production. Therefore, the yield per hector of land is not satisfactory than our national demand. The production rate of sugarcane will reach the satisfactory level if the selected technologies are applied in the sugarcane field.

In Bangladesh, sugarcane is not a prime crop and very few works were done in the area. So, there is a huge scope to conduct research in sugarcane production and find out the efficiency level of farmers. This study focuses on the interaction between modern technologies and efficient production level within a particular agro-economic zone of a single country context. The researcher felt that the study would be of much useful to the government, foreign 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 grower of the country. This will also be helpful to the donors, international development agencies, private enterprises and banks to formulate a pragmatic welfare basis dynamic sugarcane policy for the country.

1.2 Statement of the Problem

With a view to have an understanding on the extent of adoption of sugarcane cultivation techniques by the farmers, the researcher undertook a research study entitled "Adoption of selected sugarcane cultivation technologies by the farmers." The purpose of the study was to determine the extent of adoption of sugarcane production technologies by the farmers and also to ascertain the relationships of the selected characteristics of the sugarcane growers with their adoption of sugarcane production technologies. The present investigation is concerned with the adoption of sugarcane production technologies by the farmers which is a major concern in agricultural extension. This was done by seeking answer to the following questions:

1. What were the extents of adoption of sugarcane cultivation technologies by the farmers?
2. What were the characteristics of the farmers?
3. What were the relationships of each of the selected characteristics of the farmers with their adoption of sugarcane cultivation technologies by the farmers?

1.3 Specific Objectives

Considering the above-mentioned problems, the following specific objectives were selected in order to give proper direction to the study:

1. To determine the extent of adoption of sugarcane cultivation technologies by the farmers

2. To determine and describe the following selected characteristics of the sugarcane farmers:
 - a. Age
 - b. Education
 - c. Family size
 - d. Sugarcane farm size
 - e. Net annual income from sugarcane cultivation
 - f. Extension contact
 - g. Cosmopolitaness
 - h. Credit received
 - i. Sugarcane cultivation experience
 - j. Sugarcane cultivation knowledge

3. To explore the relationships between each of the selected individual characteristics of the farmers with their extent of adoption of sugarcane cultivation technologies

1.4 Scope and Limitation of the Study

The purpose of the study was to have an understanding of the extent of adoption of sugarcane cultivation technologies by the farmers. However, in order to make the study manageable and meaningful from the research point of view, it was necessary to impose certain limitations as follows:

- The study was confined to three village namely Pakhshi, Sahapur, and Silimpur under Ishwardi upazila. Characteristics of the sugarcane growers are many and varied but only ten were selected for investigation in this study.

- Population for the present study were kept confined within the heads of the sugarcane growing farm families because they were the major decision makers in the adoption of sugarcane production technologies.
- Facts and figures collected by the investigator applied to the situation prevailing during the year 2020.
- For information about the study, the researcher depended on the data as furnished by the selected farmers during their interview with him.

Although, the findings of the study will be specifically applicable to three village of Ishwardi upazila under Pabna district, the findings will also have implication for other areas of the country having similarities to 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 sugarcane production technologies by the farmers. The findings may also be helpful to the field workers of different nation building department/ organization including NGOs to improve their technique and strategy of action for effective working with the rural people, to generate rural employment and to improve rural economy and thus for alleviation of the poverty.

1.5 Justification of the Study

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

1.6 Assumptions

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

- The respondents included in the sample for this study were competent enough to furnish proper responses to the queries included in the interview schedule.
- The researcher who acted as interviewer was well adjusted to the social environment of the study area. Hence the data collected can be treated as reliable.
- The responses furnished by the respondents were reliable. They expressed the truth about convictions and opinions.
- Views and opinions furnished by the sugarcane growers included in the sample were representative views and opinions of the whole population of the study area.
- The findings of the study will have general application to other parts of the country with similar personal, socioeconomic and cultural conditions of the study area.

1.7 Statement of Hypothesis

A hypothesis is a proposition which can be put to a test to determine its validity. It may seem contrary to or in accord with common sense. It may prove to be correct or incorrect. In any event, however, it leads to an empirical test (Goode and Hatt 1952). In broad sense, hypothesis may be broadly divided into two categories, a) research hypothesis (H₁) and b) null hypothesis (H₀). When an investigator tries to find out relationship between variables, then first formulates research hypothesis which states anticipated relationships between the variables. On the other hand, when a researcher tries to perform statistical test, then 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 farmers with their adoption of sugarcane production technologies.

“There is no relationship between the selected characteristics of the farmers and their adoption of selected sugarcane cultivation technologies.”

1.8 Definition of the Terms

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

Adoption: Adoption is the implementation of a decision to continue the use of an innovation. However, adoption of sugarcane production technologies refers to one's use of the sugarcane production technologies practice in sugarcane and one's decision of use in future. It is an individual decision- making process.

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 of a sugarcane grower is defined as the ability of an individual to read and write or formal education received up to a certain standard. Education was measured in terms of actual year of successful schooling.

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

Sugarcane farm size: The term refers to the sugarcane cultivated area either owned by a farmer or obtained from others on "borga" system, the area being estimated in terms of full benefit to the farmers. The right of the farmers on land taken on lease from others is regarded as ownership in estimating the farm size. Sugarcane farm size was measured in terms of hectares.

Net Annual income sugarcane cultivation: Net annual income from sugarcane cultivation was measured by deducting the production cost from the annual gross income or total earning of a respondent from sugarcane cultivation. It was expressed in '000' tk

Extension contact: This term refers to one's becoming accessible to the influence of extension program through different extension teaching methods.

Cosmopolitaness: Cosmopolitaness is the degree to which an individual's orientation is external to his own social system.

Credit received: Credit received of a respondent refers to the amount of credit actually received by him from institutional or non-institutional sources.

Sugarcane cultivation experience: Experience is the practical knowledge, skill, or practice derived from direct observation of or participation in events or in a particular activity.

Sugarcane cultivation knowledge: It is the extent of basic knowledge of a sugarcane grower in different aspects of agricultural subject matters. It includes the basic understanding of cane cultivation.

CHAPTER II

REVIEW OF LITERATURE

The researcher made and elaborated search of available literature for this research. But no study could be found to be specially undertaken in this direction. Therefore, attempt has been made in the present chapter to review some interlinked literature on this aspect from home and abroad. The interlinked reviews conveniently presented on the major objectives of the study as far as possible. This chapter is divided into three major sections. The first section deals with review of literatures relevant to adoption. The second section deals with review of the studies concerning the relationship between farmers' characteristics and their adoption. The conceptual framework of the study is presented in the third section.

2.1 Review of literatures related to adoption

Subarna Biswas (2016) conducted an investigation on adoption of BARI Groundnut varieties by the farmers of Faridpur district. The study revealed that about twenty five (25 percent) of the farmers had low adoption compare to forty two (42 percent) having medium adoption and thirty three (33 percent) having high adoption of BARI Groundnut varieties.

Hussen (2001) conducted investigation on adoption of modern sugarcane cultivation practices by the farmers of Daweangonj Upazila in Jamalpur district. The study revealed that about ninety one percent (91 percent) of the farmers had medium adoption compared to 7 percent having low adoption and only 2 percent having high adoption of modern sugarcane cultivation practices.

Rahman (2001) conducted an investigation on knowledge attitude and adoption of Aalok-6201 hybrid rice by the farmers of sadar upazila in Mymenshingh district. The study revealed that the majority (75 percent) of the farmers had medium adoption while 18 percent and 7 percent had high and low adoption in sugarcane cultivation respectively. Islam (2002) conducted a study on adoption of modern agricultural technologies by the farmers of Sandwip. 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.

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

Rahman (1999) conducted an investigation on adoption of balanced fertilizer by the farmers of Ishargonj upazila in Mymensingh district. The study revealed that the majority (71 percent) of the respondents had medium adoption compared to 29 percent having below optimum level.

Chowdhury (1997) conducted an investigation on adoption of selected BINA technologies by the farmers of Boura union in Mymensingh district. The study revealed that the majority (53percent) of the respondents had no adoption of BINA technologies and 42 percent were adopted BINA technologies.

Sarker (1997) studied the extent of adoption of improved potato cultivation practices by the farmers in Comilla district. The study revealed that more than half (55 percent) of the respondents had medium adoption compared to 23 percent having low adoption and 22 percent high adoption of improved potato cultivation practices.

Akanda (1995) studied the adoption of recommended dose of fertilizer and found that 36.64 percent respondents used recommended dose of urea 6.93 percent used recommended dose of MP, 11.88 percent used T.S.P and only 2 respondents used gypsum in their potato cultivation.

Muttaleb (1995) studied the extent of the adoption of improved technologies of potato cultivation by the farmers in Haibatpur union under sadar thana of Jessore district. The study revealed that 8 percent of the potato growers had high adoption of improved technologies, 43 percent had medium and 49 percent had low adoption.

Hoque (1993) conducted an investigation on the adoption of improved practices of sugarcane cultivation in Sreepur upazila of Gazipur district. The study revealed that 31 percent of the sugarcane growers had high adoption while 37 percent had medium and 32 percent had low adoption of improved practices in sugarcane cultivation.

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

Hossain (1991) studied the extent of adoption behavior of contact wheat growers in sadar upazila of Jamalpur district. He found that more than half (52 percent) of the growers had medium adoption of improved farm practices compared to 34 percent having low adoption and only 14 percent high adoption.

Bembridge and Williams (1990) studied the personal, sociological, socio-psychological and communication characteristics that influence the adoption of maize practice in Farmer Support Programme in South Africa. The study revealed less than 50 percent of the farmers who adopted practices were implementing them according to recommendations and many did not have a clear concept that the practices were interrelated.

Kariuka (1990) studied the economic impact of the adoption of hybrid maize in Swaziland. The study revealed the sensitivity of hybrid maize adoption to different farming systems and the limited usefulness of a partial analysis in evaluating the impact of innovations. A macro level cost-benefit analysis was used in an ex-post appraisal of impact of maize research, complemented by an ex-ante projection of the Potential benefits and costs of its component maize breeding programme. Moderate increase in production cost would not affect the area of land devoted to maize, farm families are unlikely to produce beyond subsistence requirements without a considerable increase in output prices.

Rai Grover and Gangwar (1989) conducted a study on identifying factors responsible for acreage substitution and low yield of maize. This study showed a general downward trend in area and productivity of maize in Haryana, India. It argued that maize acreage in given year was influenced by size of irrigated area lag year maize acreage and lag year relative income.

2.2 Review of the Studies Concerning the Relationship between Farmers' Characteristics and their Adoption

2.2.1 Age and adoption

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

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

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

Rahman (2001) observed that there was no significant relationship between age and adoption of Aalok-6201 hybrid rice cultivation practices. Podder (1999) and

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

Hussen (2001) conducted a study, which concluded that age of the sugarcane growers had a significant negative relationship with their adoption of modern sugarcane cultivation practices. Rahman (1999) also found similar result in this study.

Chowdhury (1997) observed that the age of the farmers had no significant relationship with their adoption of selected BINA technologies.

Sarkar (1997) observed that there was no significant relationship between age of the farmers and their adoption of improved potato cultivation practices. Similar findings were observed by Singh (1989) and Kher (1992) in their respective studies.

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

2.2.2 Education and adoption

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

Sardar (2002) conducted a study on adoption of IPM practices by the farmers under

PETARRA project of RDRS. He found that education of the farmers had a positive significant relationship with their adoption of IPM practices.

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

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

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

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

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

2.2.3 Family size and adoption

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

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

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 BIN A

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 and adoption

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

Aurangozeb (2002) conducted a study on adoption of integrated homestead farming technologies by the rural women in RDRS. He found that there had no relationship between homestead area and their adoption of integrated homestead farming technologies. Rahman (2001) conducted an investigation on knowledge, attitude and adoption of Aalok-6201 hybrid rice by the farmers of sadar upazila in Mymensingh district. He observed that there was a significant positive relationship between farm size of the farmers and their adoption of Aalok-6201 hybrid rice.

Hussen (2001) conducted an investigation on adoption of modern sugarcane cultivation practices by the farmers' of Dewanganj 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.

Chowdhury (1997) conducted a research on adoption of selected BINA technologies by the farmers. He indicated that farm size of the farmers had a strongly positive significant relationship with their adoption of selected BINA technologies. Rahman (1986), Okoroetal. (1992), Khan (1993). Hoque (1993) and Sarkar (1997) observed similar results in their respective studies.

2.2.5 Income and adoption

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

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

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

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

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

Chowdhury (1997) found a significant and positive relationship between annual income and adoption of selected BINA technologies. Rahman (1986), Okoro et al. (1992), Islam (1993), Khan (1993), Sarker (1997) observed similar result in their respective studies.

Kunzra et al. (1989) studies on Adoption of green fodder production as related to some characteristics of livestock owners. They revealed that adoption of green fodder production was positively and significantly correlated with the annual income of livestock owners.

Talawar and Hirevenkaragouder (1989) studied on factors of adoption of poultry management practices. They revealed that the farmers having high income tend to own bigger size of poultry unit and possess more knowledge of improved practices leading to higher level of adoption.

2.2.6 Extension contact and adoption

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

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

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

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

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

Sarker (1997) observed a positive and significant relationship between extension contact and adoption of improved potato cultivation practices. Kashemetal. (1990). Kher (1992), Pal (1995), Islam (1993), Haque (1984) also found the similar results in their respective studies.

Nahar (1996) found that there was a significant positive relationship in agricultural knowledge on farm women in homestead farming and their level of contact with information sources.

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

2.2.7 Cosmopolitanism and adoption

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

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 cosmopolitanism of the farmers and their adoption of modern sugarcane cultivation practices.

Aurangozeb (2002) conducted a study on adoption of integrated homestead farming technologies by the rural women in RDRS. He found that cosmopolitanism of the respondents had a significant positive relationship with their adoption of integrated homestead farming technologies.

Hossain (1999) found a positive significant relationship between cosmopolitanism of the farmers and their adoption of fertilizer. Pal (1995), Haque (1993), Khan (1993), Islam (1986) and Halim (1985) observed similar results.

Chowdhury (1997) found that there was no significant relationship between the farmers' cosmopolitanism and their adoption of selected BINA technologies. Similar results were observed by Hossain (1991) and Islam (1986) in their respective studies.

2.2.8 Credit received and adoption

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, Bashar (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. Podder (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 Methersagar banana.

2.2.9 Experience and adoption

There was no available review of literature about experience and adoption.

2.2.10 Agricultural knowledge and adoption

Sarkar (1997) found that potato production knowledge of potato growers had a positive and significant relationship with their adoption of improved potato cultivation practices. Ali et al. (1986), Muttaleb (1995) and Rahman (1995) observed similar results in their respective studies.

2.3 The Conceptual Framework of the Study

In scientific research, selection and measurement of variables constitute an important task. This study expected that farmers' adoption of sugarcane cultivation technologies as the focus variable, which was influenced by selected characteristics of the farmers, viz. age, education, family size, sugarcane cultivation farm size, annual income from sugarcane cultivation, extension contact, cosmopolitanism, credit received, sugarcane cultivation experience and knowledge in sugarcane cultivation. The conceptual model of the study has been presented in Figure 2.1

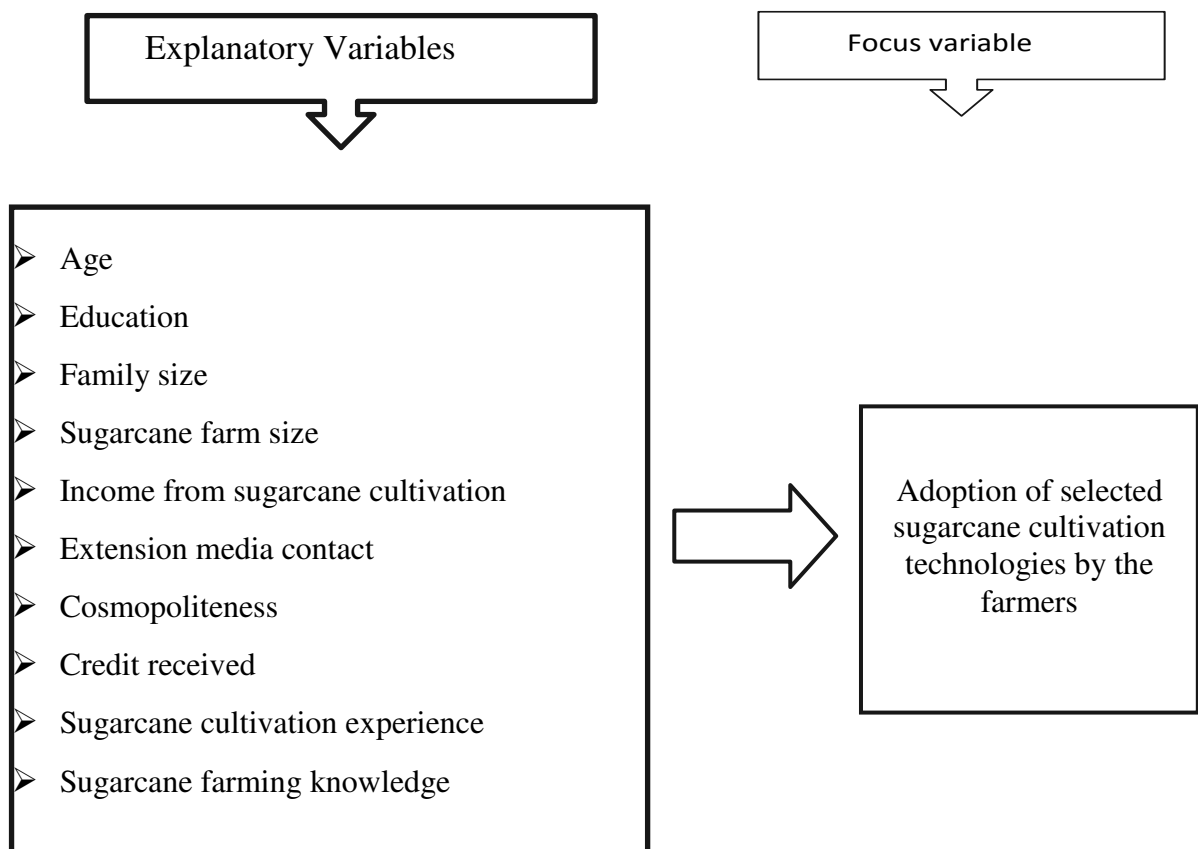


Figure 2.1: The Conceptual Framework of the Study

CHAPTER-III

METHODOLGY

Methodology deserves a very careful consideration in conducting scientific research. Importance of methodology in conducting any research cannot be undermined. Methodology enables the researcher to collect valid and reliable information and to analyze them properly to arrive at correct decisions. Keeping this point in view, the researcher took utmost care for using proper methods in all the aspects of this piece of research work. Methods and procedures followed in conducting this study has been described in this chapter.

3.1 The Locale of the Study

Three village namely, Pakshi, Sahapur and Silimpur of Ishwardi Upazilla under Pabna district was purposively selected for the study due to easy communication as well as easy contact with the Sugarcane growers. Ishwardi is the western most upazila of Pabna District in Rajshahi Division of Bangladesh. A map of Pabna district and the study area has been presented in Fig 3.1 and 3.2 respectively.

3.2 Populations and Sampling Design

All the sugarcane growers of the selected village were the population of the study. Separate lists of the farmers of the study villages were prepared by the researcher with the help of Sub-Assistant Agriculture Officer (SAAO) of Ishwardi Upazila Agriculture Office and Cane Development Assistant of the local sugar mill. The lists comprised of 513 famers which was considered as the population of the study. Among 513 farmers, 81 farmers were determined as the sample size of the study by using ‘Sample Size Calculator’ developed by Creative Research System (1984). Proportionate random sampling method was used to draw the sample size. If anyone included in the original sample were unavailable during data collection, the next farmers regarding that list were considered turn by turn for collecting data. Therefore, 9 farmers were included in the reserve list. Distribution of the farmers constituting the populations, sample and reserve list are shown inTable3.1

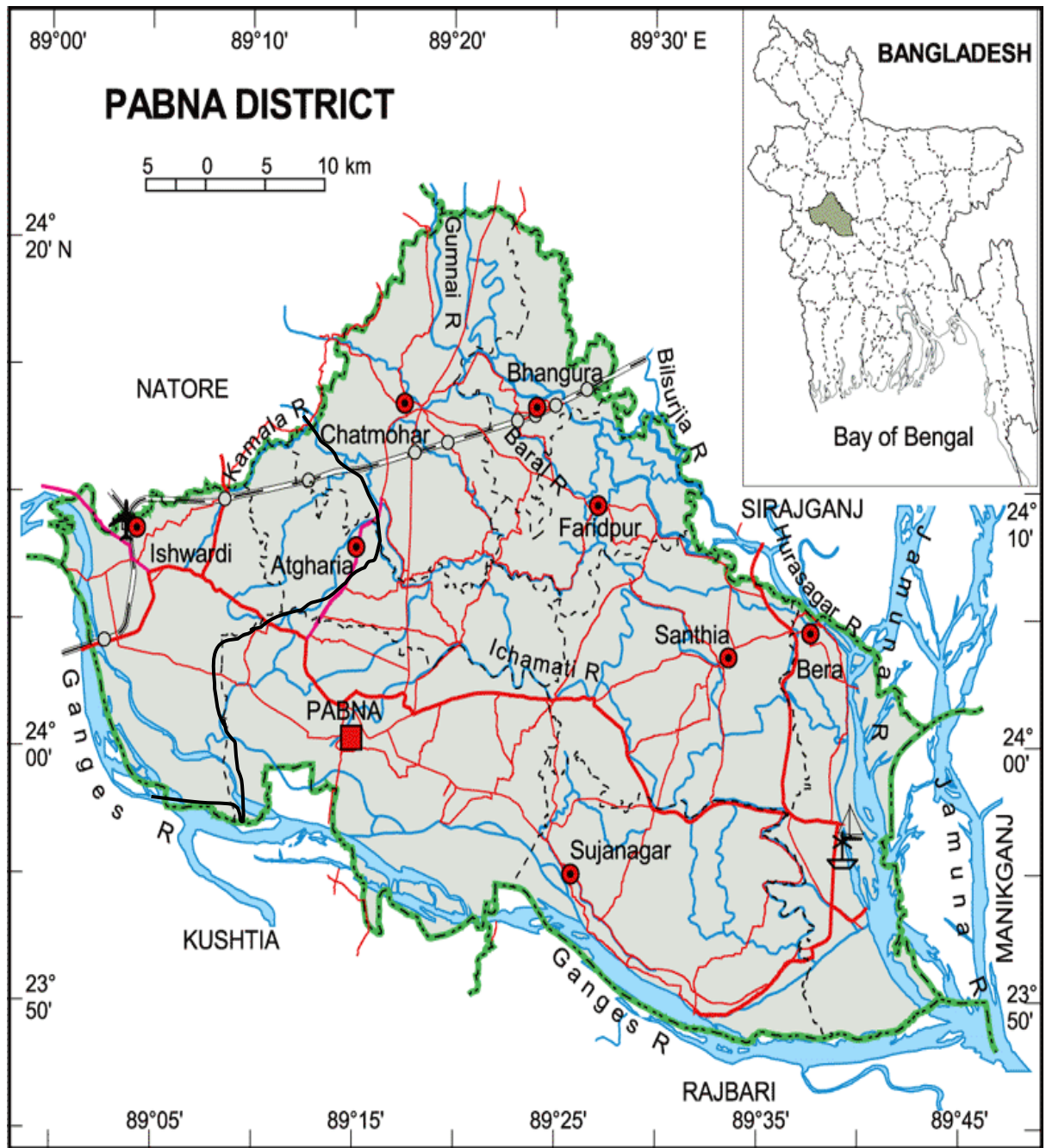


Figure 3.1: A map of Pabna district showing the Ishwardhi upazila

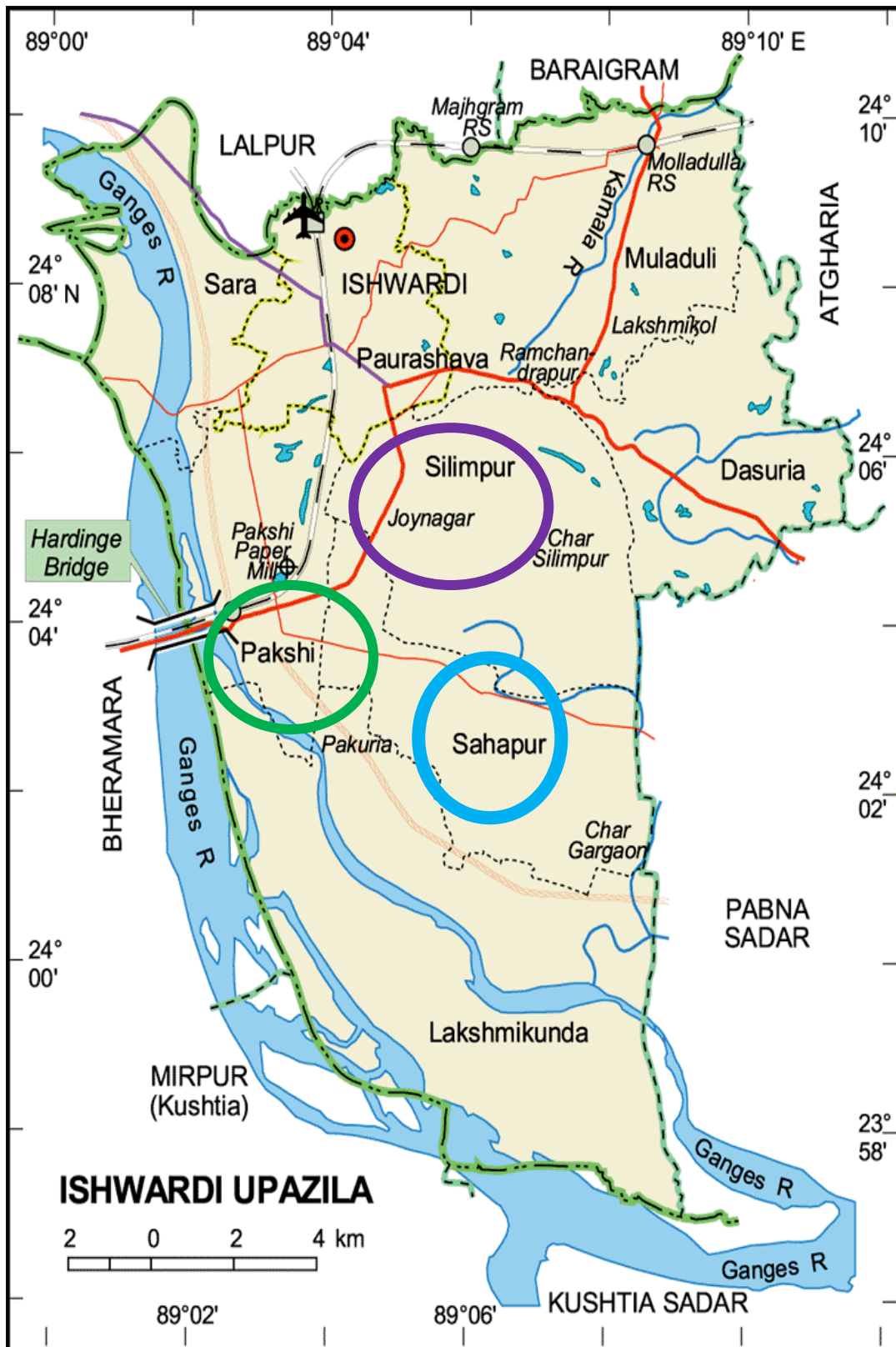


Figure 3.2: A map of Ishwardi upazila showing the study area

Table 3.1 Distribution of the farmers constituting the populations, sample and reserve list

Name of unions	Population size	Sample size	Reserve list
Pakhshi	165	26	3
Sahapur	170	27	3
Silimpur	178	28	3
Total	513	81	9

3.3 Research Instrument

In a descriptive research, selection and preparation of an instrument for collecting evidence constitute an important task and it requires a very careful consideration. A previously structured interview schedule was used as data gathering device in keeping the objectives in mind. Fixed-alternatives, open-ended questions and scales were used in constructing the schedule whenever necessary. The schedule contained both closed and open form of questions. An English version of the interview schedule may be seen in appendix-A.

Appropriate scales were developed to operationalize some selected characteristics of the farmers. The schedule was prepared in Bengali for clear understanding of the respondents. The schedule was pre-tested in actual field situations and necessary corrections, modifications and alternations before finally cyclostyled the schedule in its final form.

3.4 Variables of the Study

In a descriptive social research, the selection of variables constitutes an important task. In this connection, the investigator looked into the literature to widen his understanding about the nature and scope of the variables involved in the research studies. Ezekiel and Fox (1959) stated variable as any measurable characteristics which can assume varying or different values in successive individual cases.

Various factors may influence the farmers to adopt sugarcane cultivation techniques, but in a single study it is neither possible, nor desirable to deal with all the factors. Thus, it is required to select the variables with the consideration of the limitations in respect of time, money and other resources available to the researcher.

For selection of variables, the researcher went through the related literatures as far as possible. He had discussion with the relevant experts and researchers in agricultural extension and related fields. Therefore, considering the farmers' behavior (observed), condition and the limitations in respect of time, money and other resources available

to the researcher, ten characteristics of the farmers were selected which might have relationship with their adoption of sugarcane cultivation technologies. The selected variables included age, education, family size, sugarcane farm size, income from sugarcane cultivation, training on sugarcane cultivation, extension contact, cosmopolitaness, credit received, sugarcane cultivation experience and sugarcane cultivation knowledge. Adoption of sugarcane cultivation technologies was the main focus variable of the study.

3.5 Measurement of Variables

In order to conduct the study in accordance with the objectives, it was necessary to measure the selected variables. Ten characteristics of the farmers were considered for the study which might have relationship with the focus variable like adoption of sugarcane cultivation technologies. The procedure followed for measuring the variables are briefly discussed below:

3.5.1 Age

Age of a respondent referred to the period of time from his/her birth to the time of interview. It was measured in terms of actual years.

3.5.2 Education

Education was defined as the ability of an individual to read and write, or formal education received up to a certain standard. Actual year of successful schooling was taken as the education score of a respondent. If a respondent passed the S.S.C. examination, his education score was taken as 10; if passed the final examination of class V, his education score was taken as 5; and if a respondent had education outside school, his education score was determined according to the level of his education in relation to the educational standard in school. 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 those who could sign their name only.

3.5.3 Family size

Family size was measured in terms of actual number of members in his family (including himself) during the period of study. The scoring was made by the actual number mentioned by the respondents. For example, if a respondent had six members in his family then his family size score was 6.

3.5.4 Sugarcane farm size

Sugarcane farm size was the area on which a farmer continued his sugarcane farming operation during the period under study whether it was owned by him as well as those

(if any) obtained from others by borga, lease or other means. The area being estimated in terms of full benefit to the farmers. Farm size was measured in hectare. The farm size of a respondent was measured by using the following formula:

$$\text{Farm size} = A_1 + A_2 + 1/2 (A_3 + A_4)$$

Where,

A₁ = Owned land under own cultivation

A₂ = Land given to others as shared crop

A₃ = Land taken from others as shared crop

A₄ = Land taken from others as lease

3.5.5 Net annual income from sugarcane cultivation

Net annual income from sugarcane cultivation of respondent was determined by deducting the annual production cost of sugarcane from the annual gross income from sugarcane cultivation during a year and it was measured in 000 taka. A unit score of one was taken for every Tk. 1000.00 income.

3.5.6 Extension contact

Extension contact was defined as one's extent of contact with different extension media. It was assumed that the more contact an individual would have with different extension media, the more would be the influence of extension education on him. In this study an extension contact score was computed for each respondent on the basis of the nature of his contact with thirteen selected extension media. The scoring system of each of these 13 extension contact media were as follows:

Nature of contact	Weights assigned
Frequently	3
Occasionally	2
Rarely	1
Not at all	0

Logical frequencies of contacts was assigned to each of the four nature of contact. The weights obtained by a respondent for his contacts with all the 13 extension media were added together to get his extension contact score. Extension contact scores could range from 0 to 39, where '0' indicated no contact and '39' indicate highest contact with extension media.

3.5.7 Cosmopolitaness

Cosmopolitaness of a respondent was measured by computing a cosmopolitaness score based on his frequency of visit to selected six (6) different places outside his own social environment. Each respondent was asked to indicate the number of times he visited to each of the six different places. Scores were assigned to the response in the following ways:

Nature of cosmopolitaness	Weights assigned
Regularly	3
Occasionally	2
Rarely	1
Not at all	0

Logical frequencies of visits were assigned to each of the four nature of cosmopolitaness. The weights obtained by a respondent for his nature of communication with all the six selected places were added together to get his cosmopolitaness score. Cosmopolitaness scores could range from 0 to 18, where 0 indicated no cosmopolitaness and '18' indicate very high cosmopolitaness.

3.5.8 Credit received

Credit received by a respondent refers to the amount of credit actually received by him. During interview each respondent was asked to indicate the amount of credit received from various institutional and non-institutional sources. Credit received was initially measured in taka, however, a unit score of 1 (one) was taken for Tk. 1000.

3.5.9 Sugarcane cultivation experience

A score of one (1) was assigned for each year of sugarcane cultivation experience of a respondent either in his own farm or to that of his parents or others. This variable appears in item number 10 in the interview schedule as presented in Appendix-A.

3.5.10 Sugarcane cultivation knowledge

Sugarcane cultivation knowledge of the respondents was measured with the help of sugarcane cultivation knowledge scale consisting 17 questions related to various aspects of sugarcane cultivation. A score of 2 was given to correct answer to a question. Partial score was given to partially correct answer. A score of zero (0) was given to wrong or no answer to a question. Thus, a respondent could get a highest score of 34 for correct answer to all the 17 questions and a lowest score of zero (0) for wrong or no answer to all the 17 questions.

3.5.11 Adoption of sugarcane cultivation technologies

Adoption of sugarcane cultivation technologies was the main focus variable of this study. Adoption of sugarcane cultivation technologies was measured on the basis of the extent of adoption of nine selected cultivation technologies by the cane growers for 3 years (2016-17, 2017-18 and 2018-19).

Adoption of each sugarcane cultivation technologies (A) in this study was computed by using the following formula:

$$\text{Adoption of sugarcane cultivation technologies, (A)} = \sum e/p \times 100$$

Where,

e = Extent of sugarcane cultivation i.e. actual area for sugarcane cultivation in a particular year

P=Potential area (i.e. possible area) of sugarcane cultivation in a particular year

Adoption of each sugarcane cultivation technology was measured by the average of the adoption of three year and it was expressed in percentage. As there were nine selected technologies, the total adoption of sugarcane cultivation technologies could range from 0-900, where, '0' indicating no adoption and 900 indicating highest adoption of sugarcane cultivation technologies.

3.6 Data collection

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

Before going to the respondents' home for interviewing they were informed verbally to ensure their availability at home as per schedule date and time. In the case of failure to collect information from the respondents due to their other business, a revisit was made with prior to appointments. Data were collected during 15 February, 2020 to 20 March, 2020.

3.7 Compilation of data

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

3.8 Categorization of data

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

3.9 Null hypothesis

Following null hypothesis was formulated for testing the relationship of the concerned variables: "there is no relationship between each of the selected characteristics of the farmers with their adoption of sugarcane cultivation technologies"

3.10 Statistical analysis

Data collected from the respondents were analyzed and interpreted in accordance with the objectives of the study. The analysis of data was performed using statistical treatment with SPSS (Statistical Package for Social Sciences) computer program, version 20. Statistical measures as a number, range, mean, standard deviation was used in describing the variables whenever applicable. Pearson Product Moment correlation test was used to determine the relationship of each of the selected characteristics of the farmers with their adoption of sugarcane cultivation technologies. Throughout the study the 0.05 levels of probability was used as the basis of rejection or accepting any null hypothesis

CHAPTER IV

RESULT AND DISCUSSION

In this chapter the findings of the study and its interpretation are presented in three sections according to the objectives of the study. The first section deals with the selected characteristics for the sugarcane growers, while the second section deals with the adoption of sugarcane cultivation technologies by the farmers. The third section deals with the relationships between each of the selected characteristics of the farmers and their adoption of sugarcane cultivation technologies.

4.1 Selected Characteristics of the Sugarcane Growers

In this section the results of the sugarcane growers' selected characteristics have been discussed. Ten characteristics of the sugarcane farmers were selected for this research. The characteristics include: age, education, family size, sugarcane farm size, income from sugarcane cultivation, extension media contact, cosmopolitanness, credit received, sugarcane cultivation experience and knowledge on sugarcane cultivation. The salient feature of the 10 selected characteristics of the farmers has been presented in Table 4.1.

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

Categories	Measuring Unit	Range		Mean	S D
		Possible	Observed		
Age	Years	-	25-70	48.75	9.65
Education	Year of schooling	-	00.12	4.70	3.92
Family size	No. Person		4-10	5.00	2.41
Farm size	Hectare	-	0.13-2.40	0.70	0.45
Net income from sugarcane Cultivation	('000' tk)	-	35-320	124.45	73.47
Extension contact	Score	0-39	10-36	27.31	6.63
Cosmopolitanness	Score	0-18	5-16	11.26	2.81
Credit received	Score	-	0-60	15.90	14.93
Experience in sugarcane cultivation	Score	-	5-40	18.79	8.79
Knowledge on sugarcane production	Score	0-34	14-34	27.91	4.34

4.1.1 Age

The age score of the framers ranged from 25 to 70 with an average of 48.75 and a standard deviation of 9.65. According to age, the respondents were categorized based on the classification provided by the Ministry of Youth and Sports, Government of the People's Republic of Bangladesh. The distribution of the farmers according to their age is shown in Table 4.2.

Table 4.2 Distribution of the farmers according to their age

Categories	Farmers	
	Number	Percent
Young aged (up to 35)	12	14.82
Middle aged (36-50)	33	40.74
Old (>50)	36	44.44
Total	81	100

Table 4.2 indicates that the majority (44.44 percent) of the respondents was old while 14.82 percent and 40.74 percent were found young and middle-aged respectively. This finding also moderated that decision making relating to sugarcane cultivation in the study area would be considerably influenced by relatively old, because the old respondents can take risk to receive the modern technology. Basher (1993) and Hussen (2001) also found the similar results in their studies.

4.1.2 Education

The education scores of the sugarcane growers ranged from 0-12 with an average of 4.70 and standard deviation of 3.92. On the basis of their education scores, the farmers were classified into five categories, namely" illiterate (0), can sign only (0.5), primary (1-5), secondary (6-10) and above secondary (above 10).This distribution was supported by Hoque (2016) and Masud, (2007) and shown in theTable-4.3.

Table 4.3 Distribution of the farmers according to their education

Categories	Farmers	
	Number	Percent
Illiterate (0)	8	9.88
Can sign only (0.5)	21	25.93
Primary level (1-5)	24	29.63
Secondary level (6-10)	23	28.39
Above secondary level (>10)	5	6.17
Total	81	100

Data presented in Table 4.3 indicate that the majority (29.63 percent) of the respondents had primary level of education. One-fourth (25.93 percent) of the respondents could sign their name only while 9.88 percent, 28.39 percent and 6.17 percent belonged to illiterate, secondary level of education and above secondary level of education respectively. The findings indicate that 66 percent respondents had education that varied from primary to higher levels. The literacy rate of the country is 74.8 percent (BBS, 2020). Thus, the findings revealed that the literacy rate in the study area seems to be higher than the national average. Basher (1993) and Hussien (2001) also found similar results in their studies.

4.1.3 Family size

The family size scores of the farmers ranged from 4 to 15 with an average of 8 and standard deviation of 2.41. The respondents were classified into three categories based on their family size as "small family" (upto5), "medium family" (6-8) and large family (above8). The distribution of the farmers according to their family size is shown in Table 4.4

Table 4.4 Distribution of the farmers according to their family size

Categories	Farmers	
	Number	Percent
Small family (up to 5)	8	9.88
Medium family (6-8)	46	56.79
Large family (above 8)	27	33.33
Total	81	100

Data presented in Table 4.4 indicate that the highest proportion (56.79 percent) of the respondents had medium family while 33.33 percent and 9.88 percent of them had large and small family size respectively. The findings indicate that the majority (90.12 percent) of the farmers under the study area had medium to large family size. Hossain (1931) and Sarkar (1997) also found the similar findings in their studies.

4.1.4 Sugarcane farm size

Sugarcane farm size scores of the farmers ranged from 0.13 to 2.40 ha with an average of 0.70 and standard deviation of 0.45. The respondents were classified into three categories based on their farm size as: "marginal farm" (up to 0.2ha)," small farm"(0.21–1.0ha) and" medium farm"(1.01-3.0). The distribution of the farmers according to their farm size is shown in Table 4.5.

Table 4.5 Distribution of the farmers according to their sugarcane farm size

Categories	Farmers	
	Number	Percent
Marginal farm (up to 0.2 ha)	10	12.35
Small farm (0.21-1.0 ha)	57	70.37
Medium farm (1.01-3.0 ha)	14	17.28
Total	81	100

Data presented in Table 4.5 indicate that the highest proportion (70.37 percent) of the respondents had small farm while 17.28 percent and 12.35 percent of them had medium and marginal sugarcane farm size respectively. The findings indicate that the majority (87.65 percent) of the farmers under the study area had small to medium farm size. The land holding plays a major role in determining the income of the farmers. Hossain (1931) and Sarkar (1997) also found the similar findings in their studies.

4.1.5 Net annual income from sugarcane cultivation

Net annual income from sugarcane cultivation scores of the framers ranged from 35 to 320 with an average of 124.45 and standard deviation of 73.47. On the basis of net annual income from sugarcane scores, the respondents were classified into three categories as shown in Table 4.6.

Table 4.6 Distribution of the farmers according to their annual income

Categories	Farmers	
	Number	Percent
Low income (up to 95)	39	48.15
Medium income (96-180)	26	32.10
High income (above 180)	16	19.75
Total	81	100

Data presented in Table 4.6 indicate that the highest proportion (48.15 percent) of the respondents had low income while 19.75 percent of the respondents had high income and 32.10 percent had medium income from sugarcane cultivation. The findings further indicate that (80.25percent) of the respondents had medium to low income from sugarcane cultivation. The annual income influenced the farmers to adopt modern technologies. Basher (1993) and Haque (1984) also found the similar findings in their studies.

4.1.6 Extension Contact

The extension contact scores of the framers ranged from 10-34 against the possible range 0-39 with an average of 27.31 and standard deviation of 6.63. On the basis of their extension media contact, the respondents were classified into three categories namely, low contact, medium contact and high contact. The distribution of the farmers based on their extension media contact score is presented in Table 4.7.

Table 4.7 Distribution of the farmers according to their extension media contact

Categories (Scores)	Farmers	
	Number	Percent
Low (up to 13)	4	4.94
Medium (14-26)	27	33.33
High (above 26)	50	61.73
Total	81	100

Data presented in Table 4.7 indicate that the majority (61.73%) of the respondents had high extension contact while 33.33 percent had medium and 4.94 percent had low extension contact respectively. Findings indicate that the respondents under the study

area had generally extension contact with the different information sources. Extension contact helps the farmers for better understanding and to get recent information regarding improved technologies. Sarkar (1997) and Podder (1999) found the similar results. However, Bashar and Pal observed that the highest proportion of the growers had high extension contact in their respective studies.

4.1.7 Cosmopolitaness

The cosmopolitaness scores of the sugarcane growers ranged from 5-16 against the possible range 0-18 with an average of 11.26 and standard deviation of 2.81. On the basis of cosmopolitaness, the respondents were classified into three categories namely, 'low', 'medium' and 'high' cosmopolitaness. Distribution of the respondent farmers according to their cosmopolitaness is presented in table 4.8.

Table 4.8 Distribution of the farmers according to their cosmopolitaness

Categories	Farms	
	Number	Percent
Low (up to 6)	4	4.94
Medium (7-12)	53	65.43
High (>12)	24	29.63
Total	81	100.00

Data presented in Table 4.8 indicate that about two-third (65.43 percent) of the respondents had medium cosmopolitaness while 4.94 percent and 29.63 percent belonged to low and high cosmopolitaness categories respectively. The findings further indicate that 95.06 percent of the respondents had medium to high cosmopolitaness. Chowdhury (1997) also found the similar results in his study.

4.1.8 Credit received

The credit received score of the respondents ranged from 0 to 60. The mean score was 15.90 with the standard deviation of 14.93. On the basis of credit received, the respondents were classified into three categories namely, no credit received, low credit received and medium credit received, as shown in Table 4.9.

Table 4.9 Distribution of the farmers according to their credit received

Categories (Scores)	Farmers	
	Number	Percent
No (0)	19	23.46
Low (up to 20)	47	58.02
Medium (above 20)	15	18.52
Total	81	100

Data contained in the Table 4.7 revealed that the majority (58.02%) of the farmers had low credit received as compared to 23.46% and 18.52% having no and medium credit received respectively. The majority (76.45%) of the respondents had low to medium credit received sugarcane cultivars.

4.1.9 Sugarcane farming experience

Sugarcane farming experience score of the respondents ranged from 5 to 40. The mean score was 18.79 with the standard deviation of 8.79. On the basis of sugarcane farming experience, the respondents were classified into three categories namely, low experience, medium experience and high experience, as shown in Table 4.10.

Table 4.10 Distribution of the farmers according to their experience

Categories (Scores)	Farmers	
	Number	Percent
Low (up to 10)	21	25.92
Medium (11-20)	32	39.51
High (above 20)	28	34.57
Total	81	100.00

Data contained in the Table 4.10 revealed that the majority (39.51%) of the farmers had medium experience as compared to 25.92% and 34.57% having low and high experience in sugarcane cultivation respectively. The majority (74.08%) of the respondents had medium to high experience in sugarcane cultivation. From the findings it can be said that farmers were engaged with sugarcane cultivation since long.

4.1.10 Knowledge on sugarcane cultivation

Sugarcane cultivation knowledge scores of the farmers ranged from 14-34 against the possible range of 0-34 with an average of 27.91 and standard deviation of 4.34. On the

basis of their sugarcane cultivation knowledge, the farmers were classified into the following three categories: "low knowledge" (upto21), "medium knowledge"(22-28) and "high knowledge"(above 28). Table 4.11 contains the distribution of the farmers according to their sugarcane cultivation knowledge.

Table 4.11 Distribution of farmers according to their knowledge on sugarcane cultivation

Categories	Farmers	
	Number	Percent
Low (up to 21)	8	9.88
Medium (22-28)	30	37.04
High (>28)	43	53.08
Total	81	100.00

Data presented in Table 4.11 indicate that the majority (53.08 percent) of the respondents had high knowledge while 9.88 percent and 37.04 percent had low and medium knowledge on sugarcane cultivation.

4.2 Adoption of sugarcane cultivation technologies

The adoption of sugarcane cultivation technologies score ranged from 64.23 to 890.01. The average adoption score was 669.43 and standard deviation was 124.83. Based on their adoption of sugarcane cultivation technologies score, the farmers were classified into three categories as shown in Table 4.12.

Table 4.12 Distribution of the farmers according to their adoption of sugarcane cultivation technologies

Categories	Farmers		Mean	SD
	Number	Percent		
Low adoption < (Mean-sd) i.e., < 544.6	6	17.28	669.43	124.83
Medium (Mean ± sd) i.e., 544.6-794.26	43	53.09		
High (Mean ± sd) i.e., >794.26	24	29.63		
Total	81	100		

Data presented in Table 4.12 indicate that the majority (53.09 percent) of the respondents had medium adoption while 17.28 percent had low adoption and 29.63 percent of the farmers had high adoption of sugarcane cultivation technologies. The majority (82.72%) of the respondents had medium to high adoption of sugarcane cultivation technologies. In Bangladesh, majority of the farmers are illiterate and always practices farming with a number of socio-economic problems including limited resources. Nevertheless, the average adoption score 669.43 indicates that farmers were trying to adopt sugarcane cultivation technologies. DAE, sugar mill authority and other extension organizations, especially the NGOs are trying to popularize sugarcane cultivation technologies among the farmers of the study area, should provide more technological supports to the farmers. In such cases, it is expected that farmers would able to adopt sugarcane cultivation with better performance.

4.3 Relationship between selected characteristics of the respondents and their adoption of sugarcane cultivation technologies

To explore the relationships between the selected characteristics of farmers with their adoption of sugarcane cultivation technologies, Pearson Product Moment correlation was run. From this correlation test, it was found that sugarcane farm size, net income from sugarcane cultivation, extension media contact, sugarcane farming experience and knowledge on sugarcane cultivation of the farmers had significant relationship with their adoption of sugarcane cultivation technologies. Beside these five characteristics, rest five characteristics of the farmers (age, education, family size, cosmopolitaness and credit received) had no significant relationship with their adoption. Interco relation among all the variables may be seen in Appendix-B.

The summary of the results of the Co-efficient of Correlation indicating the relationship between each of the selected characteristics of the farmers and their adoption of sugarcane cultivation technologies are shown in Table 4.13.

Table 4.13 Co-efficient of correlation showing relationship between selected characteristics of the sugarcane cultivars and their adoption of selected sugarcane cultivation technologies

Focus variable	Explanatory Variables	Computed value “r”	Tabulated value of “r”	
			at 0.05 level	at 0.01 level
Adoption of selected sugarcane cultivation practices technologies	Age	0.049 ^{NS}	0.194	0.254
	Education	0.127 NS		
	Family size	0.080 ^{NS}		
	Sugarcane farm size	0.338 ^{**}		
	Net income from sugarcane cultivation	0.408 ^{**}		
	Extension media contact	0.651 ^{**}		
	Cosmopolitaness	0.058 NS		
	Credit received	0.011 NS		
	Sugarcane cultivation experience	0.296 ^{**}		
	Sugarcane farming knowledge	0.728 ^{**}		

^{NS} Not significant

Significant at 0.05 level of probability

^{**}Significant at 0.01 level of probability

4.3.1 Age and adoption of selected sugarcane cultivation technologies

value ($r=0.194$) with 79 degrees of freedom at 0.05 level of probability as The computed value of ‘r’ (0.049) was smaller than that of the tabulated shown in Table 4.13 Hence, the concerned null hypothesis was accepted and it was concluded that age of the farmers had no significant relationship with their adoption of selected sugarcane cultivation practices technologies.

4.3.2 Education and adoption of selected sugarcane cultivation technologies

The computed value of ‘r’ (0.127) was smaller than that of the tabulated value ($r=0.194$) with 79 degrees of freedom at 0.05 level of probability as shown in Table 4.13. Hence, the concerned null hypothesis was accepted and it was concluded that education of the

farmers had no significant relationship with their adoption of selected sugarcane cultivation technologies.

4.3.3 Family size and adoption of selected sugarcane cultivation technologies

The computed value of 'r' (0.080) was smaller than that of the tabulated value ($r=0.194$) with 79 degrees of freedom at 0.05 level of probability as shown in Table 4.13. Hence, the concerned null hypothesis was accepted and it was concluded that family size of the farmers had no significant relationship with their adoption of selected sugarcane cultivation technologies.

4.3.4 Relationship between adoption of sugarcane cultivation technologies and sugarcane farm size

Relationship between adoption of sugarcane cultivation technologies and sugarcane farm size was determined by Pearson's product moment correlation coefficient.

The coefficient of correlation between adoption of sugarcane cultivation technologies and sugarcane farm was presented in Table 4.13. The coefficient of correlation between the concerned variables was found to be 0.388. The following observations were made on the basis of the value of correlation coefficient between the two concerned variables of the study under consideration.

- The relationship showed a positive trend between the concerned variables.
- The observed value of "r" (0.338) between the concerned variables was found to be greater than the tabulated value ($r = 0.254$) with 79 degrees of freedom at 0.01 level of probability.
- The null hypothesis was rejected.
- The relationship between the concerned variables was statistically significant at 0.01 level of probability.

Based on the above findings, it was concluded that sugarcane farm size of the farmers had significant positive relationship with the adoption of sugarcane cultivation technologies. It means that higher is the sugarcane farm size, higher is the adoption. Farmers having more sugarcane farm size could understand the benefits of sugarcane production in respects of its food value; protein, vitamin and minerals. So, reasonably sugarcane farm size had significant relationship with adoption of sugarcane cultivation technologies.

4.3.5 Relationship between adoption of sugarcane cultivation technologies and net annual income from sugarcane farming

Relationship between net annual income from sugarcane farming and adoption of sugarcane cultivation technologies was determined by Pearson's product moment correlation coefficient.

The coefficient of correlation between net annual income from sugarcane farming and adoption of sugarcane cultivation technologies was presented in Table 4.13. The coefficient of correlation between the concerned variables was found to be 0.408. The following observations were made on the basis of the value of correlation coefficient between the two concerned variables of the study under consideration.

- The relationship showed a positive trend between the concerned variables.
- The observed value of "r" (0.408) between the concerned variables was found to be greater than the tabulated value ($r = 0.254$) with 79 degrees of freedom at 0.01 level of probability.
- The null hypothesis was rejected.
- The relationship between the concerned variables was statistically significant at 0.01 level of probability.

Based on the above findings, it was concluded that net annual income from sugarcane farming of the famers had significant relationships with the adoption of sugarcane cultivation technologies.

4.3.6 Relationship between adoption of sugarcane cultivation technologies and their extension media contact

Relationship between adoption of sugarcane cultivation technologies and extension media contact was determined by Pearson's product moment correlation coefficient.

The coefficient of correlation between adoption of sugarcane cultivation technologies and extension media contact was presented in Table 4.13. The coefficient of correlation between the concerned variables was found to be 0.651. The following observations were made on the basis of the value of correlation coefficient between the two concerned variables of the study under consideration.

- The relationship showed a positive trend between the concerned variables.
- The observed value of “r” (0.651) between the concerned variables was found to be greater than the tabulated value ($r = 0.254$) with 79 degrees of freedom at 0.01 level of probability.
- The null hypothesis was rejected.
- The relationship between the concerned variables was statistically significant at 0.01 level of probability.

Based on the above findings, it can be summarized that a farmers had more extension media contact increased the capabilities to reduce problems of sugarcane production of the farmers in Pabna district. Extension media contact makes individuals to become rational and conscious about related field. It enhances the abilities of the farmers at short time than other to reduce constraints. So, extension media contact has significant positive relationship with adoption of sugarcane cultivation technologies.

4.3.7 Cosmopoliteness and adoption of selected sugarcane cultivation technologies

The computed value of ‘r’ (0.058) was smaller than that of the tabulated value ($r=0.194$) with 79 degrees of freedom at 0.05 level of probability as shown in Table 4.13. Hence, the concerned null hypothesis was accepted and it was concluded that cosmopoliteness of the farmers had no significant relationship with their adoption of selected sugarcane cultivation technologies.

4.3.8 Credit received and adoption of selected sugarcane cultivation technologies

The computed value of ‘r’ (0.011) was smaller than that of the tabulated value ($r=0.194$) with 79 degrees of freedom at 0.05 level of probability as shown in Table 4.13. Hence, the concerned null hypothesis was accepted and it was concluded that credit received of the farmers had no significant relationship with their adoption of selected sugarcane cultivation technologies.

4.3.9 Relationships between adoption of sugarcane cultivation technologies and sugarcane cultivation experience

Relationship between adoption of sugarcane cultivation technologies and sugarcane cultivation experience was determined by Pearson's product moment correlation coefficient.

The coefficient of correlation between adoption of sugarcane cultivation technologies and cultivation sugarcane cultivation experience was presented in Table 4.13. The coefficient of correlation between the concerned variables was found to be 0.296. The following observations were made on the basis of the value of correlation coefficient between the two concerned variables of the study under consideration.

- The relationship showed a positive trend between the concerned variables.
- The observed value of "r" (0.296) between the concerned variables was found to be greater than the tabulated value ($r = 0.254$) with 79 degrees of freedom at 0.01 level of probability.
- The null hypothesis was rejected.
- The relationship between the concerned variables was statistically significant at 0.01 level of probability.

Based on the above findings, it was concluded that sugarcane cultivation experience had highly positive significant relationships with the adoption of sugarcane cultivation technologies. So, it could be said that higher is the sugarcane cultivation experience, higher is the adoption of sugarcane cultivation technologies. Sugarcane cultivation experience helps the farmers to take the right decision. It guides the farmers to take action for that which is best for them.

4.3.9.1 Relationship between adoption of sugarcane cultivation technologies and sugarcane farming knowledge

Relationship between adoption of sugarcane cultivation technologies and sugarcane farming knowledge was determined by Pearson's product moment correlation coefficient.

The coefficient of correlation between adoption of sugarcane technologies and sugarcane farming knowledge was presented in Table 4.13. The coefficient of correlation between the concerned variables was found to be 0.728. The following observations were made on the basis of the value of correlation coefficient between the two concerned variables of the study under consideration.

- The relationship showed a positive trend between the concerned variables.
- The observed value of “r” (0.728) between the concerned variables was found to be greater than the tabulated value ($r = 0.254$) with 79 degrees of freedom at 0.01 level of probability.
- The null hypothesis was rejected.
- The relationship between the concerned variables was statistically significant at 0.01 level of probability.

Based on the above findings, it was concluded that sugarcane farming knowledge of the famers had significant positive relationships with their adoption of sugarcane cultivation technologies. Therefore, it could be said that higher is the sugarcane farming knowledge, higher is the adoption of sugarcane cultivation technologies. Sugarcane farming knowledge makes the farmers dynamic, innovative and conscious about sugarcane cultivation. So, it helps the famers to adopt sugarcane cultivation technologies.

CHAPTER V

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

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

5.1 Summary of Findings

5.1.1 Characteristics of the farmers

Age

The old aged farmers comprised the highest proportion (44.44 percent) followed by middle aged category (40.74 percent) and the lowest proportion were made by the young aged category (14.82 percent).

Education

Farmers under primary level of education category constituted the highest proportion (29.64 percent) compared to 25.93 percent illiterate category and 28.39 percent secondary level. On the other hand the lowest (6.17 percent) belonged to above secondary level category.

Family size

The highest proportion (56.79 percent) of the respondents had medium family while 33.33 percent and 9.88 percent of them had large and small family size.

Sugarcane farm size

The highest proportion (70.37 percent) of the respondents had small farm while 17.28 percent and 12.35 percent of them had medium and marginal farm size.

Income from sugarcane cultivation

The highest proportion (48.15 percent) of the respondents had low income while 19.75 percent of the respondents had high income and 32.10 percent had medium income from sugarcane cultivation.

Extension Contact

The majority (61.73%) of the respondents had high extension contact while 33.33 percent had medium and 4.94 percent had low extension contact.

Cosmopolitaness

The highest proportion (65.43 percent) of the respondents had medium cosmopolitaness category while only 4.94 percent and 29.63 percent belonged to low and high cosmopolitans.

Credit received

The majority (58.02%) of the farmers had low credit received as compared to (23.46%) and (18.52%) having no and medium credit received.

Sugarcane farming experience

The majority (39.51%) of the farmers had medium experience as compared to (25.92%) and (34.57%) having low and high experience.

Knowledge on sugarcane cultivation

The majority (53.08 percent) of the respondents had high knowledge while 9.88 percent and 37.04 percent had low and high knowledge on sugarcane cultivation.

5.1.2 Adoption of sugarcane cultivation technologies

The adoption score ranged from 64.23 to 890.01. The average adoption score was 669.43 and standard deviation was 124.83. The majority (53.09 percent) of the Respondents felt into medium adoption category while 17.28 percent fell into low adoption category and 29.63 percent of the farmers had high adoption of sugarcane cultivation technologies. The majority (82.72%) of the respondents had medium to high adoption of sugarcane cultivation.

5.1.3 Relationship between adoption of sugarcane cultivation technologies and their selected characteristics

Sugarcane farm size, net income from sugarcane cultivation, extension media contact, sugarcane cultivation experience and knowledge on sugarcane cultivation had significant positive relationships with the adoption of sugarcane cultivation technologies. Age, education, family size, cosmopolitaness and credit received had non-significant relationships with the adoption of sugarcane cultivation technologies.

5.2 Conclusions

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

1. Majority (53.09%) of the sugarcane growers of the study area had medium adoption while 17.28% and 29.63% had low and high adoption. Therefore, it may be concluded that farmers of the study area were the adopters of sugarcane cultivation technologies in variety of degrees.
2. A great majority (87.65 percent) of the farmers had small to medium sugarcane farm size, and there was a positive significant relationship between farmers' sugarcane farm size and their adoption of sugarcane cultivation technologies. Therefore, it may be concluded that, with the increase in sugarcane farm size of the farmers tends to increase their extent of adoption of sugarcane cultivation technologies.
3. The majority (80.25 percent) of the farmers had low to medium income from sugarcane cultivation, while there had a positive significant relationship between income from sugarcane cultivation of the farmers and their adoption of sugarcane cultivation technologies. Therefore, it may be concluded that, with the Increase in net annual income from sugarcane cultivation of the farmers tends to increase their rate of adoption of sugarcane cultivation technologies.
4. A great majority (95.06.percent) of the farmers had high extension media contact, and there had a positive significant relationship between extension contact and adoption of sugarcane cultivation technologies. Therefore, it may be concluded that, low extension contact farmers adopted less sugarcane cultivation and with the increase of extension contact of the farmers tends to increase their extent of adoption of technologies.
5. A major portion (74.08 percent) of the farmers had medium to high experience in sugarcane cultivation, and there had a positive significant relationship between experience in sugarcane cultivation of the farmers and their adoption of sugarcane cultivation technologies. Therefore, it may be concluded that farmers having higher experience in sugarcane cultivation were adopted more sugarcane cultivation technologies.
6. A great majority (90.12 percent) of the farmers had medium to high knowledge sugarcane cultivation, there had a positive significant relationship between knowledge and adoption of sugarcane cultivation technologies. Therefore, it may be concluded that farmers having higher knowledge on sugarcane cultivation technologies were adopted more sugarcane cultivation technologies in the study area.

5.3 Recommendations

5.3.1 Recommendations for policy implications

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

1. All the sample farmers were involved in sugarcane cultivation. But their extent of adoption of sugarcane cultivation technologies was varied person to person. Therefore, it may be recommended that necessary steps should be taken to increase the adoption of sugarcane cultivation technologies in the study area.
2. Sugarcane farm size of the farmers had significant positive relationships with their adoption of sugarcane cultivation technologies. Therefore, it may be recommended that attempts should be taken to all categories of farmers to involve them in more area of sugarcane cultivation to increase their sugarcane cultivation technologies.
3. Net annual income from sugarcane of the farmers had significant positive relationships with their adoption of sugarcane cultivation technology. Therefore, it may be recommended that extension service providers of the study area should provide more advisory services to the farmers so that they could increase their income from sugarcane cultivation
4. Extension contact of the farmers had significant positive relationships with their adoption of sugarcane cultivation technologies. Therefore, it may be recommended that, extension service providers as well as other parties should increase their contact with farmers so that they could increase their adoption of sugarcane cultivation technologies.
5. Sugarcane farming experience of the farmers had significant positive relationship with their adoption of sugarcane cultivation technologies. Therefore, it may be recommended that extension service providers should increase their facilities to all categories of farmers so that they would be more conscious to adopt sugarcane cultivation technologies.
6. Knowledge on sugarcane cultivation of the farmers had significant positive relationship with their adoption of sugarcane cultivation technologies. Therefore, it may be recommended that extension service providers should arranged more learning events for the farmers, so that they could increase their knowledge to adopt sugarcane cultivation technologies.

5.3.2 Recommendation for further study

This study investigated adoption of sugarcane cultivation technologies by the farmers of Ishwardi Upazila under Pabna district. As a small and limited research has been conducted in the present study, so, it cannot provide much information related to this aspect. Further studies should be undertaken to cover more information in the relevant matters. So, the following recommendations were put forward for further research:

- It is difficult to determine the extent of adoption of sugarcane cultivation technologies by the farmers. Measurement of adoption of the farmers is not free from questions. More reliable measurement of concerned variables is necessary for further study.
- The present study was conducted only in three village of Ishwardi Upazila under Pabna district. Findings of the study need further verification through similar research in other parts of the country.
- The study investigated the relationship of ten characteristics of the farmers with their adoption of sugarcane cultivation technologies. So it is recommended that further study would be conducted with other variables.

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Appendix-A
Questionnaire of the study
Department of Agricultural Extension & Information System
Sher-e-Bangla Agricultural University, Dhaka-1207
A questionnaire on
An interview schedule for a research study entitled
ADOPTION OF SELECTED SUGARCANE CULTIVATION
TECHNOLOGIES BY THE FARMERS

Serial No.

Name of the respondent:

Address :

.....

.....

Please answer the following questions. Information given by you will be kept secret and only be used for research work

1. Age

What is your age? ----- Years.

2. Education:

- a) Illiterate.....
- b) Can sign only
- c) Studied up to primary education -----
- d) Studied up to secondary education-----
- e) Studied up to above secondary education-----

3. Family size

Please mention the number of your family members in the following groups:

Total member:.....person(s)

4. Sugarcane farm size

Please mention the area of your land possession for sugarcane cultivation:

Sl. No.	Types of land ownership	Land Area	
		Local unit	Hectare
1.	Own land under own cultivation (A1)		
2.	Land given to others as shared crop (A2)		
3.	Land taken from lease others as shared crop (A3)		
4.	Land taken from others as lease (A4)		
	Total		

Total farm size = A1 + A2 + ½ (A3 + A4)

5. Net income from sugarcane cultivation (Tk)

Cultivation cost:..... tk

Gross Income: tk

Net income:tk

6. Extension contact

Please mention the extension contact you have attended so far

Type of media	Name of information media	Extent of contact			
		Frequently	Occasionally	Rarely	Not at all
		3	2	1	0
Personal Contact	Friends/relative s model farms	6-7 times/6 months ()	4-5 times/6 months ()	2-3 times/6 months ()	1-2 imes/6 months ()
	Input dealers	6-7times/ month ()	5-6 times/ mont ()	3-4 times/ month ()	1-2 times/ month ()
	Block level extension agents (SAAO/CPD)	5-6 times / month ()	4-5 times/ month ()	2-3times/ month ()	1-2 times/ month ()
	Upazilla level extension officials (AEO/AAO/UPO)	5-6times/year ()	4-5times/year ()	2-3 times/year ()	1-2 times/year ()
	NGO personnel	5-6 times/year ()	4-5 times/year ()	2-3 times/year ()	1-2 imes/ year ()
	Demonstrations	1time/year	1time/year	1times/2years	1

Group Contact		()	()	()	ime/3years ()
	Field days	3times/year ()	2-3 times/year ()	2 time/year ()	1times/year ()
	Group meetings	7-8 times/year ()	6-7 times/years ()	4-5 times/year ()	2-3 times/year ()
Mass Contact	Radio	6-7 times/week ()	5-6 times/week ()	3-4 times/week ()	1-2 times/week ()
	Television	5-7 times/month ()	4-5 times/month ()	3-4 times/month ()	1-2 times/mont h ()
	Leaf lets or booklet	5- 7 times/year ()	4-5 times/year ()	3-4 times/year ()	1-2 times/year ()
	Reading agricultural books	6-12 times/year ()	4-5 times/year ()	2-3 times/years ()	1-2 times/year ()
	Agricultural fair	1time/year ()	1time/year ()	1 time/2 year ()	1 time/3 year ()

7. Cosmopolitaness

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

Sl. No.	Places of visit	Degree of Visit			
		Regularly (3)	Occasionally (2)	Rarely (1)	Not at All (0)
1.	Visit to Other union	6 or more Times/month ()	4-5 times/ month ()	1-3times/ month ()	No Visit ()
2.	Visit to own thana headquarter	6 or more Times/month ()	4-5 times/ month ()	1-3times/ month ()	No Visit ()
3.	Visit to other Thana headquarter	4 or more Times/year ()	3-4 times/ year ()	once/ year ()	No Visit ()

4.	Visit to own town/head quarter	4 or more Times/year ()	3-4 times/ year ()	once/ year ()	No Visit ()
5.	Visit to other District town/headquarter	4 or more Times/year ()	2-3times/ year ()	once/ year ()	No Visit ()
6.	Visit to Capital City or Other Metropolitan City	4 or more Times/year ()	2-3times/ year ()	once/ year ()	No Visit ()

8. Credit received:

Did you receive any credit from any sources? Yes or No

If yes, please mention the sources of receiving credit and the amount of credit received

Sl. No.	Sources of credit	Amount of credit (Tk.)
1.	NGOs	
2.	Banks	
3.	Money lenders	
4.	Relatives	
5.	Others	
	Total	

9. Sugarcane cultivation experience.....year**10. Sugarcane cultivation knowledge: Please answer the following questions:**

Sl. No.	Questions	Full Marks	Obtained Marks
1.	Which type of land is suitable for sugarcane cultivation?	2	
2.	Mention two modern sugarcane varieties?	2	
3.	What is the proper sowing time of sugarcane setts?	2	
4.	What is the seed rate kg/ha for modern sugarcane cultivation?	2	
5.	How many times irrigation is needed for sugarcane cultivation?	2	
6.	Mention the rate of fertilizer per ha is needed in sugarcane cultivation?	2	
7.	What is the importance of applying balance fertilizer in Sugarcane cultivation?	2	
8.	How do you control insect & pest in sugarcane field?	2	
9.	After how many days of sowing the first irrigation is required?	2	
10.	Mention two chemicals for sugarcane red rot treatment?	2	
11.	Mention two diseases of sugarcane?	2	
12.	Mention the name of a pesticide for sugarcane setts treatment?	2	
13.	Mention the symptom of red rot diseases of sugarcane?	2	
14.	How do you control red rot diseases in sugarcane field?	2	
15.	What is the suitable time of harvesting sugarcane?	2	
16.	What is the best method for setts storing?	2	
17.	Why sugarcane cultivation is decreasing day by day?	2	
Total		34	

11. Adoption of selected Sugarcane cultivation technologies:

Please provide the following information about the selected sugarcane cultivation technologies.

SL. No.	Name of practices	2016-2017		2017-2018		2018-2019	
		Net useable land(ha)	Net used land (ha)	Net useable land(ha)	Net used land(ha)	Net useable land(ha)	Net used land(ha)
1.	Improved varieties						
2.	Sett treatment						
3.	Trench method of sowing						
4.	Planting time management						
5.	Earthing up						
6.	Detrashing						
7.	Tying of the plants						
8.	Trash mulching						
9.	Ratooning						

Thanks for your co-operation Date:

Signature of the interviewer

Appendix-B

Correlations matrix between dependent and independent variables

	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	Y
X1	1										
X2	-.588*	1									
X3	.217	-.104	1								
X4	-.036	.112	-.136	1							
X5	-.058	.083	-.029	.818**	1						
X6	-.357**	.318**	-.001	.259*	.370**	1					
X7	-.763**	.663**	-.282*	.088	.042	.421**	1				
X8	-.042	.047	.087	.254*	.268*	-.106	.063	1			
X9	.856**	-	.238*	.126	.086	-.073	-	-.055	1		
X10	-.154	.536**	.179	.194	.330	.831**	.190	.084	.096	1	
Y	.049	.127	.080	.338**	.408**	.651**	.058	.011	.296**	.728**	1

*. Correlation is significant at the 0.05 level (2-tailed).

** . Correlation is significant at the 0.01 level (2-tailed).

<p>X1=Age X2= Education X3= Family size X4= Sugarcane farm size X5= Income from sugarcane cultivation X6= Extension Media contact</p>	<p>X7= Cosmopolitaness X8= Credit received X9= Sugarcane cultivation experience X10= Sugarcane farming knowledge Y= Adoption of selected sugarcane cultivation practices technologies</p>
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