

USE OF IMPROVED PRACTICES BY THE FARMERS IN LITCHI CULTIVATION

Sher-e-Bangla Agricultural University

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By

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A Thesis

*Submitted to the Faculty of Agriculture,
Sher-e-Bangla Agricultural University, Dhaka-1207
in partial fulfillment of the requirements for the degree of*

MASTER OF SCIENCE (M.S.)
IN
AGRICULTURAL EXTENSION & INFORMATION SYSTEM
SEMESTER: JANUARY-JUNE, 2011

Approved By:



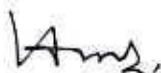
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CERTIFICATE

This is to certify that the thesis entitled, "*Use of Improved Practices By the farmers in Litchi Cultivation*" submitted to the Faculty of Agriculture, Sher-e- Bangla Agricultural University, Dhaka, in partial fulfillment of the requirements for the degree of **MASTER OF SCIENCE in AGRICULTURAL EXTENSION AND INFORMATION SYSTEM**, embodies the result of a piece of bona-fide research work, carried out by **SUDERSON SIKDER** Registration No. **09-3715** under my supervision and guidance. No part of the thesis has been submitted for any other degree or diploma.

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



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ACKNOWLEDGEMENT

All praise and appreciation to the invisible, the Almighty God, the supreme ruler of the universe, who enabled the researcher to complete the study successfully. The author is also deeply grateful and remembers the heartiest cooperation of many persons for completing different stages of this work although it is not possible to mention all by names.

The author deems it a privilege to express his deep sense of gratitude to his honorable supervisor Dr. Md. Rafiqueel Islam, Professor, Agricultural Extension and Information System, Sher-e-Bangla Agricultural University, Dhaka for his indefatigable labor, painstaking guidance and innovative suggestions. His effective and continuous supervision, intellectual instructions and analytical ability are mikes behind all phase of this study.

The author also with a sense of respect expresses his sincere appreciation to his co-supervisor Md. Shadat Ulla, Professor, Agricultural Extension and Information System, Sher-e-Bangla Agricultural University, Dhaka for his inspiration and necessary suggestions which contributed a lot to research destination of this research and prepare this thesis.

The humbly desires to acknowledge his heartfelt gratitude to all other respected teachers and staffs of the Department of Agricultural Extension and Information System for their guidance, inspiration and co-operation.

The author is glad to express high gratefulness to Md. Abdur Rashid and Uttam Kumar, sub-assistant agricultural officer of Magura Sadar Upazilla, Magura and Oliar Rahman, farmer's leader of Hazrapur Unoin, Magura.

Finally, the author links to extend his gratitude to his beloved parents, brothers, sisters and other relatives for their blessings, inspiration, cooperation, moral support and sacrifices in all respects towards the completion of the study.

The Author

ABSTRACT

The main purpose of the study was to determine the extent of use of improved practices in litchi cultivation by the farmers and to explore its relationship with selected characteristics of the farmers. Three villages of Magura Sadar Upazilla namely Ichakada, Hazrapur and Mithapur were selected as locale of the study. Out of 515 farmers of these three villages 103 (20 percent) farmers were randomly selected as the sample for this study. Data were collected from the selected farmers through interview by using an interview schedule during July 1 to August 09, 2012. Use of improved practices in litchi cultivation by the farmers was ascertained through four point rating scale. Coefficient of correlation was used in order to analyze data in fulfilling the objectives. The highest proportion (69.90 percent) of the farmers had medium use while 22.34 percent had low use and only 7.76 percent had high use of improved practices. Extension contact, agricultural knowledge, innovativeness and farming experience had positive relationship with their use of improved practices in litchi cultivation, while age, education, litchi cultivation area and annual income had no significant relationship with their use of improved practices. The major problems in litchi cultivation were packaging problem, insect attack, Lack of extension service, Lack of credit, Lack of skilled labors, Problems of irrigation in dry season, High price of fertilizer, Disease infestation, Lack of improved seedling.

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ABBREVIATIONS AND ACRONYMS

GDP = Gross Domestic Product

d.f. = Degree of Freedom

SD = Standard Deviation

UIPI = Use of Improved Practices Index

PCI = Problem Confrontation Index

BBS = Bangladesh Bureau of Statistics

et al. = And Others

SAAO = Sub Assistant Agriculture Officer

ITK = Indigenous Technical Knowledge

*Dedicated to
My Beloved Parents*

1.1 GENERAL BACKGROUND

Bangladesh is a developing country where 149 million people are virtually elbowing each other in a land based on agriculture. The population density (people per sq. km) in Bangladesh is 1015. The role of agriculture in Gross Domestic Product (GDP) is 18.4% (BBS, 2011). The present population will grow to at least 180 million within the next 20 years. For this additional population an additional amount of 50 million tons of food grain will be required.

Most of the fruits are high in carbohydrate. But we need vitamins and minerals. So that we need to increase fruit production. Among the fruits, litchi contains 77.83% water, 6.74 %-20.64% sugar, 0.8%-0.9% protein, 0.3% fat, mineral specially calcium, phosphorus and iron 0.7% and vitamin C 40.2-90 mg/100g of fruits (Bose and Mitra, 1990; Scanlan, 1995)

Litchi, *Litchi chinensis sonn.*, the most popular member of the sopindaceae, produce arillate fruit with sweet, translucent, juicy, flesh. The fruit are high in sugar and contain several vitamins and minerals and can be eaten fresh, frozen, canned, dried, or processed into juice, wine, pickles, ice-cream and yoghurt. In Bangladesh, fruits are available only 60 g/head/day against the standard requirement of 85 g/head/day.

Litchi is adapted to the warm subtropics, cropping best in climates with hot, humid summers and dry, cool winters. Flower initiation in litchi is best below 20⁰ c, while the optimum temperature for leaf and fruit growth is about 30⁰ c (Menzel and Simson, 1992). About 95% of litchi production is

in South East Asia, with China, Vietnam, Thailand, India, Bangladesh and Nepal being the most important.

In Bangladesh, about 3973 acres land was under cultivation of litchi gave 55,288 tons production (BBS, 2009).

Chittagong, Comilla, Rangpur, Dinajpur, Dhaka, Faridpur, Barisal, Jessore, Bogra, Mymensing, Jamalpur, Khulna, Magura, Pabna districts entangled in litchi production and its better future. But the growing technology is poor, so the average productivity of bearing orchards being only 1.7 t/ha in the different areas (Siddiqui, 2002). The main cultivars are 'Bombai', 'Muzzaffarpuri', 'Bedana' and 'china-3'.

The season lasts for two months from May to June. The fruit are very popular locally with none being exported (Siddiqui, 2002). Usually litchi farmers do not pay attention to modern cultural management practices like irrigation and fertilization and are not aware of application of hormones, good propagation techniques and post harvest handling. Some of the farmers who are slightly conscious add cowdung or farmyard manure and provide irrigation once a while. Their lack of knowledge on the establishment of orchards, propagation techniques, cultural management etc. is also contributing to the low yield and slow expansion of the litchi area in Bangladesh. The present study makes attempt to have an understanding of improved practices of litchi cultivation by the farmers and explore its application to Ichakada, Hazrapur and Mithapur villages under Magura Sadar Upazila at Magura District. There are around 14 thousand litchi gardens in the district, of which 1,200 are in sadar upazila where many varieties, including Bombai, China-3, Bedana and Mozaffarpuri of litchi are produced. Commercial production of litchi first started in the district in 1994. Warm weather with high summer heat, rainfall and humidity as well as soil rich with organic matters made it possible to produce the succulent fruit in Ichakada, Hazrapur and Mithapur. The findings may also have

applicability to other areas of the country having similarities with the study area. However the findings are expected to be useful to the extension workers and planners for preparation of program for rapid diffusion of improved practices in litchi cultivation among the farmers.

This type of research works is not available in our country. To lead the farmer in achieving right technology and improved practices, the researcher became interested to do this research work.

1.2 Statement of the Problem

The economic problems of agriculture sector in Bangladesh are varied and manifold and no productivity of agriculture leads to high income for the agricultural producers. Due to lack of knowledge, low income, necessary investment farmers cannot improve productivity. Litchi sapling, the basic element of litchi cultivation is more important. The availability of good quality sapling could increase yield drastically. The major cause for low yield were insufficient quality sapling, inadequate rural credit, packaging problem, lack of litchi cultivation knowledge, attack of several insect and diseases etc.

It is necessary to have clear understanding of the present status of the use of improved practices in litchi cultivation. The main purpose of the study was to have an understanding the use of improved practices in litchi cultivation and problem confrontation by the farmers in litchi cultivation. In order to explore the main issue, this study attempts to find out the answers of the following research questions:

1. What are the improved practices in litchi cultivation that has been used by the farmers in litchi cultivation?
2. To what extent of use of improved practices in litchi has been made by the farmers in litchi cultivation?

3. What are the farmers' characteristics having relationship with their use of improved practices in litchi cultivation?
4. What are the problems faced by the farmers in litchi cultivation?

To get answer of the above questions, the researcher undertook a study entitled "Use of Improved Practices by the Farmers in Litchi Cultivation".

1.3 Specific Objectives of the Study

In order to give proper direction to the study and to keep it under manageable limit, the following objectives were developed:

1. To determine and describe some of the selected characteristics of the farmers in litchi cultivation. Selected characteristics are:
 - Age
 - Education
 - Annual income
 - Litchi cultivation area
 - Extension contact
 - Innovativeness
 - Knowledge in litchi cultivation
 - Farming experience
2. To determine and describe the extent of use of improved practices by the farmers in litchi cultivation.
3. To explore the relationship between the extent of use of improved practices by the farmers in litchi cultivation and each of the selected characteristics of the farmers.
4. To identify the problem faced by the farmers in litchi cultivation.

1.4 Justification of the Study

By this time it has been established as a fact that 75 percent people of Bangladesh living in village, where the prime means of managing their livelihood is the agricultural production scheme.

It has been revealed by different scientific studies that major portion of our farmers are illiterate or slightly educated, and most of our farmers are following conventional methods of agricultural production courses. Due to ignorance of majority of our farmers to recent improved practices in litchi cultivation, our traditional structures has not been yet changed so much. So to motivate our farmers in respect of improved practices in litchi cultivation, use of these practices is of vital importance. We just tried to figure out the field space response of our farmers' tendency to modern and improved practices in litchi cultivation under a selected site. By searching the practical status of the frequency of our farmer' interests that concern we can get an idea about the fact, and thus we can assume the present status and also predict about the probable solution.

The findings of the study will be applicable particularly in the socio-economical cultural and environmentally similar regions of Bangladesh. The researcher findings are expected to be useful to students, teachers, researchers, farmers and other allied group of people like extension field workers and particularly for the national policy makers for designing future plans. The findings may also be helpful to the field workers of different nation building departments to improve strategies for popularizing improved practices among the farmers. Lastly, the researcher believes that the findings and recommendations of the study will definitely led to maximize the litchi production.



1.5 Statement of Hypothesis

In order to guide relevant data collection, analysis and interpretation of data, a set of hypothesis would be formulated for empirical testing. As defined Goode and Hatt (1952) "Hypothesis is a proposition which can be put to a test to determine its validity. It may seem to 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." However, for statistical test it becomes necessary to formulate null hypothesis. A null hypothesis states that there is no relationship between the concerned variables.

The following null hypothesis would be formulated to explore the relationship of the selected characteristics of the farmers with their use of improved practices in litchi cultivation.

"There are no relationships between the selected characteristics of the farmers and their extent of use of improved practices in litchi cultivation."

1.6 Assumption of the Study

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

1. The respondents included in the sample for this study were competent to furnish proper responses to the question included in the interview schedule.
2. The researcher who acted as the interviewer was well adjusted to the social environment of the study area. Hence, the data collected by him from the respondents were free from bias.
3. That the subjects selected for the study were qualified to satisfy the queries of the investigator.
4. The findings of the study had general application to other parts of the country similar personal, socio-economic and cultural conditions of the study area.

1.7 Limitation of the Study

The present study was undertaken to have an understanding of the farmers' use of improved practices in litchi cultivation and to explore the relationships with their selected characteristics. Considering the time and other resources available to the researcher and to make the study available and meaningful, it became necessary to impose certain limitations as noted below:

1. The study was confined to three villages of Magura sadar upazila.
2. The study was based on the cultivation of litchi by the farmers.
3. The characteristics of the farmers in the study area are many and varied, but only eight characteristics were selected for investigation in this study area as stated in the objectives.
4. The researcher relied on the data furnished by the farmers from their memory during interview.
5. For some cases, the researcher confrontation unexpected interference from the over interested side talkers while collecting data from the target respondents. However, the researcher tried to overcome the problems as far as possible with sufficient tact and skill.
6. Reluctance of farmers to provide information was overcome by establishing proper rapport.

1.8 Definition of Important Terms

For clarify of understanding certain terms frequently used throughout the study are defined and interpreted as follows:

Use of Improved practices

Improved practices in respect of any crop refer to those practices, which are advocated by some component authority and which are helpful for improving the yield and quality of the crop.

Age

Age of the farmers was defined as the period of time in actual year from his birth to the time of interview.

Education

It is defined as the development of desirable knowledge, skill and attitude in an individual through the experience of reading, writing and other related activities.

Litchi cultivation area

Litchi cultivation area refers to the total area on which a farmer carries on litchi cultivation operation.

Annual income

It refers to the total annual earning of the family members of a farmer from agricultural and other non-agricultural sources during a year. It was expressed in taka.

Extension contact

It refers to an individual's exposure to or contact with different communication media and sources and personalities being used for dissemination of new practices among the farmers.

Innovativeness

Innovativeness means that an individual was relatively earlier to use improved practices than other member of the social system.

Agricultural knowledge in litchi cultivation

It refers to the understanding of an individual about different facts, information, causes and effects related to litchi cultivation.

Farming experience

Farming experience of a farmer was defined on the basis of his involvement in farming activities in litchi cultivation.

CHAPTER 2

REVIEW OF LITERATURE

Reviews of literatures relevant with the objectives of this study are presented in this chapter. This study is concerned with the use of improved practices by the farmers and relationships with their selected characteristics. The researcher attempted to search the literatures and observed that a number of studies have been conducted.

This chapter is divided into three sections. The first section deals with the review of literature on general context, the second section deals with the relationship between use of improved practices and selected characteristics, third section deals with the conceptual framework of the study.

2.1 Review of literature on General context

Hossain (1971) carried out a research study on the adoption of four improved practices in Gouripur of Mymensingh district. The practices were (a) plant protection measures, (b) recommended variety of paddy, (c) line transplanting and (d) recommended dose of fertilizer. It revealed that among the respondent farmers 57.40 percent adopted plant protection measures, 35.51 percent adopted recommended variety of paddy, 25.36 percent adopted line transplanting and 11.52 percent adopted recommended dose of fertilizers.

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 having high adoption.

Rahman (1974) studied the adoption of IR-20 variety of paddy in Bhabakhali union of Mymensingh district. He found that 29 percent of the

growers had medium adoption of IR-20 while 31 percent of the growers did not adopt the innovation.

Sobhan (1975) conducted a study on the extent of adoption of winter vegetables in Boilor union of Mymensingh district. Overall winter vegetable adoption scores of the farmers could range from 0 to 140. Overall adoption scores indicated that 27 percent of the farmers did not adopt winter vegetables cultivation while 48 percent had low adoption and 25 percent had high adoption.

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

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

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

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

the extent of use of balanced potassic fertilizer 80.95 percent of the farmers had below optimum adoption compared to 18.10 and 0.95 percent having optimum and above optimum adoption, respectively.

Haider et al. (2001) observed in his study of adoption of improved package practices for transplanting aman rice cultivation that one third (37%) of the farmers fell in low adopter category compared to 32.5 percent falling in optimum adopter, 23.5 percent were above optimum adopter and only 7 percent were non-adopter of nitrogenous fertilizer. In respect of extent of phosphoric fertilizer two thirds (68%) of the farmers were non-adopter category compared to 23 percent were above optimum adopter and 4 percent were below optimum adopter of phosphoric (p) fertilizer. In respect of extent of potassic fertilizer three-quarters (79%) of the farmers fell under non-adopter category compared to 10 percent falling below optimum adopter, 8 percent were optimum adopter and only 32 percent were above optimum adopter of potassic (k) fertilizer.

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

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



2.2 Relationship between farmers' characteristics with their Use of Improved Practices in Litchi Cultivation

2.2.1 Age and use of improved practices

Bavalatti and Sundaraswamy (1990) found that age of the farmers was not related with their adoption of dry land farming practices rather it had a negative trend.

Veeranna (2000) found that age had significant relationship with adoption of scientific goat rearing practices.

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

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

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

Sarker (2004) found that age of the farmers had a positive significant relationship with the use of selected crop technologies in homestead gardening.

2.2.2 Education and use of improved practices in litchi cultivation

Hossain and Crouch (1992) studied the relationship of education with adoption of improved farm practices. The study revealed a positive relationship between education and adoption of improved farm practices.

Okoro and Obibuaka (1992) studied adoption of recommended management practices among small holders in IMO state, Nigeria. The findings of the

study indicated a positive relationship between education of the respondents and their adoption of recommended management practices.

Chowdhury (1997) found a positive significant relationship between the education of the farmers and their adoption of selected BINA technologies.

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 of integrated farming technologies.

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

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

Sarker (2004) found that education of the farmers had no significant relationship with the use of selected crop technologies in homestead gardening.

2.2.3 Litchi cultivation area and use of improved practices in litchi cultivation

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

Aurangozeb (2002) conducted a study on adoption of integrated homestead farming technologies by the rural women in RDRS. He found that farm size

had no relationship with adoption of integrated homestead farming technologies.

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

Sarkar (2004) found that farm size of the homestead gardening had a significant positive relationship with their use of selected crop technologies. Similar findings on adoption of selected BINA technologies were also reported by Chowdhury (1997).

2.2.4 Annual income and use of improved practices in litchi cultivation

Haque (1993) found a negative but significant relationship between farm income and adoption of improved practices in sugarcane cultivation.

Pal (1995) in his study found a positive significant relationship between income of the farmers and their adoption of recommended practices in sugarcane cultivation.

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 respondent and their adoption of integrated homestead farming technologies.

Islam (2003) in his study found that there was a positive and significant relationship between family income of the farmers and adoption of organic manures.

Sarker(2004) found that annual income of the farmers had no significant relationship with the use of selected crop technologies in homestead gardening.

2.2.5 Extension contact and use of improved practices in litchi cultivation

Aurangozeb (2002) observed that there was significant relationship between contact with extension media and adoption of integrated homestead farming technologies.

Sadar (2002) found that the contact with RDRS personnel had significant positive relationship with their adoption of IPM practices.

Sarker(2004) found that extension contact of the farmers had a significant relationship with the use of selected crop technologies in homestead gardening.

2.2.7 Innovativeness

Rahman (1973) found a positive relationship between modernism and adoption of farm practices. Modernism as used by him is synonymous with the innovation proneness or in other words innovativeness of the present study.

Muhammad (1974) conducted the study on the extent of adoption of strong positive relationship by the farmers. He observed a strong positive relationship between innovativeness and adoption of insect measures.

Sharma and Sonoria (1983) observed higher average innovativeness among contact farmers the non contact farmers. They also found that contact farmers' adoption of innovations differed significantly with their variation in innovativeness.

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

Rahman (2003) in his study showed that there was positive and significant relationship between innovation proneness of the farmers and adoption of intercropping in pineapple cultivation.

2.2.8 Knowledge and use of improved practices in litchi cultivation

Koch (1985) conducted a study in the North-western Orange Free State, South Africa concerning perception agricultural innovations, aspiration, knowledge and innovation use. He observed that there was a strong positive relationship between perception, knowledge and practice use.

Moulik et al. (1996) conducted a study on predictive values of some factors of adopting nitrogen fertilizers by north by India. He found a significant and positive relationship between agricultural knowledge and adoption of nitrogenous fertilizers among the cultivators.

Ali (1995) stated that agricultural knowledge of the rural women had significant positive relationship with their attitude towards working in a group in different agricultural activities.

Veeranna (2000) found that knowledge had positive and highly significant relationship with adoption of scientific goat rearing practices.

Sarker(2004) found that knowledge of the farmers had a significant relationship with the use of selected crop technologies in homestead gardening.

2.3 Conceptual framework of the study

The present study would be tried to focus two concepts; first, the farmers selected characteristics and the second, their use of improved practices in litchi cultivation. Use of improved practices in litchi cultivation of an individual may be influenced and affected through interacting forces in his surroundings. Use of improved practices in litchi cultivation and individual

farmers may also be influenced by the personal, economic, social and physiological characteristics. In this study, farmers' eight (8) selected characteristics have only been taken into consideration. Moreover, it is quite impossible to deal with all the characteristics. Selected characteristics are: age, education, litchi cultivation area, annual income, extension contact, innovativeness, farming experience, agricultural knowledge in litchi cultivation. These eight (8) characteristics are the independent variables of the study, while use of improved practices in litchi production being the main focus of the study constituted the only dependent variable. A sample conceptual framework in this connection has been given below:

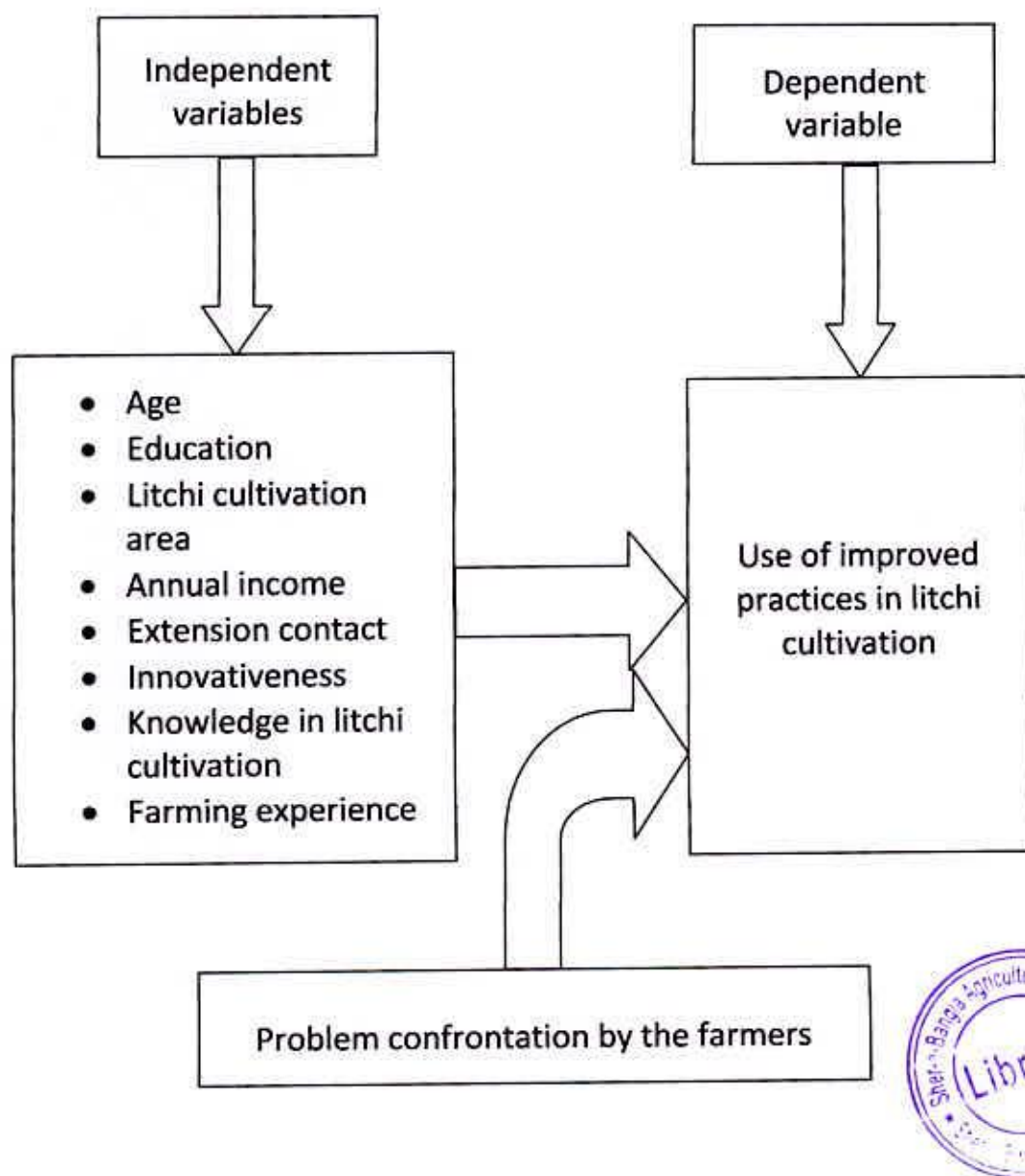


Figure 2.1. A Conceptual Framework of the study

CHAPTER 3

METHODOLOGY

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

3.1. Locale of study

Considering litchi growing area, the study was conducted in three villages named Hazrapur, Mithapur, Isakhada under Hazrapur Union of Magura Sadar Upazilla of Magura district. It is surrounded by Mohammadpur upazila at east, Jhenidah Sadar at west, Sripur Upazilla at the north and Shalikha Upazilla at the south. The map of Magura district showing Hazrapur union showing the study area.

3.2. Design of the study

The design of the study was a descriptive survey research. It was designed to determine and describe the extent of use of improved practices in litchi cultivation. Efforts were also made to assess the problems of the farmers in litchi cultivation.

3.3. Population and Sampling Design

Sampling method was used purposively to select the villages under the study. Out of fourteen unions, one union "Hazrapur union" of Magura Sadar Upazilla was selected purposively. From this Hazrapur Union three villages Ichakada, Hazrapur and Mithapur were selected purposively also. Then a list of litchi growers of these three villages was made by the help of the Sub-Assistant Agricultural Officer (SAAO). The list comprised a total of 515 farmers constituted the population of this study. Twenty percent (20%) of

the population was proportionately and randomly selected as sample of population by using a calculator of Random Numbers. Thus, the total sample size of this study area was one hundred and three (103) farmers.

In addition to that, two (2) percent of the population was selected randomly and proportionately from each of the selected villages. Thus, the additional sample, also drawn 10 farmers, which were included in the reserve list. In case, the individual included in the original samples were not available or not found suitable at the time of data collection, the farmers of the reserve list were used for the purpose. The distribution of the farmers included in the population, sample and those in the reserve list appears in Table 3.1.

Table 3.1 Distribution of farmers in litchi cultivation constituting the population, sample and reserve list in three villages of 5 no. Hazrapur Union

Name of the villages	Target Population	Sample	Reserve list
Ichakada	305	61	6
Hazrapur	105	21	2
Mithapur	105	21	2
Total	515	103	10

3.4. Variables of the study

In social research like extension education, the selection and measurement of variable constitute a major task. In this connection, the researcher reviewed literature as far as possible to widen his understanding about the nature and scope of the variables relevant to his research. A variable is any measurable characteristic, which can assume varying or different values in successive individual cases (Ezekiel and Fox, 1959). The hypothesis of a research, when constructed properly contains at least two important

elements, viz. an independent variable and a dependent variable. An independent variable is that factor which is manipulated by the experimenter in his attempt to ascertain its relationship to an observed phenomenon. A dependent variable is that factor which appears, disappears or varies as the experimenter introduces, removes or varies the independent variables (Townsend, 1953). The dependent variable is often called treatment, experimental or antecedent variable (Deobold, 1973).

In this research work, the independent variables was age, education, litchi cultivation area, annual income, extension contact, innovativeness, agricultural knowledge in litchi cultivation, farming experience and the dependent variable was use of improved practices in litchi cultivation.



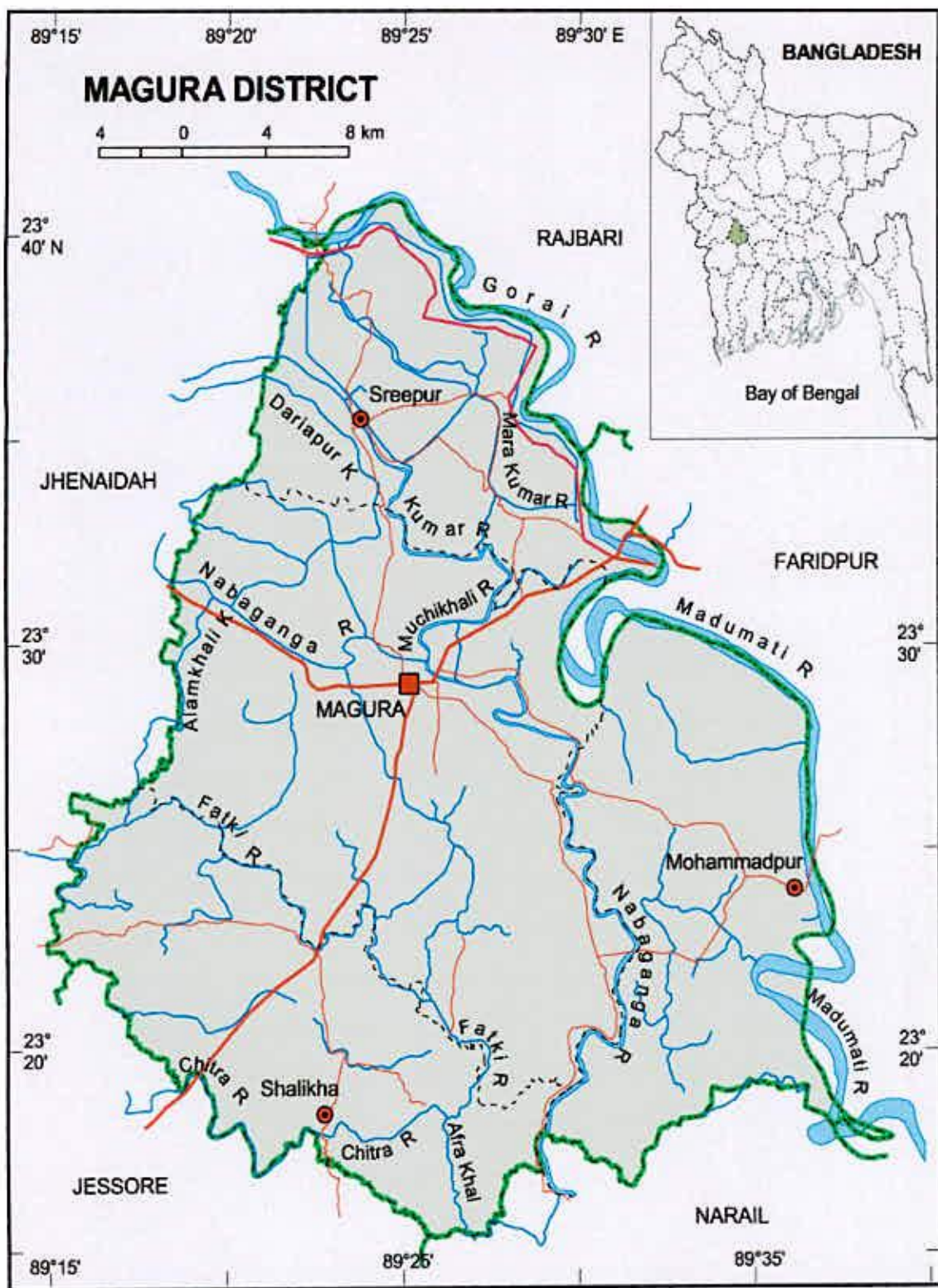


Fig. 3.1 Map of Magura District showing the study upazilla



Fig. 3.2. Map of Magura Sadar Upazila showing the study villages

3.4.1 Measurement of independent variables

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

3.4.1.1 Age

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

3.4.1.2 Education

Education was measured as the ability of an individual farmer in litchi cultivation to read and write or formal education received up to a certain standard. Education of a respondent was measured on the basis of classes who passed in formal educational institution. For example, if a respondent passed class 5, his education score was 5. If a respondent did not know how to read and write his education score was taken as zero (0). A score of 0.5 was given to that respondent who could sign his name only.

3.4.1.3 Litchi cultivation area

Litchi cultivation area of a respondent was determined as total area on which he continued his litchi cultivation operations that was focused in hectare.

3.4.1.4 Annual income

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

3.4.1.5 Extension contact

Extension contact may be defined as one's extent of exposure to different extension teaching methods. The extent of contact was determined against four (4) point rating scales as Not at all, Rarely, Occasionally and regularly score was assigned as 0, 1, 2 and 3 respectively. An extension contact score was computed for each of the 13 selected media. Each respondent was asked to mention the frequency of his contact with each of the 13 selected media.

Extension contact	Assigned score
Not at all	0
Rarely	1
Occasionally	2
Regularly	3

Logical frequencies of contact were assigned for each response. Extension contact score of the respondents could range from 0 to 39, where 0 for no extension media contact and 39 indicating highest extension contact. Respondent's extension contact scores were obtained by adding the weights for his responses to all the sources listed in the instrument.

3.4.1.6 Innovativeness

Innovativeness is the degree to which an individual uses an innovation relatively earlier than other members in a social system (Rogers, 1995). Hence, innovativeness of respondent was measured on the basis of the period of use of innovation from the period he first listened about the innovation. Scores were assigned on the basis of time required by an individual to individual to use each of the eight technologies in the following manner:

Period of use	Assigned score
Do not use	0
1 year after listening	4
2-3 years after listening	3
4-5 years after listening	2
6 years and above after listening	1

Thus, the innovativeness score of a respondent was obtained by adding the score of all items and it ranged from 0 to 32, while 0 indicting no innovativeness and 32 indicating very high innovativeness.

3.4.1.7 Knowledge in litchi cultivation

Litchi cultivation knowledge of a respondent was measured by asking 14 questions related to litchi cultivation. It was measured in score. A score of 2 was assigned for each correct answer, partial correct answer and 0 (zero) for the wrong or no answer. The total assigned scores of all the questions were 28. However, a respondent could get 0-28 score, while '0' indicating very low litchi cultivation knowledge and '28' indicating high knowledge in litchi cultivation.

3.4.1.8 Farming experience

Farming experience of a farmer was defined on the basis of his involvement in farming activities in litchi cultivation. Score of 1 was assigned to one year of farming activities.

3.5 Measurement of dependent variable

Use of improved practices in litchi cultivation by farmers the was the dependent variable of this study. The researcher selected six (6) groups of improved practices, which considered in this investigation. These included:

- a) Improved variety
- b) Use of recommended fertilizers
- c) Use of hormones
- d) Use of irrigation
- e) Use of pesticides

f) Use of intercultural operation

The dependent variable of the study was use of improved practices by the farmers in litchi cultivation. To operationalize the variable, six groups of improved practices in litchi cultivation were identified through field survey and consultation with farmers in litchi cultivation of the study area. These six groups of improved practices were selected to measure the extent of use of improved practices by the farmers in litchi cultivation. Each group of improved practices was included several practices. The six (6) groups of improved practices included with 27 practices.

A. Improved varieties

Variety is the key factor to increase litchi production. Varieties score was measured on basis of the nature of one's use in different variety. The following scale was used for computing the variety score.

Sl No.	Name of varieties	Extent of use			
		Regularly	Occasionally	Rarely	Not used
1	Bombay	11-15years	6-10 years	1-5 years	
2	China-3	11-15years	6-10 years	1-5 years	
3	BARI litchi	11-15years	6-10 years	1-5 years	
4	Muzaffarpuri	11-15years	6-10 years	1-5 years	
5	Bedana	11-15years	6-10 years	1-5 years	
6	Local (Hazrapuri)	11-15years	6-10 years	1-5 years	

The variety score of a respondent was determined by adding his assigned 6 variety scores. The score could range 0 to 18, 0 indicated no use of variety and 18 indicated quick trend to use the variety.



B. Use of recommended dose of fertilizer

The fertilizers are cowdung, urea, TSP and MP, Zipsum, Zinc Sulphate, Chai. Hence, fertilizer scores of a respondent was obtained by adding 7 practices scores. Procedures through computing by 4 point rating scale, overall fertilizers scores are calculated:

Sl No.	Name of fertilizer	Extent of use			
		Regularly	Occasionally	Rarely	Not used
7.	Cowdung				
8.	Urea				
9.	T.S.P				
10.	M.P				
11.	Zipsum				
12.	Zinc Sulphate				
13.	Chai				

The range of the fertilizer score of litchi cultivation could be from 0 to 21, 0 indicated no-use and 21 indicated high trend to use the fertilizers.

C. Use of hormone

Hormone application was computed on the basis of intensity of hormone application in litchi garden.

Sl No.	Name of hormone	Extent of use			
		Regularly	Occasionally	Rarely	Not used
14	Planofix				
15	Flora				
16	Boxal super				

The score could range from 0 to 9, while 0 indicated no use and 9 indicated high trend to use the hormone.

D. Use of irrigation

Irrigation Score was computed on the basis of using irrigation in the litchi orchard by the farmers in the study area and calculated by using the same procedure of calculating fertilizer score.

Sl No.	Type of irrigation instrument	Extent of use			
		Regularly	Occasionally	Rarely	Not used
17	Shallow tubewell				
18	Deep tubewell				
19	Hand tubewell				

The score could range from 0 to 9, 0 indicate no use and 9 indicate high trend to use the irrigation.

E. Use of pesticides

Pesticides application was computed on the basis of using pesticides in the litchi orchard by the farmers in the study area and calculated by using the same procedure of calculating fertilizer score:

Sl. No.	Name of pesticides	Extent of use of pesticides			
		Regularly	Occasionally	Rarely	Not used
20	Antacon				
21	Sobicron				
22	Cyperson				
23	Malathion				

The score could range from 0 to 12, 0 indicated no use and 12 indicated high trend to use the pesticides.

F. Use of intercultural operation

Intercultural operation measured score of a respondent was obtained by adding the 4 scores. A four point rating scale was used for computing the intercultural operation score. Score on responses against 4 operations were assigned by the following way:

Sl. No.	Intercultural operations	Extent of use of Intercultural operations			
		Regularly	Occasionally	Rarely	Not used
24	Pruning				
25	Training				
26	Weeding				
27	Drainage management				

The score could range from 0 to 12, 0 indicated no use and 12 indicated high trend to use of intercultural operations.

The scores against all the 27 items of six (6) groups of improved Practices were added together to obtain the use of improved practices scores by a respondent. Thus, the range of the scores could vary from '0' to '81', where '0' indicated no use of improved practices by a respondent and '81' indicated highest level of use of improved practices.

However, Use of Improved Practices Index (UIPI) was also developed on the basis of multiplication of percentage of opinion expressed by the respondents against each of the four point rating scales and finally added together.

Among the practices which practice is highly used that is shown through the Use of Improved Practices Index (UIPI).

$$\text{Use of Improved Practices Index (UIPI)} = (\text{Unu} \times 0) + (\text{Uru} \times 1) + (\text{Uou} \times 2) + (\text{Uru} \times 3)$$

Where,

Unu = Number of farmers in litchi cultivation with no use

Uru = Number of farmers in litchi cultivation with rarely use

Uou = Number of farmers in litchi cultivation with occasionally use

Uru = Number of farmers in litchi cultivation with regularly use

3.6 Measurement of problem confrontation of the farmers in litchi cultivation

The growers were asked to mention the extent of problem they encountered in litchi cultivation. It was measured by using closed form of questions. A four point modified likert scale was used for computing the problem confrontation score. Weights on responses against the 10 problems to a farmer were assigned in the following way.

Extent of problem confrontation	Weights
Not at all	0
High	3
Medium	2
Low	1

The weights of responses of all the problems they faced were added together to obtain the problem confrontation score of the respondents which could range from 0 to 30, where 0 indicating no problem confrontation and 30 indicating highest problem confrontations.

Among the problems items, severity was measured by the Problem Confrontation Index (PCI).

Problem Confrontation Index (PCI) = $(P_n \times 0) + (P_l \times 1) + (P_m \times 2) + (P_h \times 3)$

Where,

P_n = Number of farmers in litchi cultivation confronted no problem

P_l = Number of farmers in litchi cultivation confronted low problem

P_m = Number of farmers in litchi cultivation confronted medium problem

P_h = Number of farmers in litchi cultivation confronted high problem

3.8 Instrument of collection of data

In order to collect relevant information an interview schedule was carefully designed keeping the objectives of the study in mind. The interview schedule was designed in Bengali to ensure easy communication between the researcher and the respondent. The interview schedule initially prepared

was pre-tested by administering the same to ten litchi growers of the study area. The pre-test was helpful to identify faulty questions and statements in the draft schedule. Necessary additions, corrections, alterations and adjustments were made in the schedule on the basis of the pre-test experience. The schedule was multiplied in its final form for the collection of data. An English version of the interview schedule has been presented in the Appendix-A. The Bangla version of the interview schedule was used during final data collection.

3.9 Collection of data

The researcher himself collected data from the litchi growers by using the interview schedule. The interviews were conducted individually in the houses of the respondents during their leisure period. Only ten litchi growers of the original list were not available during interview and hence ten farmers in litchi cultivation were replaced from the reserve list. Advance information was given to the respondents before going to them for interviewing. The researcher took all possible care to establish rapport with them. While any respondent faced difficulty in understanding any question, the researcher took utmost care to explain the issue. He obtained excellent cooperation from the respondents and others concerned during the time of interview. The entire process of collecting data took 40 days from July 1 to August 09, 2012.

3.10 Categorization of the respondent

For describing the various independent and dependent variables, the respondents were classified into various categories. In developing the categories, the investigator was guided by the nature of data and the effect of general consideration prevailing on the social system.

3.11 Statistical analysis

Data collected from respondents for this study were compiled, coded and analyzed in accordance with the objectives of the study. The statistical measures such as, number and percentage distribution, range, mean, standard deviation and rank order were used in describing the selected independent and dependent variables.

In order to explore the relationships between the use of improved practices in litchi cultivation and the selected characteristics of the litchi farmers, the Pearson's Product Moment Correlation was computed. Correlation matrix was also used to determine the interrelationships among the variables. Five percent (0.05) and one percent (0.01) level of significance was used as the basis of statistical significance. If the computed value of coefficient of correlation 'r' was equal to or greater than Table value of correlation coefficient at designated level of significance for the relevant degrees of freedom, the null hypothesis was rejected and it was concluded that there was significant relationship between the concerned variables. However, when the computed value of co-efficient of correlation was found to be smaller than the tabulated value at the designated level of significance of the relevant degrees of freedom, it was concluded that the null hypothesis could not be rejected and hence there was no relation between the concerned variables.

CHAPTER 4

FINDINGS AND DISCUSSION

In this chapter, the findings of the study and the interpretations of the meaning are presented. These are conveniently presented in four sections in accordance with the objectives of the study. In the first section deals the discussion of selected characteristics of the litchi growers. The second section deals with farmers' extent of use of improved practices in litchi cultivation. The third section deals with the relationships between litchi growers selected characteristics and their use of improved practices of the growers and fourth section deals with problem confrontation by the farmers in litchi cultivation.

4.1 Selected Characteristics of farmers in litchi cultivation

The characteristics of an individual are an important factor in developing mental makes up for making decisions about various issues of livelihood. More particularly decisions related to farming activities are being influenced largely by different characteristics of an individual. The characteristics of the farmers were selected to explore their relationship with the use of improved practices. The selected characteristics included their age, education, litchi cultivation area, annual income, extension contact, innovativeness, knowledge in litchi cultivation and farming experience. These characteristics of the farmers have been described in this section. Distribution of the farmers according to their different selected characteristics has been shown in Table 4.1.

Table 4.1: Salient feature of the selected characteristics of farmers in litchi cultivation

Sl. no.	Selected characteristics of farmers in litchi cultivation	Measuring units	Possible score	Observed range	Mean	Standard deviation
1.	Age	Number of years	-	24-75	49.34	12.64
2.	Education	Years of schooling	-	0-15	5.88	4.33
3.	Litchi cultivation area	Hectare	-	0.04-8.09	1.32	1.41
4.	Annual income	Taka ('000' tk)	-	50-950	362.32	202.27
5.	Extension contact	Scoring scale	0-39	5-22	15.87	2.69
6.	Innovativeness	Scoring scale	0-32	5-28	17.67	4.58
7.	Knowledge in litchi cultivation	Scoring scale	0-28	10-19	13.88	2.01
8.	Farming experience	Years of cultivation	-	5-50	21.12	8.05

4.1.1 Age

Age of the growers was found to range from 24 to 75 years. The average age was 49.34 years with the standard deviation of 12.77. Based on their age, the farmers were classified into three categories as shown in Table 4.2.

Table 4.2: Distribution of farmers according to their age

Categories	Farmers (N = 103)		Mean	Standard deviation
	Number	Percent		
Young (<36)	17	16.01	49.34	12.77
Middle (36-50)	42	40.77		
Old (>50)	44	42.72		
Total	103	100		



Data presented in Table 4.2 indicated that the highest proportion (42.72 percent) of the respondents were in old aged category compared to 16.01 percent young and 40.77 percent middle aged category. However, data also revealed that about 56.87 percent of the farmer in the study area was young to middle aged. Hussien (2001) also found the similar findings in their studies.

The young farmers are generally receptive to new ideas and things. They have favorable attitudes towards adopting new ideas. The middle aged farmers are the most productive group in the use of innovation. The extension agents can make use of these views and opinions in designing their extension activities among young and middle-aged group farmers.

4.1.2 Education

Education scores of farmers in litchi cultivation ranged from 0 to 15. The average score was 6.12 with the standard deviation 4.86. Based on their score, the growers were classified into four categories as shown in Table 4.3.

Table 4.3: Distribution of farmers according to their education

Categories	Farmers (N = 103)		Mean	Standard deviation
	Number	Percent		
No education (0 & 0.5)	31	30.10	5.88	4.33
Primary education (1-5)	24	23.30		
secondary education (6-10)	38	36.90		
Above secondary education(>10)	10	9.70		
Total	103	100		

Data presented in Table 4.3 indicate that that a large proportion (36.90 percent) of the respondents fell under category of “secondary education” compared to 30.10 percent “No education”, 23.30 percent “primary education” 9.70 percent “above secondary education”.

The findings indicate that 69.90 percent of the respondents were literate that varied from primary to higher levels. The literacy rate of the country is 55.08 percent (BBS, 2010). Thus the findings indicate that in the study area, the literacy rate seems to be higher than that of the national average.

4.1.3 Litchi cultivation area

Litchi cultivation area of the growers ranged from 0.04 to 8.09 ha with the mean of 1.32 ha and standard deviation 1.41. On the basis of the litchi cultivation area the growers were classified into three categories as shown in Table 4.4.

Table 4.4: Distribution of farmers according to their cultivation area

Categories	Farmers (N = 103)		Mean	Standard deviation
	Number	Percent		
Low (<1.00)	56	54.37	1.32	1.41
Medium (1.00-2.77)	36	34.95		
High (>2.77)	11	10.68		
Total	103	100		

Data presented in Table 4.4 indicate that highest proportion (54.37 percent) of the respondents had low litchi cultivation area compound to 10.68 percent high litchi cultivation area and 54.37 percent had medium litchi cultivation area. Thus, the overwhelming majority (99.03 percent) of the respondents had medium to high litchi cultivation area, indicating that use of improved practices are usually done by the farmers having comparatively in higher litchi cultivation area.



4.1.4 Annual income

Annual income of the growers ranged from Tk. 50 to 950 thousands with the mean of Tk. 362.32 thousands and standard deviation 202.27. On the basis of the annual income the growers were classified into three categories as shown in Table 4.5.

Table 4.5: Distribution of farmers according to their annual income

Categories	Farmers (N = 103)		Mean	Standard deviation
	Number	Percent		
Low (<171)	22	21.36	362.32	202.27
Medium (171-550)	64	62.14		
High (>550)	17	16.50		
Total	103	100		

Data presented in Table 4.5 indicate that highest proportion (62.14 percent) of the respondents had medium annual income compared to 16.50 percent high income and 21.36 percent had low income. Thus, the overwhelming majority (78.64 percent) of the respondents had medium to high annual income, indicating that use of improved practices are usually done by the growers having comparatively higher economic standards.

The average income of the growers of study area is much higher than the average per capital income of the country i.e. 690 US dollar (BBS, 2010). This might be due to the fact that the growers in the study area were not only engaged in agriculture. They also earned from other sources, such as service, business etc. Generally higher income gives an individual better status in the society.

4.1.5 Extension contact

The possible extension contact scores of the respondents ranged from 0 to 39 while observed range was found 5 to 22 with an average 15.87 and standard deviation of 2.69. On the basis of extension contact scores, the respondents were classified into four categories as shown in Table 4.6.

Table 4.6: Distribution of farmers according to their extension contact

Categories	Farmers (N = 103)		Mean	Standard deviation
	Number	Percent		
Low contact (<13)	13	12.63	15.87	2.69
Medium contact (1-22)	90	87.37		
Total	103	100		

Data presented in Table 4.6 indicate that the highest proportion (87.37 percent) of the respondents of the study area had the medium extension contact, while 12.63 percent had low extension contact, no one was found to high extension contact. The findings of the study indicate that all the respondents had low and medium extension contact with various information sources. Islam (2002) and Hussen (2002) observed similar findings in their studies.

4.1.6 Innovativeness

Innovativeness scores of the growers ranged from 5 to 22 against the possible range of 0 to 32. The mean score was 17.67 and standard deviation of 4.58. On the basis of innovativeness scores, the respondents were classified into three categories as shown in Table 4.7.

Table 4.7: Distribution of farmers according to their innovativeness

Categories	Farmers (N = 103)		Mean	Standard deviation
	Number	Percent		
Low (<13)	13	12.62	17.67	4.58
Medium (13-16)	67	65.05		
High (>16)	23	22.33		
Total	103	100		

Data presented in Table 4.7 indicate that the highest proportion (65.05 percent) of the farmers had medium innovativeness compared to 12.62 percent low innovativeness, 22.33 percent high innovativeness. Data also revealed that majority (77.67 percent) of the respondents in the study area had low to medium innovativeness. Chowdhury (1997) and Podder (1999) also observed the similar findings in their study.

4.1.7 Knowledge in litchi cultivation

Agricultural knowledge of a farmer is the foundation of his farming business. Agricultural knowledge of the growers varied from 10 to 19 against the possible range of 0 to 28. The average agricultural knowledge score was found to be 13.88 and standard deviation was 2.01. Based on the observed overall agricultural knowledge score, the respondents were classified into three categories as shown in Table 4.8.

Table 4.8: Distribution of farmers according to their knowledge in litchi cultivation

Categories	Farmers (N = 103)		Mean	Standard deviation
	Number	Percent		
Low (<13)	28	27.18	13.88	2.01
Medium (13-16)	67	65.05		
High (>16)	8	7.77		
Total	103	100		

Data presented in Table 4.8 shows that the highest proportion (65.18 percent) of the farmers had medium knowledge in litchi cultivation

compared to 27.18 percent had low knowledge in litchi cultivation and 7.77 percent had high knowledge in litchi cultivation. A farmer who receives high level of education but less involvement in farming might possess lower knowledge in litchi cultivation than the growers who is actively involved in farming for a long period of time.

4.1.8 Farming experience

Farming experience of the farmers varied from 5 to 50. The average farming experience score was found to be 21.12 and standard deviation was 8.05. Based on the observed overall farming experience score, the respondents were classified into three categories as shown in Table 4.9.

Table 4.9: Distribution of farmers according to their farming experience

Categories	Farmers (N = 103)		Mean	Standard deviation
	Number	Percent		
Low (<13)	9	8.74	21.12	8.05
Medium (13-30)	86	83.50		
High (>30)	8	7.76		
Total	103	100		

Data presented in Table 4.9 shows that the highest proportion (83.50 percent) of the growers had medium farming experience compared to 8.74 percent had low farming experience, 7.76 percent had high farming experience. A farmer who receives high level of farming experience might possess higher agricultural knowledge than the farmers who have less involvement in farming activities.

4.2 Problem confrontation by the farmers in Litchi Cultivation

The observed problem confrontation scores of the farmers ranged from 13 to 25 with an average of 20.73 and standard deviation of 2.53. The possible problem confrontation scores were 0 to 30. On the basis of problem confrontation scores, the growers were distributed into three categories as shown in Table 4.10.

Table 4.10 Distribution of the farmers according to their Problem Confrontation

Categories	Farmers (N = 103)		Mean	Standard deviation
	Number	Percent		
Low confrontation(< 10)	5	4.85	20.73	2.53
Medium confrontation(10-20)	64	62.14		
High confrontation(> 20)	34	33.01		
Total	103	100		

Data contained in the highest proportion (62.14 percent) of the farmers in litchi cultivation had medium problem confrontation as compared to 4.85 percent low and 33.01 Percent high problem confrontation in litchi cultivation. The findings of the study indicated that overwhelming majority (95.15 percent) of the respondents had problem confrontation ranging from medium to high. This will affect the rate of use of improved practices in litchi as well as its cultivation.

4.2.1 Rank order of problem confrontation by the litchi growers

The problems identified by the litchi growers are listed below according to importance based on Problem Confrontation Index (PCI) in the Table 4.11.

Table 4.11 Rank order of Problem Confrontation

Sl No.	Problems	Extent of problem confrontation				Compound scores	Rank order
		High	Medium	Low	Not at all		
1	Packaging problem	86	15	3	0	291	1
2	Insect attack	67	34	1	1	270	2
3	Post harvest damage caused by bat	56	45	1	1	259	3
4	Lack of extension service	64	28	7	4	255	4
5	Lack of credit	21	65	14	3	207	5
6	Lack of skilled labors	17	68	16	2	203	6
7	Problems of irrigation in dry season	5	72	25	1	184	7
8	High price of fertilizer	1	79	23	0	184	7
9	Disease infestation	6	72	12	13	174	8
10	Lack of improved seedling	1	24	67	11	118	9

Data presented above showed that the extent of use of improved practices was mostly hindered due to Packaging problem, Insect attack, Post harvest damage caused by bat, Lack of extension service, Lack of credit, lack of skilled labors, problems of irrigation in dry season, high price of fertilizer, lack of improved seedling etc. in litchi cultivation.

In view of the urgent need for increasing litchi cultivation, adequate steps should be taken on a priority basis to remove various problems causing hindrance to the cultivation practices. Utmost effort should be taken to remove or minimize these problems.

4.3 Use of improved practices by the farmers in litchi cultivation

In order to have clear understanding of the six groups of improved practices in litchi cultivation, all the six groups' scores were added together. Thus, the use scores of the farmers ranged from 21 to 49 against the possible range 0 to 81 where the mean 38.94 and the standard deviation 6.78. Based on the observed scores, the growers were classified into three categories as shown in Table 4.12

Table 4.12 Distribution of farmers according to their use of improved practices in litchi cultivation

Categories	Farmers (N = 103)		Mean	Standard deviation
	Number	Percentage		
Low user (up to 33)	23	22.34	38.94	6.78
Medium user (33-47)	72	69.90		
High user (>47)	8	7.76		
Total	103	100		

Data presented in Table 4.12 revealed that the highest proportion (69.90 percent) of the growers fell under 'medium user category' while 22.34 percent had 'low user' and 7.76 percent had 'high user' category. Thus, the overwhelming majority (77.66 percent) of the growers had medium to high use of improved practices in litchi cultivation.

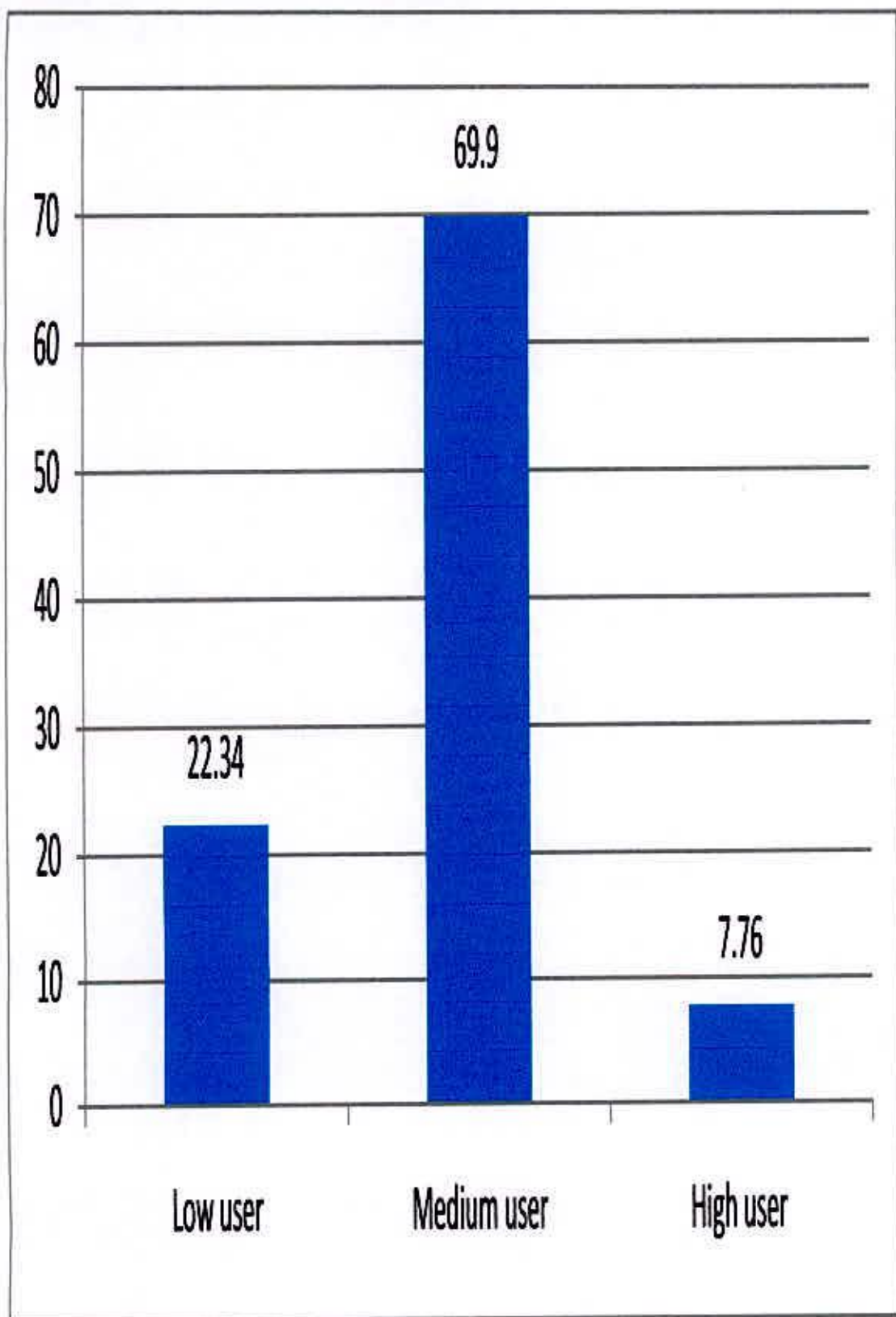


Fig. 4.1 Bar graph of percentages of improved practices user in litchi cultivation.

Table 4.13 Use of improved practices in litchi cultivation in twenty seven (27) items by the farmers with improved practices use index (UIPI) and rank order (N = 103)

Sl. No	Name of improved practices	Farmers in litchi cultivation(N=103)				Use of Improved Practices Index (UIPI)	Rank Order
		Regularly	Occasionally	Rarely	Not used		
1	'M.P' fertilizer	102	0	0	1	306	1
2	Weeding	101	0	1	1	304	2
3	Pruning	97	6	0	0	303	3
4	'Urea' fertilizer	100	1	0	2	302	4
5	'T.S.P' fertilizer	100	0	0	3	300	5
6	Shallow tubewell	100	0	0	3	300	6
7	'Local (Hazrapuri)' variety	95	6	1	1	298	7
8	'Bombay' variety	93	6	2	2	293	8
9	'Cowdung' fertilizer	86	13	2	2	286	9
10	'Planofix' hormone	84	3	0	16	258	10
11	'Cyperson' pesticide	75	14	0	14	253	11
12	'Antacon' pesticide	70	0	0	33	210	12
13	'Zipsum' fertilizer	65	0	1	37	196	13
14	'China-3' variety	32	5	8	58	114	14
15	'Sobicron' pesticide	20	16	1	66	93	15
16	'Zinc Sulphate' fertilizer	19	0	0	84	57	16
17	'Boxal super' hormone	9	14	0	80	55	17
18	'Muzaffarpuri' variety	12	4	3	84	47	18
19	Hand tubewell	1	19	4	79	45	19
20	'Malathion' pesticide	5	0	1	97	16	20
21	'Bedana' variety	2	0	1	100	7	21
22	'Flora' hormone	0	3	0	100	6	22
23	'BARI litchi' variety	0	1	0	102	2	23
24	'Chai' fertilizer	0	0	0	103	0	24
25	Deep tubewell	0	0	0	103	0	24
26	Training	0	0	0	103	0	24
27	Drainage management	0	0	0	103	0	24

Table 4.14 Correlation Co-efficient between the Selected Characteristics of the farmers in litchi cultivation and their extent of Use of Improved Practices in Litchi Cultivation

Dependent variable	Independent variable	Computed value of "r"	Tabulated value of "r" of 101 d.f.	
			0.05	0.01
Extent of Use of improved practices in litchi cultivation	Age	0.082 ^{NS}	0.191	0.254
	Education	0.080 ^{NS}		
	Litchi cultivation area	0.108 ^{NS}		
	Annual income	0.058 ^{NS}		
	Extension contact	0.379**		
	Innovativeness	0.770**		
	Agricultural knowledge	0.712**		
	Farming experience	0.296**		

NS = Not significant

* = Correlation is significant at the 0.05 level of probability at 101 d.f.

** = Correlation is significant at the 0.01 level of probability at 101 d.f.

4.4 Relation between Selected Characteristics of the farmers in Litchi cultivation and their Use of Improved Practices in Litchi Cultivation

4.4.1 Age and improved practices in litchi cultivation

The relationship between age of the farmer and their use of improved practices was examined by testing the concerned null hypothesis.

Co-efficient of correlation between the concerned variables was found to be 'r' = (0.082) as shown in table 4.14. This led to the following observation regarding the relationship between the two variables under consideration

- The relationship showed a positive trend.
- The computed value of 'r' (0.082) was smaller than the tabulated value (r = 0.191) with 101 degree of freedom at 0.05 of probability.

On the basis of above findings, the null hypothesis could not be rejected. Hence, the researcher concluded that age of the growers had no significant

relationship with their use of improved practices. Similar findings were also observed by Chowdhury (1997) and Islam (2003).

4.4.2 Education and use of improved practices in Litchi cultivation

The relationship between education of the farmer and their use of improved practices was examined by testing the concerned null hypothesis.

Co-efficient of correlation between the concerned variables was found to be ' r ' = (0.080) as shown in Table 4.14. This led to the following observations regarding the relationship between the two variables under consideration.

- The relationship showed a positive trend.
- The computed value of ' r ' (0.080) was smaller than the tabulated value ($r = 0.191$) with 101 degree of freedom at 0.05 level of probability.

On the basis of above findings, the null hypothesis could not be rejected. Hence, the researcher concluded that education of the growers had no significant relationship with their use of improved practices. Litchi cultivation is a long term practice. Those who are engaged, literacy rate in them is low. A farmer who receives high level of education but less involvement in farming might possess lower improved practices in litchi cultivation than the farmers who are actively involved in farming for a long period of time.



4.4.3 Litchi cultivation area and improved practices in litchi cultivation

The relationship between litchi cultivation area of the farmer and their use of improved practices was examined by testing the concerned null hypothesis.

Co-efficient of correlation between the concerned variables was found to be ' r ' = (0.108) as shown in table 4.14. This led to the following observation regarding the relationship between the two variables under consideration.

- The relationship showed a positive trend.
- The computed value of ' r ' (0.108) was smaller than the tabulated value ($r = 0.191$) with 101 degree of freedom at 0.05 of probability.

On the basis of above findings, the null hypothesis could not be rejected. Hence, the researcher concluded that area of the farmers had no significant relationship with their use of improved practices. Similar findings were also observed by Chowdhury (1997 and Islam (2003).

4.4.4 Annual income and use of improved practices in litchi cultivation

The relationship between annual income of the growers and their use of improved practices was examined by testing the concerned null hypothesis.

Co-efficient of correlation between the concerned variables was found to be ' r ' = (0.058) as shown in Table 4.14. This led to the following observation regarding the relationship between the two variables under consideration.

- The relationship showed a positive trend.
- The computed value of " r " (0.058) was smaller than the tabulated value ($r = 0.191$) with 101 degree of freedom at 0.05 level of probability.

On the basis of above findings, the null hypothesis could not be rejected. Hence, the researcher concluded that annual income of the growers had no significant relationship with their use of improved practices.

Similarly, Faruque (2002) indicate that the annual income of the farmers had no significant relationship with the use of ITK in rice cultivation.

4.4.5 Extension contact and use of improved practices in litchi cultivation

The relationship between extension contact of the growers and their use of improved practices was examined by testing the concerned null hypothesis. Co-efficient of correlation between the concerned variables was found to be ' r ' = (0.379) as shown in Table 4.14. This led to the following observation regarding the relationship between the two variables under consideration.

- The relationship shows a positive trend.
- The computed value of " r " (0.379) was larger than the tabulated value ($r=0.254$) with 101 degree of freedom at 0.01 level of probability.

On the basis of above findings, the null hypothesis was rejected. Hence, the researcher concluded that extension contact of the growers had significant relationship with their use of improved practices. Similar findings were also observed by Chowdhury (1997), Podder (1999), Hussen (2001) and Aurangozeb (2002).

4.4.6 Innovativeness and use of improved practices in litchi cultivation

The relationship between innovativeness of the farmers in litchi cultivation and their use of improved practices was examined by testing the concerned null hypothesis.

Co-efficient of correlation between the concerned variable was found to be ' r ' = (0.770) as shown in Table 4.14. This led to the following observed regarding the relationship between the two variables under consideration.

- The relationship showed a positive trend.
- The computed value of " r " (0.770) was larger than the tabulated value ($r = 0.254$) with 101 degrees of freedom at 0.01 level of probability.

On the basis of above findings, the null hypothesis was rejected. Hence, the researcher concluded that innovativeness of the growers had high significant relationship with their use of improved practices. Similar findings were also observed by Chowdhury (1997), Podder (1999), Aurangozeb (2002) and Islam (2002).

4.4.7 Knowledge in litchi cultivation and use of improved practices in litchi cultivation

The relationship between agricultural knowledge of the growers and their use of improved practices was examined by testing the concerned null hypothesis.

Co-efficient of correlation between the concerned variable was found to be “ r ” = (0.712) as shown in Table 4.14. This led to the following observed regarding the relationship between the two variables under consideration.

- The relationship showed a positive trend.
- The computed value of “ r ” (0.712) was larger than the tabulated value ($r = 0.254$) with 101 degrees of freedom at 0.01 level of probability.

On the basis of above findings, the null hypothesis was rejected. Hence, the researcher concluded that knowledge in litchi cultivation of the growers had high significant relationship with their use of improved practices in litchi cultivation. Here, acquiring of deep knowledge in litchi cultivation helped the farmers to high use of improved practices in litchi cultivation.

Sadar (2002) found that the agricultural knowledge had significant positive relationship with their adoption of IPM practices. Ali (1995) also got the similar finding.

4.4.8 Farming Experience and use of improved practices in litchi cultivation

The relationship between Farming Experience of the growers and their use of improved practices was examined by testing the concerned null hypothesis.

Co-efficient of correlation between the concerned variable was found to be “ r ” = (0.296) as shown in Table 4.14. This led to the following observed regarding the relationship between the two variables under consideration.

- The relationship showed a positive trend.
- The computed value of “ r ” (0.296) was larger than the tabulated value ($r = 0.254$) with 101 degrees of freedom at 0.01 level of probability.

On the basis of above findings, the null hypothesis was rejected. Hence, the researcher concluded that farming experience of the growers had high significant relationship with their use of improved practices in litchi cultivation. It could be concluded that the farmers who were more experienced found related to high use improved practices in litchi cultivation.

CHAPTER 5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

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

5.1 Summary of the findings

The major findings of the study are summarized below:

5.1.1 Selected characteristics of the study

Age

The highest proportion (66.51 percent) of the farmers was middle aged, while 16.01 percent was young and 17.48 percent old.

Education

Highest proportion (36.90 percent) of the farmers are secondary education, compared to 30.10 percent having no education, 23.30 percent had primary education and 9.70 Percent had above secondary education.

Litchi cultivation area

Large proportion 54.37 percent of the farmers were found to have small cultivation area, 34.95 percent medium cultivation area and 10.68 percent had large cultivation area.

Annual income

The highest proportion (62.14 percent) of the growers had medium annual income compared to 21.36 percent low annual income and 16.50 percent having high annual income.

Extension contact

The highest proportion (87.37 percent) of the growers had medium extension contact compared to 12.63 percent low extension contact, 0 percent having high extension contact.

Innovativeness

The highest proportion (65.05 percent) of the growers had medium innovativeness compared to 12.62 percent low and 22.33 percent having high innovativeness.

Agricultural knowledge in litchi cultivation

The highest proportion (65.05 percent) of the farmers had medium agricultural knowledge, compared to 27.18 percent had low knowledge and 7.77 percent had high knowledge.

Farming experience

Based on the observed overall farming experience score, the highest proportion (83.50 percent) of the farmers had medium farming experience, compared to 8.74 percent had low farming experience and 7.76 percent had high farming experience.

5.1.2 Extent of use of improved practices by the farmers in litchi Cultivation

Majority (69.90 percent) of the farmers had medium user of improved practices compared to 22.34 percent having low user and 7.76 percent having high user of improved practices.

5.1.3 Relationships of the selected characteristics with their use of improved practices in litchi cultivation

Extension contact, Innovativeness, knowledge in litchi cultivation and farming experience had significant positive relationship with their use of improved practices in litchi cultivation. Other variable like age, education, litchi cultivation area and annual income of the farmers had no significant relationship with their use of improved practices in litchi cultivation.

5.1.4 Problem confrontation by the farmers in litchi cultivation

Majority (62.14 percent) of the farmers were medium confronted compared to 4.85 percent were low confronted and 33.01 percent were high confronted.

5.2 Conclusions

Findings of the study and the logical interoperations of their meaning in light of other relevant facts promoted the research to draw the following conclusions:

1. Findings indicate that about 69.90 percent of the farmers are medium user of improved practices in litchi cultivation, while 22.34 percent are low user and 7.76 percent are high user. Therefore, it may be concluded that extent of use of the farmers in respect of improved practices presents a promising picture, but there is a future scope for increasing the extent of use of improved practices in litchi cultivation.
2. Extension contact of the litchi farmers had a significant relationship with their use of improved practices in litchi cultivation. This means that the growers with more extension contact with different extension methods are expected to more use of improved practices in litchi cultivation. It may therefore, be concluded that use of improved practices in litchi cultivation will be increased, if the farmers are highly exposed to different information sources and extension teaching methods.
3. Innovativeness of the growers had significant and positive relationship with their use of improved practices in litchi cultivation. This means that with increase of innovativeness, the rate of use also increases. Frequent contact with extension media can make farmers more innovative which will ultimately lead to use of improved practices in litchi cultivation. This situation is quite favorable for the implementation of agricultural development programs in the study area.
4. Knowledge in litchi cultivation of the growers had a significant and positive relationship with their use of improved practices in litchi cultivation. Through agricultural knowledge, an individual farmer

becomes aware of recent information on various aspects of improved practices in litchi cultivation. Unless arrangements are made for increasing the agricultural knowledge of the litchi farmers, their use of improved practices in litchi cultivation would be hampered. For successful use of improved practices in litchi cultivation, the farmers need to be aware and then to know the methods about their cultivation.

5. Farming experience in litchi cultivation of the farmers had a significant and positive relationship with their use of improved practices in litchi cultivation. Farming experience of individual farmers can be shared with the recent information on various aspects of improved practices in litchi cultivation. The increasing of farming experience of the farmers in litchi cultivation, their use of improved practices in litchi cultivation would be increased. For successful use of improved practices in litchi cultivation, the farmers need to be aware and then to know the methods about their cultivation.

5.3 Recommendations

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

5.3.1 Recommendation for policy implication

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

1. The level of use of improved practices in litchi cultivation was encouraging. However, there is a need of efforts for wide use of improved practices in litchi cultivation by the farmers.
2. In view of the absence of any relationship between age of the farmers and their use of improved practices in litchi cultivation, it is

recommended that the extension workers should work with the farmers of all groups to promote the use of improved practices in litchi cultivation.

3. In respect of insignificant relationship between the education and improved practices, it would be recommended that the extension workers should work with the educated farmers in sharing their views with the farmers in using improved practices in more and long term basis.
4. The annual income of the farmers had no significant relationship with their use of improved practices. Those farmers who are in long time in litchi cultivation, their annual income will increase more when they use more improved practices. So it leads to the recommendation that extension service should provide adequate litchi cultivation management practices to the farmers.
5. Extension contact of the farmers showed significant influence on use of improved practices in litchi cultivation. Hence, the concerned authorities should take cognizance of these facts and should take necessary steps to increase the frequency of extension contact of the farmers.
6. Innovativeness of the farmers in litchi cultivation has positive and significant relationship with their use of improved practices in litchi cultivation. So, extension providers should take necessary steps to increase innovativeness of the farmers for better use of improved practices in litchi cultivation.
7. Knowledge in litchi cultivation of the farmers had significant and positive relationship with their use of improved practices in litchi cultivation. Hence, it may be recommended that arrangements should be made by the relevant authorities to increase the agricultural knowledge of the farmers in litchi cultivation through training and other motivational activities.

5.3.2 Recommendation for further study

A small piece of study as has been conducted cannot provide all information for the proper understanding of the farmers towards the use of improved practices in litchi cultivation. Therefore, the following recommendations were made for further study:

1. The present study was conducted in Magura Sadar Upazila under Magura district. It is recommended that similar studies should be concluded with other litchi growing areas of Bangladesh.
2. This study investigated the relationship eight characteristics of the farmers with their use of improved practices in litchi cultivation as dependent variable. Therefore, it is recommended that further study be conducted with other independent and dependent variables.
3. In the present study age, education, annual income had no significant relationship with their use of improved practices in litchi cultivation. In this respect, further verification is necessary.
4. Research should be undertaken to identify the factors causing hindrance towards the use of improved practices in litchi cultivation.
5. Studies need to be undertaken to ascertain the litchi production procedures for establishment and maintenance of nursing organization in the rural areas of Bangladesh. In viewing the outcome of the research govt. should manipulate present policies to upgrade the production.



CHAPTER 6

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APPENDICES

APPENDIX-A

(English version of interview schedule)

Department of Agricultural Extension and Information System

Sher-e-Bangla Agricultural University

Dhaka-1207

Use of Improved Practices by the Farmers in Litchi Cultivation

Serial No.....

Name of the respondent.....

Village.....

Union.....

Upazila.....

District.....

Please answer the following questions

1. Age

How old are youyrs

2. Education

What is the extent of your education?

a. Don't know reading and writing.....

b. Don't know reading and writing but can sign only.....

c. Passedclass

3. Litchi cultivation area

Please mention the area of your litchi cultivation land.....ha

4. Annual income

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

A. Income from agricultural sources

Sl. No.	Name of crops	Total production (local unit)	Price per unit	Total price Tk
1.	Litchi			
2	Mango			
3	Jackfruit			

4	Rice			
5	Jute			
6	vegetables			
7	pulse,oils			
8	wheat			
9	Banana			
10	Others			
Sub total				

B. Income from livestock and fisheries

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

C. Income from non-agricultural sources

Sl. No.	Sources of income	Income	
		Monthly income(Tk.)	Annual income(Tk.).
1	Service		
2	Business		
3	Other family members income		
4.	Others		
Sub total			

Total income= A+B+C= Tk.



5. Extension Contact

Please mention extent of your contact of following agricultural extension media.

Sl. No.	Communication Media	Extent of communication			
		Regularly	Occasionally	Rarely	Not at all
Personal media contact					
1	Sub-asstt. Agri. Officer	>3 times/month	2 times/month	1times/month	0
2	Model farmer	>3 times/year	2 times/year	1times/year	0
3	Upazila level Agriculture Officer	>6 times/year	3-4 times/year	1-2 times/year	0
4	Neighbors	>4 times/month	3-4 times/month	1-2 times/month	0
5	NGO workers	>4 times/month	2 times/month	1times/month	0
Group media contact					
6	Group discussion	>4 times/year	2-3 times/year	1-2 times/year	0
7	Field day	>4 times/year	1-3 times/year	1-2 times/year	0
8	Result demonstration	>4 times/year	1-3 times/year	1-2 times/year	0
9	Training	>3 times/life	2 times/life	1times/life	0
Mass media contact					
10	Farm Radio	>4 times/week	2-3 times/week	1-2 times/week	0
11	Agricultural television program	>4 times/week	2-3 times/week	1 times/week	0
12	Print media	>5 times/month	3-4 times/month	1 times/month	0
13	Agricultural fair	3 times/year	2 times/year	1times/year	0

6. Innovativeness

Indicate the extent of your use of the following innovation

Sl No.	Name of the practices	Do not use	Duration of use			
			Within 2 year after listening	Within 2-3 year after listening	3-4 years after listening	After 5 years of listening
1	Use of IPM					
2	China-3 litchi					
3	Use of pesticides (Basis, Antacon) after fruit setting					
4	Use of hormone before flowering					
5	Use of guti urea					
6	Use of tractor					

7	Use of micronutrient (zinc & boron)					
8	Cultivation of Hybrid rice					

7. Agricultural knowledge in Litchi Cultivation

Please answer the following questions

Sl No.	Questions	Full Mark	Mark Obtained
1	What is the suitable soil for litchi cultivation	2	
2	Mention two modern varieties of litchi	2	
3	Mention the fertilizer doses used in pit before plantation of litchi seedling	2	
4	Name two intercrops used in litchi	2	
5	Mention the suitable application time of fertilizer in litchi cultivation	2	
6	Mention the reasons for dropout of fruit	2	
7	Mention two harmful insects of litchi	2	
8	Mention name of that hormone used in litchi cultivation	2	
9	Mention two insecticides for controlling the insect of litchi	2	
10	What is air layering	2	
11	Mention two reasons of pruning of litchi	2	
12	Mention fertilizer doses of an adult litchi plant	2	
13	Mention the spray mixture used for protecting the dropout of litchi	2	
14	Mention the appropriate time of irrigation	2	
Total		28	

8. Farming experience (year)

How many years are you engaged in litchi cultivation.....yrs

9. Problem confrontation

Please mention the extent of problems that you faced during litchi cultivation.

Sl No.	Problems	Extent of problems			
		High	Medium	Low	Not at all
1	Lack of improved seedling				
2	High price of fertilizer				
3	Problems of irrigation in dry season				
4	Lack of skilled labors				

5	Lack of extension service				
6	Lack of credit				
7	Packaging problem				
8	Post harvest damage caused by bat				
9	Insect attack				
10	Disease infestation				

10. Use of improved practices in litchi cultivation

a. Improved varieties

Please mention the extent of use of the following litchi varieties

Sl No.	Name of varieties	Extent of use			
		11-15 years	6-10 years	1-5 years	Not used
1	Bombay				
2	China-3				
3	BARI litchi				
4	Muzaffarpuri				
5	Bedana				
6	Local (Hazrapuri)				

b. Use of recommended dose of fertilizer

Please mention the doses of fertilizer in adult litchi plant in a year that you use in your litchi garden.

Sl No.	Name of fertilizer	Extent of use			
		Regularly	Occasionally	Rarely	Not used
1.	Cowdung				
2.	Urea				
3.	T.S.P				
4.	M.P				
5.	Zipsum				
6.	Zinc Sulphate				
7.	Chai				

c. Use of hormone

Please mention the extent of hormone application in your litchi garden

Sl No.	Name of hormone	Extent of use			
		Regularly	Occasionally	Rarely	Not used
1.	Planofix				
2.	Flora				
3.	Boxal super				

d. Use of irrigation

Please mention the extent of irrigation using the pump/tubewell in your litchi garden

Sl. No.	Type of irrigation instrument	Extent of use			
		Regularly	Occasionally	Rarely	Not used
1.	Shallow tubewell				
2.	Deep tubewell				
3.	Hand tubewell				

e. Use of pesticides

Please mention the extent of use of following pesticides in your litchi garden

Sl. No.	Name of pesticides	Extent of use			
		Regularly	Occasionally	Rarely	Not used
1.	Antacon				
2.	Sobicron				
3.	Cyperson				
4.	Malathion				

f. Use of intercultural operation

Please mention the extent of following intercultural operations in your litchi garden

Sl. No.	Intercultural operations	Extent of use			
		Regularly	Occasionally	Rarely	Not used
1.	Pruning				
2.	Training				
3.	Weeding				
4.	Drainage management				

Thank you for your kind cooperation

Date:

Signature of the interviewer

৫। সম্ভারণ কর্মকাণ্ডে ঙোগাযোগঃ

ক্রমিক নং	যোগাযোগ মাধ্যম	যোগাযোগের ব্যক্তি			
		নিয়মিত	মাঝে মাঝে	কদাচিৎ	কখনো না
● ব্যক্তিগত যোগাযোগ					
১.	উপসহকারী কর্মকর্তা	> ৩বার/মাস	২ বার / মাস	১ বার / মাস	০
২.	আদর্শ কৃষক	> ৩ বার / বছর	২ বার / বছর	১ বার / বছর	০
৩.	উপজেলা পর্বারের কর্মকর্তা	> ৬ বার / বছর	৩-৪ বার / বছর	১-২ বার / বছর	০
৪.	প্রতিবেশী	> ৪ বার / মাস	৩-৪ বার / মাস	১-২ বার / মাস	০
৫.	এনজিও কর্মকর্তা	> ৪বার / মাস	২ বার / মাস	১ বার / মাস	০
● দলভিত্তিক যোগাযোগ					
৬.	দলীয় আলোচনায় অংশগ্রহণ	>৪ বার / বছর	২-৩ বার / বছর	১-২ বার / বছর	০
৭.	কৃষক কর্মদিবস	>৪ বার / বছর	১-৩ বার / বছর	১-২ বার / বছর	০
৮.	রেজাল্ট ডেমোনেস্ট্রেশন	>৪ বার / বছর	১-৩ বার / বছর	১-২ বার / বছর	০
৯.	কৃষি প্রশিক্ষণে অংশগ্রহণ	>৩ বার / জীবনব্যাপী	২ বার / জীবনব্যাপী	১ বার / জীবনব্যাপী	০
● গণমাধ্যম যোগাযোগ					
১০.	রেডিও তে কৃষি সবেদ শোনা	>৪ বার / সপ্তাহ	২-৩ বার / সপ্তাহ	১-২ বার / সপ্তাহ	০
১১.	টেলিভিশনে কৃষি বিষয়ক অনুষ্ঠান দেখা	>৪ বার / সপ্তাহ	২-৩ বার / সপ্তাহ	১ বার / সপ্তাহ	০
১২.	কৃষি বিষয়ক ম্যাগাজিন পড়া	>৫ বার / মাস	৩-৪ বার / মাস	১ বার / মাস	০
১৩.	কৃষি মেলা প্রদর্শন	৩ বার / বছর	২ বার / বছর	১ বার / বছর	০

৬। উদ্ভাবনী টিআঃ

আপনার নতুন প্রযুক্তি গ্রহণ বা বর্জনের দিকগুলি তুলে ধরুনঃ

ক্রমিক নং	প্রযুক্তির নাম	প্রযুক্তি গ্রহণের ব্যক্তি				
		ব্যবহার করি না	শোনার ২ বছর পর	শোনার ২- ৩ বছর পর	শোনার ৩-৪ বছর পর	শোনার > ৫ বছর পর
১.	চাষে ইনটিগ্রেটেড পেষ্ট ম্যানেজমেন্ট ব্যবহার					
২.	চায়না-৩ জাতের ব্যবহার					
৩.	কীটনাশক (ব্যাসিস,এন্টাকন,সবিএন) ব্যবহার					
৪.	ফুল ধরার হরমোন (পেলানোফিক্স) এর ব্যবহার					
৫.	গুটি ইউরিয়ার ব্যবহার					
৬.	ট্রাষ্টরের ব্যবহার					
৭.	অনু খাদ্য (জিকে ও বোরন) ব্যবহার					
৮.	উচ্চ ফলদর্শী ধান চাষ					



APPENDIX C

Correlation Matrix showing interrelationship among all the variables

	X ₁	X ₂	X ₃	X ₄	X ₅	X ₆	X ₇	X ₈	X ₉
X ₁	1	-.178	.242(*)	.086	.154	.037	-.010	.293(**)	.082
X ₂	-.178	1	.041	.008	.098	.106	-.048	.023	.080
X ₃	.242(*)	.041	1	.411(**)	.302(**)	.137	.148	.068	.108
X ₄	.086	.008	.411(**)	1	.295(**)	.126	.119	.040	.058
X ₅	.154	.098	.302(**)	.295(**)	1	.423(**)	.376(**)	.209(*)	.379(**)
X ₆	.037	.106	.137	.126	.423(**)	1	.618(**)	.295(**)	.770(**)
X ₇	-.010	-.048	.148	.119	.376(**)	.618(**)	1	.187	.712(**)
X ₈	.293(**)	.023	.068	.040	.209(*)	.295(**)	.187	1	.296(**)
X ₉	.082	.080	.108	.058	.379(**)	.770(**)	.712(**)	.296(**)	1

Note: * = Correlation is significant at the 0.05 level of probability (Table value of 'r' is 0.191 at 101 d.f.)

** = Correlation is significant at the 0.01 level of probability (Table value of 'r' is 0.254 at 101 d.f.)

X₁ = Age

X₂ = Education

X₃ = Annual income

X₄ = Litchi cultivation area

X₅ = Extension contact

X₆ = Innovativeness

X₇ = Agricultural knowledge in litchi cultivation

X₈ = Farming experience

X₉ = Use of Improved Practices

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