

BARRIERS IMPEDING MUSHROOM CULTIVATION

SADIA TABASSUM PAYEL



DEPARTMENT OF AGRICULTURAL EXTENSION &

INFORMATION SYSTEM

SHER-E-BANGLA AGRICULTURAL UNIVERSITY

DHAKA-1207

DECEMBER 2015

BARRIERS IMPEDING MUSHROOM CULTIVATION

By

SADIA TABASSUM PAYEL

Reg. No. 14-06353

A thesis

Submitted to the Department of Agricultural Extension and Information System

Sher-e-Bangla Agricultural University, Dhaka

In partial fulfillment of the requirements

for the degree of

MASTER OF SCIENCE

IN

AGRICULTURAL EXTENSION

SEMESTER: JANUARY-JUNE, 2015

APPROVED BY:

M. Zahidul Haque

Professor

Department of Agricultural Extension and
Information System

Sher-e-Bangla Agricultural University

Sher-e-Bangla Nagar, Dhaka-1207

(Supervisor)

Mohammad Zamshed Alam

Associate Professor

Department of Agricultural Extension
and Information System

Sher-e-Bangla Agricultural University

Sher-e-Bangla Nagar, Dhaka-1207

(Co-Supervisor)

Dr. Md. Mahbubul Alam

Chairman

Examination Committee

Dept. of Agricultural Extension and Information System

Sher-e-Bangla Agricultural University



**DEPARTMENT OF AGRICULTURAL
EXTENSION AND INFORMATION
SYSTEM**

Sher-e-Bangla Agricultural University
Sher-e-Bangla Nagar, Dhaka-1207

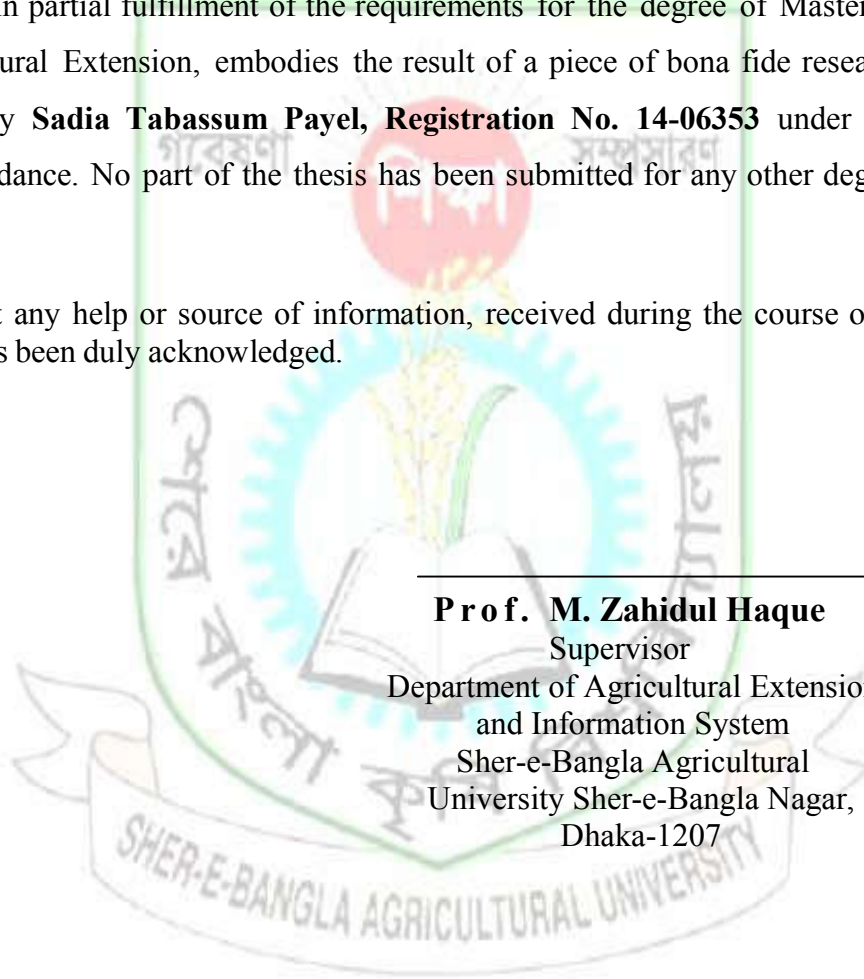
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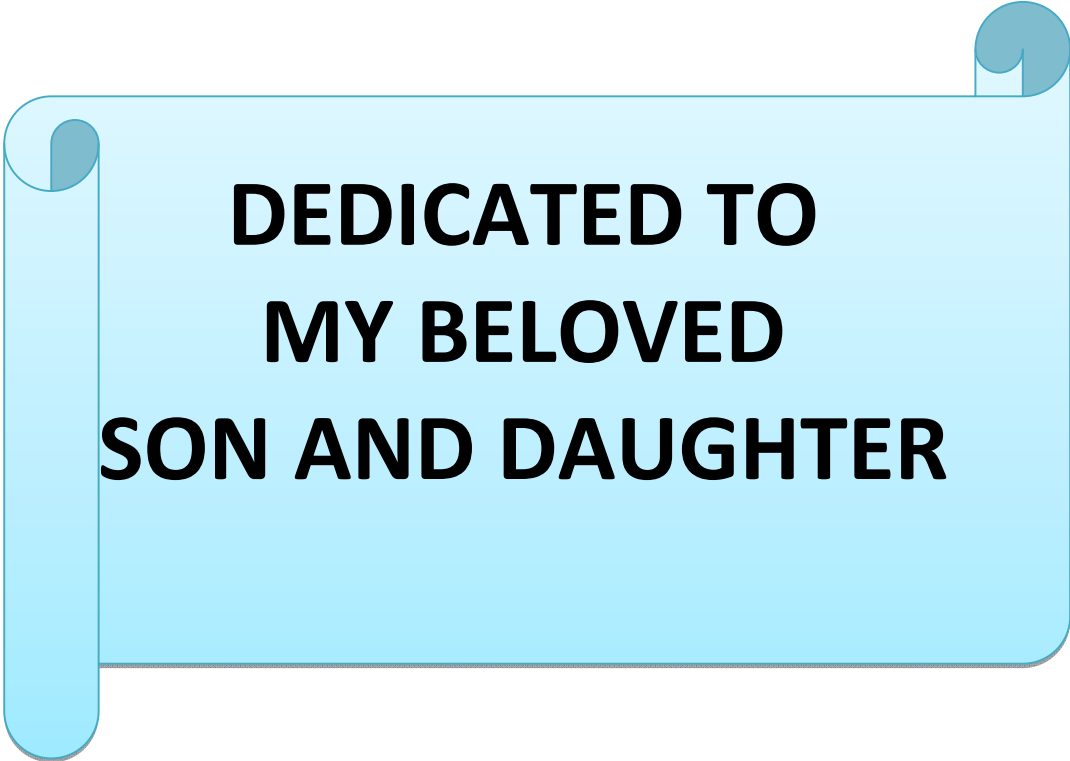
This is to certify that the thesis entitled “**BARRIERS IMPEDING MUSHROOM CULTIVATION**” submitted to the Faculty of Agriculture, Sher-e-Bangla Agricultural University, Dhaka, in partial fulfillment of the requirements for the degree of Master of Science in Agricultural Extension, embodies the result of a piece of bona fide research work carried out by **Sadia Tabassum Payel, Registration No. 14-06353** under my supervision and guidance. No part of the thesis has been submitted for any other degree or diploma.

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

Dated:
Dhaka, Bangladesh

Prof. M. Zahidul Haque
Supervisor
Department of Agricultural Extension
and Information System
Sher-e-Bangla Agricultural
University Sher-e-Bangla Nagar,
Dhaka-1207





**DEDICATED TO
MY BELOVED
SON AND DAUGHTER**

ACKNOWLEDGEMENTS

All praises to Almighty Allah the Lord of the Universe, the Beneficial, the Merciful, without whose grace the author would have never been able to pursue to carry out the whole research and to build up this thesis for the degree of Master of Science (MS) in Agricultural Extension.

The author would like to express her heartfelt indebtedness, deepest sense of gratitude, sincere appreciation and profound regards to her reverend teacher and research supervisor, M. Zahidul Haque, Professor, Department of Agricultural Extension and Information System, Sher-e-Bangla Agricultural University, Dhaka for his scholastic and dynamic guidance, unflinching cooperation, constant inspiration, affectionate feeling, constructive criticism and encouragement throughout the period of the research and preparation of the manuscript.

The author deems proud privilege to extend her extreme gratefulness and best regards to her venerable co-supervisor Mohammad Zamshed Alam, Associate Professor, Department of Agricultural Extension and Information System, Sher-e-Bangla Agricultural University, Dhaka for his keen interest, valuable advice, creative suggestions, co-operation and encouragement to bring this thesis up to its present standard.

It is also a great pleasure for the author to express hearty appreciation and regard to Dr. Muhammad Humayun Kabir, Associate Professor; Dr. Md. Mahbubul Alam, Associate Professor; and Dr. Ranjan Roy, Associate Professor, Department of Agricultural Extension and Information System, Sher-e-Bangla Agricultural University, Dhaka for their affectionate feelings and valuable suggestions during the research work.

The author deeply acknowledges the cooperation and sincere help of the Deputy Director of mushroom cultivation center of Savar municipality. The author also expresses her heartfelt gratitude to the respondents of the study area who patiently provided the information during the interview with the author.

Thanks and sincere gratitude is also due to her beloved husband Dewan Mohammad Sams-uz-zaman, Senior Officer, Dhaka bank Ltd., EPZ branch for his gracious, cordiality, sacrifice and hospitality during research work.

Last but not least, the author expresses her deepest sense of gratitude, indebtedness and profound respect to her beloved parents, uncles, brothers, sister, relatives and friends for their blessings, encouragement and moral support in all phases of this academic pursuit from beginning to the end.

The Author

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ABBREVIATIONS AND ACRONYMS

BBS	:	Bangladesh Bureau of Statistics
FAO	:	Food and Agriculture Organization
Tk.	:	Taka
df	:	Degrees of Freedom
SPSS	:	Statistical Package for Social Sciences

BARRIERS IMPEDING MUSHROOM CULTIVATION

ABSTRACT

Mushrooms are very nutritious products that can be generated from lignocelluloses waste materials; and are rich in crude fiber and protein. The climate of Bangladesh is favorable for mushroom cultivation. Although mushroom is nutritious food in many countries of the world, but the production and consumption of mushroom is yet to be popular in Bangladesh. The purpose of the study was to determine the barriers impeding mushroom cultivation and to explore the contributing characteristics of the mushroom growers to barriers impeding mushroom cultivation. Savar municipality was purposively selected as the study area from Savar upazila under Dhaka district. Data were collected using interview schedule from a sample of 114 mushroom growers out of 204 growers selected by random sampling. To measure the dependent variable 20 barriers were selected and scale score was used to determine the barriers impeding mushroom cultivation. For making comparative analysis of the 20 selected barriers impeding mushroom cultivation an overall barriers impeding mushroom cultivation Index (BIMCI) was calculated. Multiple regression was used to analyze the contribution of selected characteristics of the mushroom growers to the barriers impeding mushroom cultivation. The findings revealed that majority (74.6%) of the growers faced medium barriers of mushroom cultivation compared to 11.4 percent faced low and 14.0 percent faced high barriers of mushroom cultivation. The overall contribution was 51.8%. Experience in mushroom cultivation, knowledge on mushroom cultivation, attitude towards mushroom and credit availability showed the negative significant contribution to the barriers impeding mushroom cultivation. Other characteristics of mushroom growers had no significant contribution to the barriers impeding mushroom cultivation. The findings also revealed that low technical knowledge on mushroom cultivation, lack of market facilities were the major barriers among selected twenty barriers. On the basis of findings it can be concluded that consultation and training programs on mushroom cultivation, well developed market facility and giving credit facility for mushroom cultivation can reduce the barriers impeding mushroom cultivation.

CHAPTER 1

INTRODUCTION

1.1 General Background

Bangladesh is one of the lower-middle developed countries of the World. About three-fourths of the total population lives in rural areas. All of them virtually make their living exclusively or substantially from agriculture. Agriculture is one of the largest sectors of the economy in Bangladesh. The contribution of agriculture to Gross Domestic Product (GDP) in the economy of Bangladesh is 15.96 percent (BER, 2015).

Agriculture is considered as a critical sector in the world economy. It contributes 24 percent of global GDP and provides employment to 22 percent of world's population (FAO, 2015). Out of the total 15.09 million farm holdings, the marginal, small, medium, large holdings account for 38.63, 49.86, 10.34 and 1.17 percent, respectively. The landless holdings account for 14.03 percent of 28.17 million total holdings (BBS, 2012). Most of the poor farmers are employed mainly on, family farms. The objectives of rural development in developing countries are mainly diversification of rural income and attaining a competitive structure for agriculture to increase job opportunities and development. Small family farms are disadvantaged groups since they do not have enough land to produce crops and raise animal. However, the rural environment can be protected by improvement of environmental friendly agricultural practices. In the recent past different eco-friendly agricultural practices got popularity worldwide. Among those mushroom cultivation is a recognized eco-friendly production practice.

Bangladesh is a suitable country for mushroom cultivation because of her favorable climate with low production cost and high market price. Mushroom cultivation is also an accepted income generating activity that can alleviate poverty, eradicate malnutrition and create employment opportunity for educated, uneducated youths, adolescents, men and women. It can be a suitable job avenue for the poor people and alternative income source for all. Basically, Mushroom production is labor and management-intensive which takes a considerable amount of knowledge, research, planning, and capital investment to set up a production system. Comparing with other

agro-economic crops mushroom cultivation is more profitable for its low production cost, and high market price. Using agricultural waste mushroom can be produced by small, landless and marginal farmers inside a house. In Bangladesh, there is a huge prospect of mushroom cultivation because of its climate which is fairly suitable for high volume of mushroom production (Begum, 2008). So it is possible to make a good profit by investing a small amount of capital and labor in mushroom cultivation.

Mushroom is a soft delicate white fruit body of fleshy fungi. Its body looks umbrella-shaped and it grows on the substratum or under the surface of soil. The term 'mushroom' is a macro-fungus with a distinctive fruiting body, which can be hypogeous or epigeous, large enough to be seen with the naked eye and to be picked by hand (Chang and Miles, 1992). Mushroom is a highly nutritious, delicious and a good food for the children and the older as well. It is also halal vegetable with medicinal qualities which is appropriate for Bangladeshi Muslims (Begum, 2008). It has high protein and economic value. The amount of protein in mushroom is double than that of other vegetables. One hundred grams of dried mushroom contain 26.9 per cent protein while the same quantity of potato contains 7.6 percent protein (Asia Pulse News, 2008). Mushroom is used as delicious item of our food menu containing both nutritive and medicinal values (Agrahar-Murugkar *et al.*, 2005; Cheung and Cheung, 2005).

Mushroom is a fungus-type colorless plant. It does not need any sunlight to survive or grow. Mushroom seed can be sowed using industrial waste like wooden dust and husk of wheat and rice. Given a suitable environment and proper nursing its cultivation is possible throughout the year. The main raw material for growing is a composite mixture of rice straw and rice husk saw dust and cotton waste, and some other agro-residues.

Mushrooms are very nutritious products that can be generated from lignocelluloses waste materials; and are rich in crude fiber and protein. In fact, mushrooms also contain low fat, low calories and good vitamins. In addition, many mushrooms possess multi-functional medicinal properties.

Now mushroom appears to be a sustainable source of income for many people in our country. In many countries in the world, mushroom food is prepared in different ways. In our country, some Chinese restaurants serve food made of mushroom. The mushroom soup, fry and vegetable available in Chinese restaurants of our country are very delicious. Mushroom also can be used with fish, meat and vegetables. Presently, mushroom is widely used to combat cancer, hypertension, blood pressure, diabetes, heart disease, rheumatic pain, throat inflammation and to control blood cholesterol. Particularly Mushroom is effective in preventing diseases like cancer, kidney problems, hepatitis, AIDS, asthma, diabetes, insomnia and tumor.

The trend of mushroom cultivation in Bangladesh is very recent. Mushroom cultivation in Bangladesh began in 1979 with assistance from Japanese organization JOCDV. In early 1980s commercial mushroom cultivation was initiated by Bangladesh Agricultural Research Council and Mushroom Culture Centre at Savar. Apart from Savar, mushroom is being cultivated in Dinajpur, Jessore, Barisal, Chittagong, Sylhet, Comilla, Khulna, Mymensingh, Bandarban, Rangamati, Chapainawabganj and Rangpur (Asia Pulse News, 2008). In these areas mushroom is being cultivated domestically in a small scale by landless people. But it is possible to earn even foreign currency after meeting the demand of the domestic market (Alom and Bari, 2010).

Establishing larger scale mushroom cultivation systems can be more labor and management intensive. All production systems, to some extent, are vulnerable to sporadic yields, invasions of 'weed' fungi, insect pests, and unreliable market prices for traded goods. Moving from cultivating mushrooms for subsistence use to commercial production and marketing can be quite challenging to local growers (Marshall and Nair, 2009).

Barrier or constraint is the element or that works as a bottleneck. It restricts an entity, project, or system (such as a manufacturing or decision making process) from achieving its potential (or higher level of output) with reference to its goal. The constraint in technology transfer is those, which act as the barriers to the adoption of technologies by the potential users (Kashem and Halim, 1991). Constraints are the elements, which resist in doing some activities or operations in a certain field.

Different authors have classified the constraints in different ways. Some of these are given below:

Kashem (2004) explained constraint in technology transfer mainly in three aspects:

- Social constraints
- Psychological constraints
- Situational constraints

Halim (2003) conducted a study on the “Constraints Faced by the Farmers in Adopting Crop Diversification”. In his study, he selected five aspects of constraints viz.

- Socio-cultural and psychological constraints
- Economic constraints
- Situational and management constraints
- Constraints regarding inputs availability and constraints regarding extension services

Although mushroom is a popular and nutritious food in many countries of the world, but the production and consumption of mushroom is limited in Bangladesh (Begum, 2008). The initial barriers which mushroom growers have to face include determining the most suitable mushroom varieties to grow and identifying a spawn supplier, organizing available resources to develop a growing system, and assessing requirements for supplying different marketing outlets. In spite of these, starting with home production is an advisable approach. Some mushrooms have been given bad press because of poisonings, which fortunately are generally rare and have been associated with events, including: young children collecting indiscriminately and eating raw mushrooms; immigrants arriving in a new country and incorrectly identifying a local species that turns out to be poisonous; food shortages and economic hardship forcing people to hunt for food; and different physiological responses to an ‘edible’ fungus. Other health risks can include allergies to different mushroom spores.

1.2 Statement of the Problem

In spite of growing mushroom production at a vigorous rate there have some limitations also. There are several problems to cultivate mushroom scientifically. Mushrooms have not often been actively promoted in the present days. Various reasons have been cited for this neglect, including: a lack of technical capacity in production techniques with poorly equipped government supported advisory services resulting in interested farmers having to seek technology on their own; comparatively few studies on tropical mushrooms; and a lack of technical skills to produce spawn with suitable strains often hard to find (Marshall and Nair, 2009). The market can present an additional constraint in some regions as the prices of mushrooms are out of the range of most local consumers and unable to compete with other protein sources like beef, beans or eggs for a place in the average family diet.

In Bangladesh mushroom is being cultivated domestically in a small scale by many people. Mushroom is considered as one of the important food items since ancient time and its consumption is being increased over the period for its significant role in human health, nutrition and diseases (Suzuki and Oshima, 1976; Uddin, *et al.*, 2011). Over 100 countries including Bangladesh cultivate mushroom commercially. But in Bangladesh the production of mushroom is very low. Moreover different mushroom growers abandoned the cultivation of mushroom.

In view of the overall discussion, an attempt was made to undertake a piece of research entitled barriers impeding mushroom cultivation in Savar area of Bangladesh. It is necessary to have a clear understanding that what are the causes of decreasing mushroom cultivation. The main purpose of the study was to determining the barriers impeding mushroom cultivation. The study aimed at providing information regarding the following queries:

1. What are the characteristics of the mushroom cultivating farmers?
2. What are the barriers impeding mushroom cultivation in what extent?
3. What are the contributing characteristics of the farmer to the barriers impeding mushroom cultivation?

1.3 Justification of the Study

Bangladesh is a South Asian agro based country with a total area of 147570 square km (BBS 2015). About 68 percent of the people are living in rural areas and they are directly or indirectly involved in agriculture (BBS, 2014). The farmers of the country are the center point of agriculture. Population density of this country is very high, so it is suffering from protein malnutrition with high proportion of poverty. In the context of Bangladesh, low scale farming is very important to alleviate poverty. Strengthening farming sector could be essential to develop the economy and to keep its vibrancy and development, increasing and diversifying business and employment opportunities, and providing income opportunities for disadvantaged groups and small family farms.

Mushroom (*Agaricus bisporus*) production is a lucrative and profitable cottage industry for low income rural households (Lelley, 1988). Bangladesh is one of the most suitable countries in the world for mushroom cultivation for its favorable climate with low production cost and high market price. Mushroom is a soft delicate white fruit-body of the fleshy fungi. Mushroom is a highly nutritious and tasty vegetable having medicinal value. It contains 25 to 35 per cent protein, 57 to 70 percent vitamin and mineral, 5 to 6 per cent fat and 4 to 6 per cent glucose. These are required for strengthening immune system of human body. Mushroom helps cure high blood pressure, diabetes, gastric, jaundice and heart ailment, experts say.

Mushroom cultivation technology is friendly to the environment. Although mushroom is a popular and nutritious food in many countries of the world, it had long been ignored in Bangladesh. But with the passage of time the scenario of mushroom cultivation has been changed. It is assumed that mushroom cultivation has been decreasing with time. The findings from the study may be helpful to the researcher for further studies of similar nature and to the extension personnel who are directly involved in different agricultural development programmers and to the planners for making effective plans. The study will also aid extension workers to learn the production problems of the mushroom and therefore they will able to give suggestions to the farmers related to various aspects of mushroom cultivation. However, there was no any systematic research conducted on this aspect to ascertain the extent of barriers impeding mushroom cultivation. Hence, at present conducting a research study with a

view to determining barriers impeding mushroom cultivation is become very necessary.

1.4 Objectives of the Study

In view of the problems, stated above, the following objectives put forward for giving proper direction to the study:

1. To determine and describe the barriers impeding mushroom cultivation
2. To describe the following selected characteristics of the farmers:
 - i. Age
 - ii. Education
 - iii. Family size
 - iv. Experience in mushroom cultivation
 - v. Annual family income
 - vi. Knowledge on mushroom cultivation
 - vii. Attitude towards mushroom
 - viii. Credit availability
 - ix. Training received
 - x. Satisfaction for market value of mushroom
 - xi. Extension contact
 - xii. Organizational participation
3. To explore the contributing characteristics of the farmers to barriers impeding mushroom cultivation.

1.5 Assumptions of the Study

The researcher made the following assumptions while undertaking the study.

1. The respondents were capable of furnishing proper responses to the questions included in the interview schedule.
2. The researcher who has acted as interviewer was well adjusted to the social and cultural environment of the study area. Hence, the data collected by the researcher from the respondents furnished their correct opinions.
3. The responses furnished by the respondents were reliable and valid. They expressed the truth about their convictions and awareness.

4. Views and opinions given by the respondents included in the sample of the study were the representative views and opinions of the whole population of the study area.
5. The information sought reveals the real situation to satisfy the objectives of the study.
6. The items, questions and scales included in the questionnaire were relevant and appropriate.
7. Data were normally and independently distributed.
8. The sampling procedures followed for this study, the analysis of data and interpretations etc. were free from all biases.

1.6 Limitations of the Study

In order to make the study meaningful and manageable, it was necessary to impose some limitations as stated below:

1. Since the findings of the study were based on the opinion expression capability and ability to recall of the respondents, the study was confined to both their ability to recall and also their sincerity and honesty in providing the needed information.
2. There are many characteristics of the farmers but only 12 of them were selected for this study.
3. For investigation of this study, the researcher depended on the data as furnished by the selected farmers during the time of data collection.
4. The study was confined to Savar municipality under Dhaka district only.

1.7 Definition of Important Terms

For the purpose of clarity, certain terms frequently used throughout the entire study are defined and explained as follows:

Age

Age of a respondent defined as the span of his/her life and is measured by the number of years from his/her birth to the time of interviewing.

Education

Education referred to the development of desirable knowledge, skill and attitude in an individual through the experience of reading, writing, observation and relative activities.

Family size

Family size referred to actual number of permanent members in a subject's family who live in a fixed dwelling unit and eat from the same cooking arrangement.

Annual family income

Annual family income referred to the total annual earnings of all the family members of a respondent from agriculture, livestock and fisheries and other accessible resources.

Extension contact

Extension contact referred to one's becoming accessible to the influence of extension contact through different extension teaching methods or refers to the individual exposure to or contact with information sources.

Organizational participation

Organizational participation refers to the involvement of an individual in different groups or organizations of the locality as a member, executive member or chief executive.

Barriers

Barriers refer to the influences/aspects/features/issues that act as obstruction in mushroom cultivation by farmers. Generally, a problem is created in the context of either a theoretical or practical situation.

Knowledge on mushroom cultivation

Knowledge on mushroom cultivation referred to the farmers' knowledge about the different aspects of scientific management of mushroom cultivation.

Respondent

Respondent referred to the farmers who were involved in mushroom cultivation activities and were interviewed as a part of the sample of the present study.

CHAPTER 2

REVIEW OF LITERATURE

This chapter deals with the review of past studies and findings related to the present study. In fact, very few research works have so far been done on barriers impeding mushroom cultivation. The researcher therefore, made exhaustive effort to review the previous research work directly or indirectly related to the present study by different researcher in home and abroad. Literatures reviewed are presented below in three major sections. The first section deals with review of literature on general context of barriers impeding mushroom cultivation, second section deals with the review of literature regarding relationship of selected characteristics of the respondents with their barriers impeding mushroom cultivation and third and last section of this Chapter deals with the conceptual framework of the study.

2.1 Barriers Faced by the Farmers in Different Agricultural Aspects

Regrettably, only one research work had found directly related to the barriers impeding mushroom cultivation. That is stated below:

Bashar (2006) conducted a research on problem confrontation of the farmers in mushroom cultivation at savar area. He found that the majority of the farmers confronted medium problem in mushroom cultivation. He also found that the major problems in mushroom cultivation were lack of market facility, high price of spawn, complexity to get credit, lack of knowledge etc.

However research works related to barriers faced by the farmers in different aspects of agriculture are presented below:

Noman (2012) conducted a study on constraints and scope for practicing sandbar cropping technology in riverine areas of Bangladesh. He found that low price during peak period of pumpkin, attack of insect and pathogen, lack of irrigation facilities, rotting of immature pumpkin in the field, difficult to find out soil layer, requiring more labor in pumpkin cultivation in sandbar etc. are main constraints.

Mena *et al.* (2009) conducted in their study found that socio-economic, technological and farming constraints were more prominent than extension and marketing constraints.

Sohel (2007) found that pond fish productions profitable, concerns have arisen about the long-term sustainability due to multiple ownerships, lack of sufficient fund, high price of input, lack of marketing facilities, lack of scientific and technical knowledge, non-availability of fish seed water shortage in dry season etc. The study suggests some possible steps to remove these constraints.

Khan *et al.* (2007) in their study severe constraints like unavailability of electricity, higher input cost, limited source of information and unavailability of insecticides pesticides and fertilizers increase the cost of cultivation. They found that unavailability of electricity for irrigation was the most severe problem of the study area.

Singh *et al.* (2007) in their study revealed that training method was not effective, training subject was not match with current problems, and more distance from the village were the main constraints reported by the trained farmers.

Sawant and Nikam (2007) conducted a survey to study the constraints experienced by the veterinarians while communicating the information. Constraints like non availability of needed literature, lack of time and non-availability of funds were experienced in information input, processing and output.

Ray and Mondol (2004) in their study identified the major constraints of carp fish farming were dike overflow, natural disasters (flood, drought), water pollution, excessive rainfall, theft- multiple ownership problems, harvesting and marketing problems, lack of money , higher production costs, lower market price, poor quality of fish seed and lack of technical knowledge etc.

Karmaker (2004) found that majority of the farmers (44.8 percent) faced high constraints, while 39.60 percent faced medium constraints and 15.60 percent faced low constraints in adopting aquaculture technologies. Among the total constraints “lack of proper fund for fish culture” had the highest constraints facing index (CFI: 571) and the “using position in pond for inimical cause” had the lowest (CFI: 97). Realizing the enormous potential of intensified fish farming in Bangladesh, multiple ownership of pond area was found to be a major constraint of fish farming. Other problems identified were non-availability of fish fry, lack of technical training for the

farmers, shortage of capital and the theft of fish or deliberate poisoning due to rivalry, or even jealousy.

Agnew *et al.* (2002) found that the adoption of Harvesting Based Practice (HBP) (specially, lower pour rate and lower extractor fan speed balanced against harvest time) can provide an extra \$ 100/ha to the industry. Several barriers to adoption of HBP include low sugar price, wet weather, orange rust disease, system of harvester payment, insufficient cane quality feedback mechanisms and physical, time and safety upon harvesting.

Islam (2001) conducted a study on farm youth of haor area of Mohongonj upazila. Study revealed that there were six top problems in rank order were (i) no arrangement of loan for the farm youth for fishery cultivation, (ii) lack of government programs in agriculture for the farming, (iii) absence of loan giving agencies for establishing farm in 1-0 daily, (iv) general people face problem for fishery due to government leasing of Jalmohal, (v) lack of government programs for establishing poultry farm.

Alam and Thomson (2001) examined the current status of fisheries in Bangladesh for each of the major sub sector, namely inland open water (aquaculture) and marine fisheries. They explained that production has been increased for all types of fisheries there are many constraints on expansion and it is difficult to identify significant achievement from government policy efforts, a host factor are responsible for the underutilization of fishing areas, including resources limitations, poor implementations of fisheries laws, the limited spread of fish farming technology, low financial capacities and ineffective production practices.

2.2 Relationship between selected characteristics of the farmers and barriers faced by them

This section focuses on the linkage of farmers characteristics usually vary from one person to another and those as variables play vital role in making difference regarding barriers impeding mushroom cultivation. The previous relationships between farmers characteristics and the barriers impeding mushroom cultivation are discussed below.

2.2.1 Age and barriers

Noman (2012) found that there was positive relationship between age and constraints of sandbar cropping technology.

Parvez (2009) observed a positive relationship between age and constraints faced by the farmers in small scale aquaculture.

Khan *et al.* (2007) observed that age of the farmers had positive relationship with the constraints faced by the farmers in agriculture.

Bashar (2006) observed that age of the mushroom growers had significant negative relationship with the problem confronted by them in his study.

Hasan and Anwarul (2005) found that there was no relationship between age of the farmers and their problem confrontation in using quality rice (BR 11) seed.

Nahid (2005) initiated that there was no relationship between age of the farmers and their problem confrontation in sugarcane cultivation.

Karmakar (2004) found a positive and significant relationship between age of the farmers and their constraints in banana cultivation in his study.

Bhuyian (2002) found positive significant relationship between the age of the banana cultivars and constraints faced by them in his study.

Rashid (2003) found that rural youth had significant negative relationship with their problem confrontation in undertaking selected agricultural activities.

2.2.2 Education and barriers

Roy (2014) found a negative relationship between educational qualification and constraints of small scale aquaculture.

Noman (2012) found a negative relationship between educational qualification and constraints of sandbar cropping technology.

Parvez (2009) observed that educational qualification had negative significant relationship with constraints faced by the farmers in small scale aquaculture.

Khan *et al.* (2007) conducted a study to carry out the constraints and problems faced by the farmers in agriculture. They found that education had significant negative relationship with the constraints faced by the farmers of the study area.

Bashar (2006) observed that education level of the mushroom growers had significant negative relationship with the problem confrontation faced by them in his study.

Karmakar (2004) in his study found a negatively significant relationship between of the farmers and their constraints hi adopting aquaculture techniques.

Halim (2003) in his study on the constraints faced by the farmers in adopting crop diversification found that there is no relationship between education and heir problem confrontation. Similar findings were obtained by Nahid (2005) and Bhuyian (2002) their respective studies.

2.2.3 Family size and barriers

Noman (2012) found that there was negative relationship between family size and constraints of sandbar cropping technology.

Parvez (2009) found a positive significant relationship between family size and constraints faced by the farmers in small scale aquaculture

Karmakar (2004) found that family size of the farmers had significant positive relationship with their constraints in adopting aquaculture technologies.

Salam (2003) observed in his study that family size of the farmers had significant positive relationship with the constraints faced by them adopting eco-friendly farming practices.

Halim (2003) found that there was no significant relationship between family size and problem confrontation of the Mohila Bittaheen Samabay' Samittee.

2.2.4 Experience in mushroom cultivation and barriers

Bashar (2006) observed that experience in mushroom cultivation of the farmers had no significant relationship with their problem confrontation in mushroom cultivation.

2.2.5 Annual family income and barriers

Noman (2012) found that there was negative relationship between annual income and constraints of sandbar cropping technology.

Parvez (2009) found in his research work that there was negative significant relationship between annual income and constraints faced by the farmers in small scale aquaculture.

Bashar (2006) observed that annual income of the mushroom growers had significant negative relationship with the problem confronted by them in his study.

Nahid (2005) in his study found negatively significant relationship between annual income of the farmers and then constraints in adopting aquaculture techniques. Karmakar (2004) found in his study that negatively significant relationship between annual income of the farmers and then constraints in adopting aquaculture techniques.

Salam (2003) in his study found no significant relationship between annual income of the farmers and their constraints in banana cultivation.

2.2.6 Knowledge on mushroom cultivation and barriers

Bashar (2006) observed that mushroom cultivation knowledge of the mushroom growers had significant negative relationship with the problem confronted by them in his study.

2.2.7 Attitude towards mushroom and barriers

Bashar (2006) observed that attitude towards of the mushroom growers had significant negative relationship with the problem confronted by them in his study.

2.2.8 Credit availability and barriers

No information was found on this aspect.

2.2.9 Training received and barriers

Noman (2012) found that there was negative relationship between training received and constraints of sandbar cropping technology.

Bashar (2006) observed that training exposure on mushroom cultivation of the mushroom growers had significant negative relationship with the problem confronted by them in his study.

Halim (2003) found that there was negative significant relationship between training received and constraints faced by the farmers in adopting crop diversification.

Ahmed (2002) showed that training exposure of the farmers had significant negative relationship with their problem confrontation in jute seed production.

Ali (1999) found that training experience of the rural youth had no relationship with their anticipated problem confrontation in self-employment by undertaking selected agricultural income-generating activities.

Saha (1997) observed that training experience of the rural youth had no relationship with their anticipated problem confrontation in self-employment by undertaking selected agricultural income-generating activities.

2.2.10 Satisfaction for market value of mushroom and barriers

No literature was found.

2.2.11 Extension contact and barriers

Parvez (2009) found in his research work that there was negative significant relationship between extension media contact and constraints faced by the farmers in small scale aquaculture.

Bashar (2006) observed that extension contact of the mushroom growers had significant negative relationship with the problem confronted by them in his study.

Halim (2003) found in this study that extension contact of the members of Mohila Bittaheen Samabaya Samittee had no significant relationship on their problem confrontation.

Salam (2003) in his study concluded that extension contact of the farmers had significant negative relationship with their faced constraints in cotton cultivation.

Rahman (1996) in his study concluded that extension contact of the farmers had significant negative relationship with their faced constraints in potato cultivation..

2.2.12 Organizational participation and barriers

Parvez (2009) found in his research work that there was no significant relationship between organizational participation and constraints faced by the farmers in small scale aquaculture.

2.3 The Conceptual Framework of the Study

Conceptual framework (theoretical framework) is a type of intermediate theory that attempt to connect to all aspects of inquiry (e.g. problem definition, purpose, literature review, methodology, data collection and analysis). Theoretical frameworks can act like maps that give coherence to empirical inquiry. Because theoretical framework is potentially so close to empirical inquiry, they take different forms depending upon the research questions or problem (Wikipedia, 2012).

The conceptual framework is the foundation for understanding the research issues and linkages among the different variables. The conceptual framework of Rosenberg and Hovland (1960) was kept in mind while framing the structural arrangement for the dependent and independent variables. The main focus of the study was to determine the barriers impeding mushroom cultivation which was consider as the dependent variable and 12 selected characteristics of the farmers as independent variables.

Barriers impeding mushroom cultivation of an individual may affect through interacting focuses of many independent variables. It is not possible to deal with all independent variables in a single study. It was therefore, necessary to limit the number of independent variables which include age, education, family size, experience in mushroom cultivation, annual family income, knowledge about mushroom cultivation, belief about mushroom, credit availability, training received, sale price of mushroom, extension contact and organizational participation.

Based on these discussion and review of literature, the conceptual framework of the study has been formulated as shown in Figure 2.1.

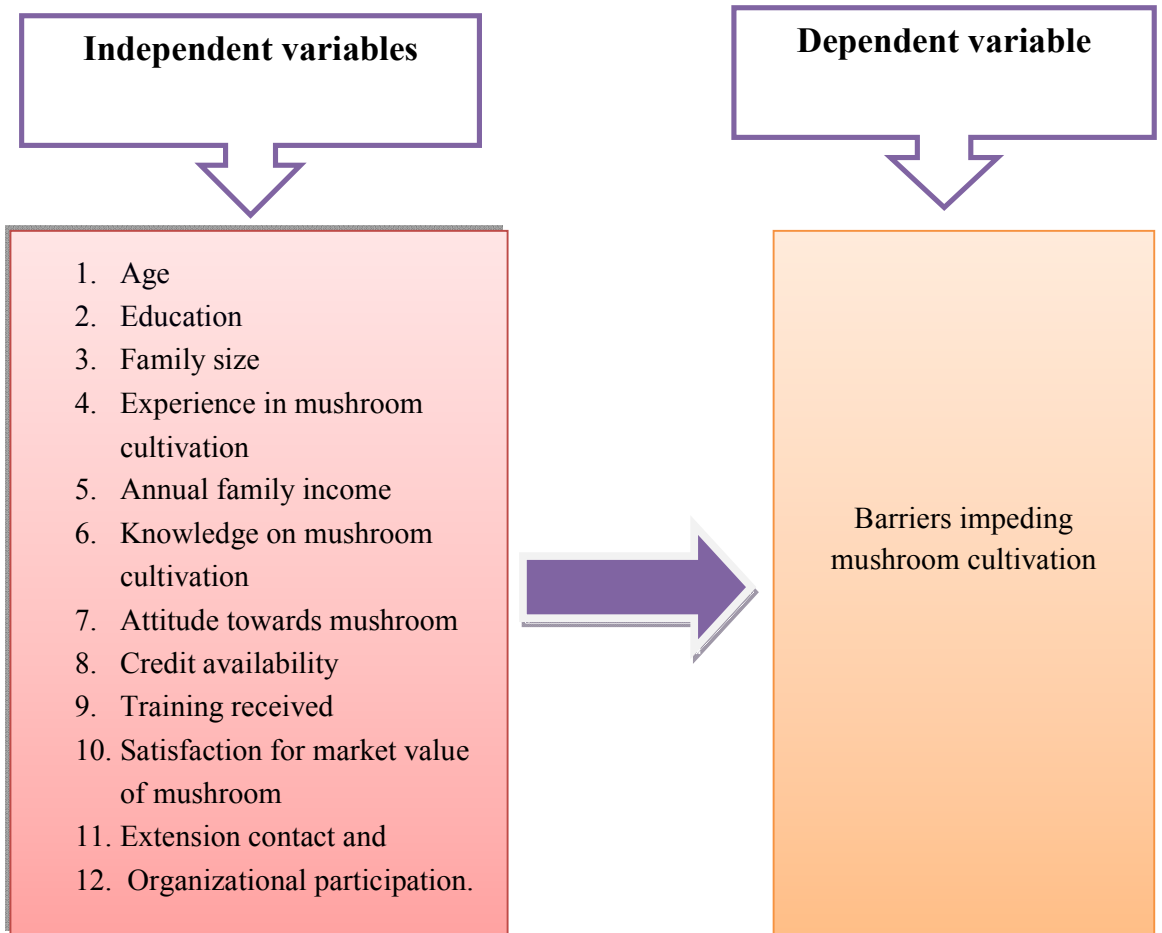


Figure 2.2 Conceptual framework of the study

CHAPTER 3

METHODOLOGY

In any scientific research, methodology deserves a very careful consideration. Methodology and procedures are the important factors in conducting a research. Appropriate methodology used in research helps to collect valid and reliable data and analyze the information purposively to arrive at correct decision. This enables the researcher to collect valid and reliable information related to the hypotheses, which can be analyzed in order to arrive at correct conclusion. The methods and procedures followed in conducting this research have been discussed in this Chapter.

3.1 Locale of the Study

The present study was conducted in Savar municipality under Dhaka district. Savar municipality was selected purposively as it is the area from where mushroom cultivation has been started in Bangladesh and the national mushroom center is situated here. Most of the farmers of this area are directly and/or indirectly engaged in agricultural activities, services and some people are involved in mushroom cultivation. Mushroom cultivation got popularity in this area at the early state of mushroom cultivation in Bangladesh. Map of Dhaka district including its upazilas, Savar upazila and Savar Municipality are given in Figure 3.1, Figure 3.2 and Figure 3.3 respectively.

3.2 Research Design of the Study

Research design is a comprehensive master plan of the research study to be undertaken. It is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure. The research design followed in the present study is ex-post-facto, because of uncontrollable and non-manipulating variables. The ex-post-facto research being a systematic empirical inquiry the scientist has no direct control over independent variables (Kerlinger, 1973).

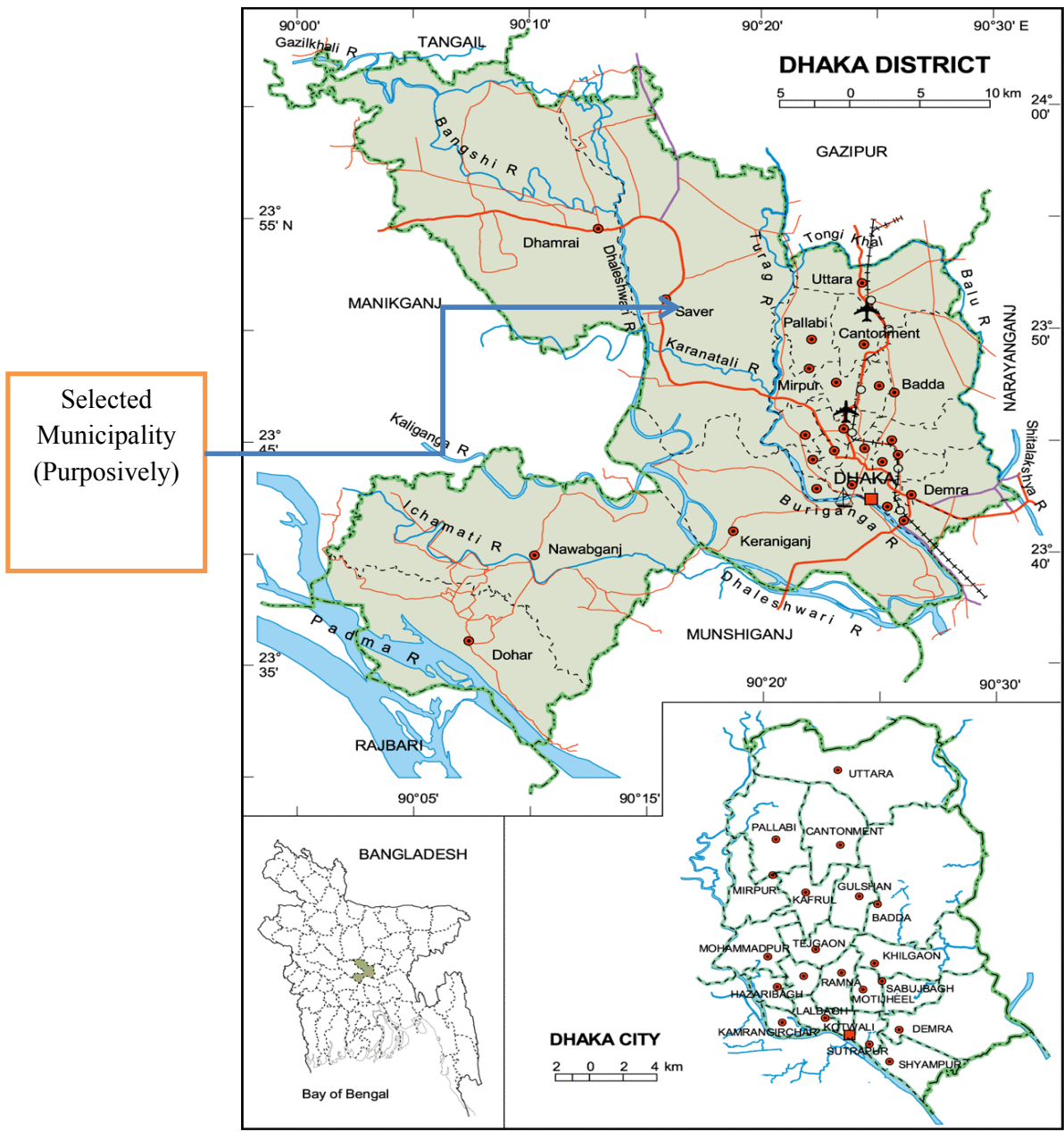


Figure 3.1: Map of Dhaka district including its upazilas (Bangladesh inset)

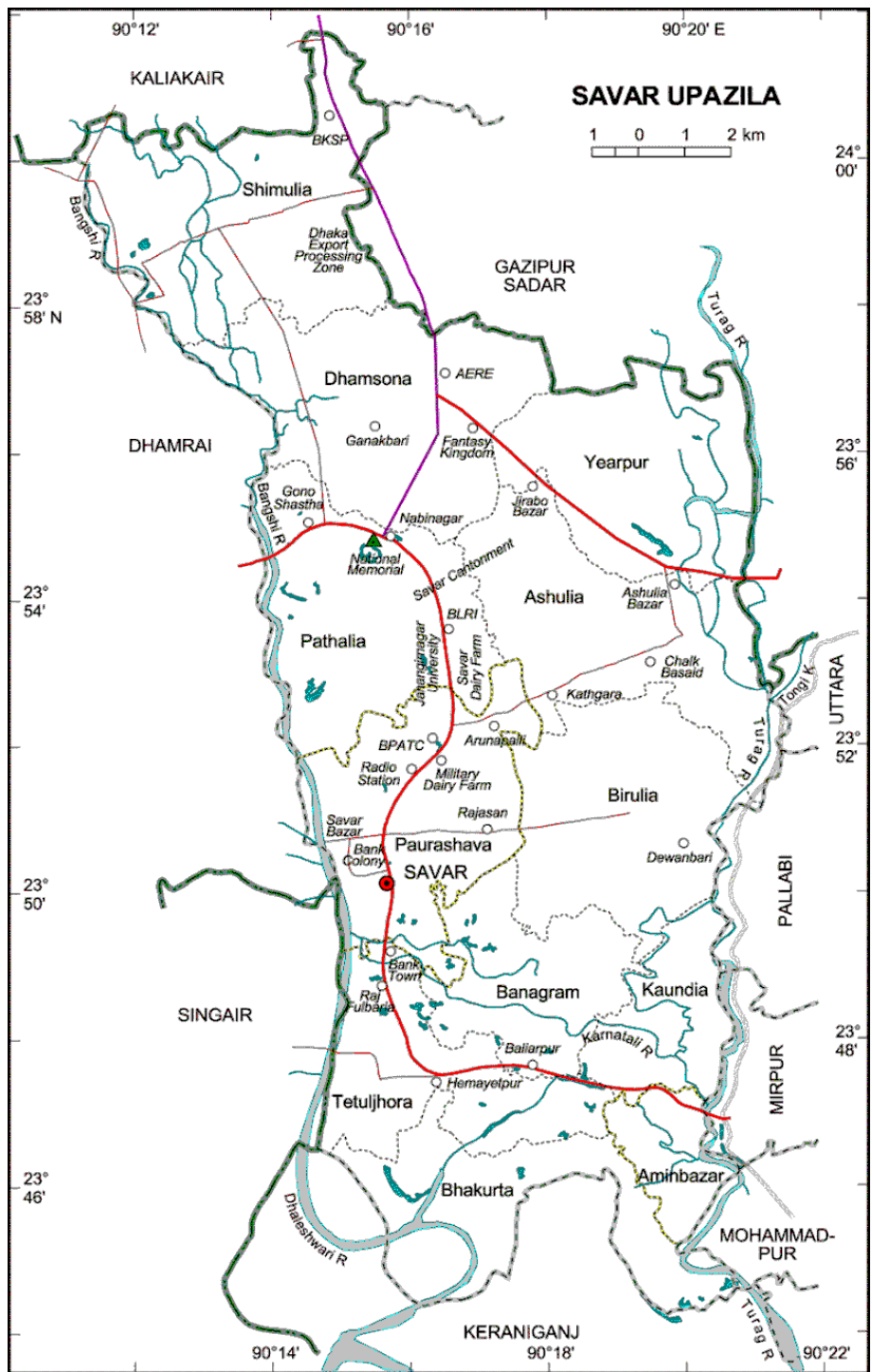


Figure 3.2: Map of Savar Upazila



Figure 3.3: Map of Savar Municipality (Study Area)

Designing the research for the present study was taken in a scientific manner. Firstly, different research themes are collected and analyzed followed by research problem formulation. Reviews were studied to select appropriate variables and preparation of questionnaire. Pretesting of the interview schedule was done before final data collection. Finally data were collected, analyzed and report was prepared. An explanatory and cross sectional research design was used in this research which has been presented in Figure 3.4.

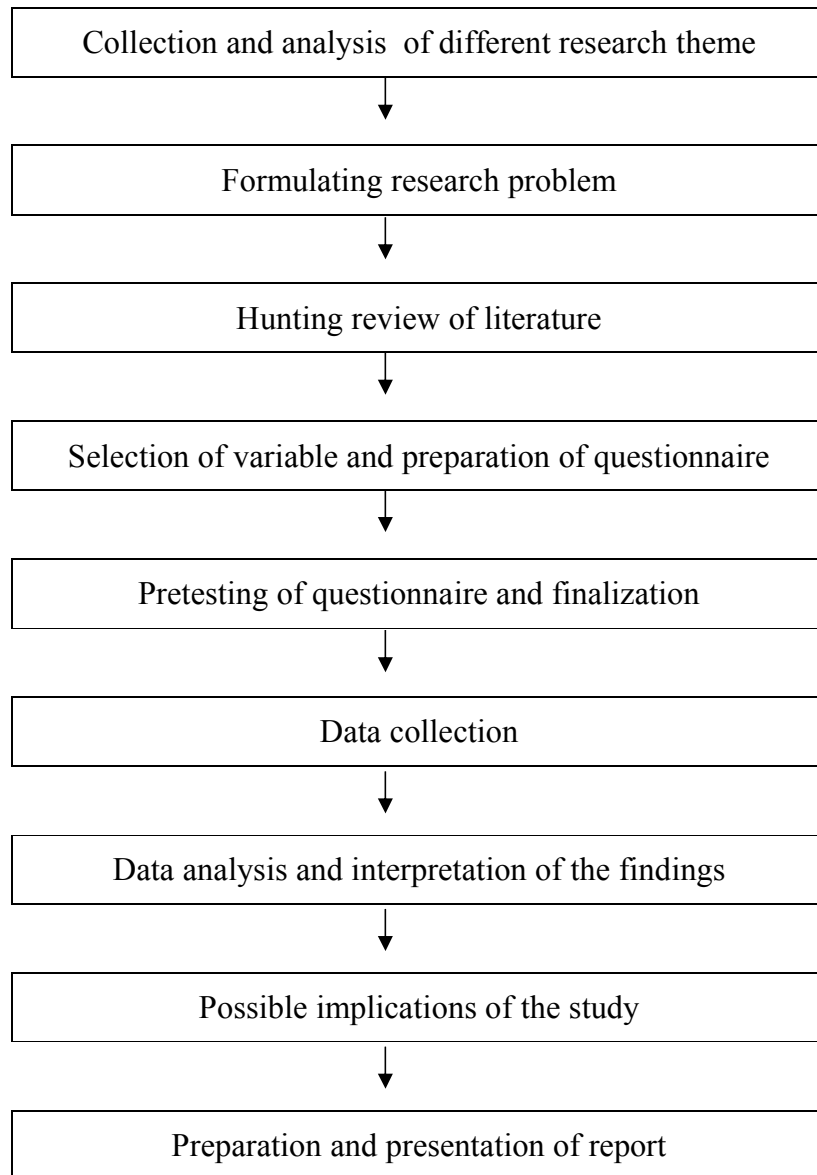


Figure 3.4: Research design of the study

3.3 Population and sample

An updated list of 204 mushroom growers was prepared by the author with the help of mushroom center. All these 204 mushroom growers of Savar municipality were treated as the population of the study. According to Yaman's (1967) formula, sample size was determined as 114. In calculating sample size from the following formula, 8% precision level, 50% degree of variability and value of $Z = 2.57$ at 99% confidence levels was chosen. Then 114 farmers were calculated as sample through Yaman's (1967) formula from the population.

The formula and calculation are given below-

$$n = \frac{z^2 P (1-P)N}{Z^2 P (1-P) + Ne^2}$$

$$n = \frac{(2.57)^2 (0.5)(1 - 0.5) 204}{(2.57)^2 (0.5)(1 - 0.5) 204 + 204 (0.08)^2}$$

$$n = 114$$

Where,

n = sample size

N = population size

e = the level of precision

z = the value of the standard normal variable given the chosen confidence level

p = the proportion or degree of variability

The simple random sampling procedure was followed to prepare the sample list of 114 mushroom growers from the population (204 mushroom growers). Besides this, 10 percent of the sample size was selected randomly from the population which was included in the reserve list supposed to be interviewed only when a respondent in original sample was found unavailable during data collection. The distribution of the population, sample and number of mushroom growers in the reserve list are shown in Table 3.1.

Table 3.1 Distribution of the population, sample and reserve list for the study

Name of The Selected District	Name of Selected Upazila	Name of Selected Municipality	Population	Sample size	Reserve list
Dhaka	Savar	Savar	204	114	11

3.4 Research Instrument

An interview schedule was prepared mostly with close form questions. Simple questions and statements were included in the schedule to obtain information regarding the research topic. Open ended questions were also used to give respondents opportunity to give their opinion and suggestions regarding needed topic.

Scales were developed for suitable scores in barriers impeding mushroom cultivation and also characteristics of the farmers namely age, education, family size, experience in mushroom cultivation, annual family income, knowledge about mushroom cultivation, belief about mushroom, credit availability, training received, sale price of mushroom, extension contact, and organizational participation.

The schedule was translated in Bengali for clarification to the respondents. The schedules were pre-tested in actual field situation before using the same for final collection of data among 15 respondents of the study area. Necessary correction, additions and alternations were made in the interview schedule on the basis of results of pre-test.

3.5 Variables and Their Measurement Techniques

A well-organized piece of research usually contains at least two important elements are an independent variable and a dependent variable. In any scientific research, the selection and measurement of variables constitutes a significant task. In these connections the researcher reviewed the literature to widen his understanding about the nature and scope of the variables relevant to this piece of research.

The selected 12 characteristics of the farmers namely age, education, family size, experience in mushroom cultivation, annual family income, knowledge on mushroom cultivation, attitude towards mushroom, credit availability, training received,

satisfaction for market value of mushroom, extension contact, and organizational participation were considered as independent variables. On the other hand, barrier impeding mushroom cultivation was selected as dependent variable of the present study.

3.5.1 Measurement of Independent Variables

The procedure followed in measuring the independent variables have been discussed in the subsequent sections.

3.5.1.1 Age

The age of the respondents was measured in terms of years from his/her birth to the day of interviewing. A unit score was assigned for each year of one's age. It was measured in a complete year on the basis of responses of the respondents. The variable appears in item No. 1 in the interview schedule (Appendix-A).

3.5.1.2 Education

Education was measured in terms of one's year of schooling. If a respondent did not know how to read and write his score was given as zero (0). A score of 0.5 was assigned to that respondent who could sign his/her name only. Besides this, a respondent was given actual score of one for every year of schooling i.e. 1 for class I, 2 for class II and so on. Similarly if a respondent passed the final examination of class V his/her level of educational score was taken as five. The variable appears in item No. 2 in the interview schedule (Appendix-A).

3.5.1.3 Family Size

The family size of the respondent was measured on the basis of the number of family members including himself, his wife, children and other dependents living in the same family. For example, if a respondent had five members in his/her family the score of the family size was taken as five. The variable appears in item No. 3 in the interview schedule (Appendix-A).

3.5.1.4 Experience in Mushroom Cultivation

Experience in mushroom cultivation was measured in terms of years of cultivating mushroom. A score of 0.5 was assigned to that respondent who could cultivate for half year only. Besides this, a respondent was given actual score of one for every year of cultivation i.e. 1 for class 1 year, 2 for 2 year and so on. The variable appears in item No. 4 in the interview schedule (Appendix-A).

3.5.1.5 Annual Family Income

Annual family income of a farmer was measured on the basis of his/her family's yearly earnings from crops (rice, maize, wheat, potato etc.), fish, land lease, business, service and others. The family income was expressed in Taka. In measuring the variable, total earning in Taka of a respondent was converted into unit score. A score of one (1) was assigned for each '1000' Taka of the annual income of a respondent. The variable appears in item No. 5 in the interview schedule (Appendix-A).

3.5.1.6 Knowledge on Mushroom Cultivation

Questions based upon different aspects of mushroom cultivation were incorporated in the interview schedule. Each respondent was asked to answer all the 10 questions. A respondent could get full score of 2 against each question for correct responses, 1 for partial answer and 0 for wrong answer. Thus, knowledge on mushroom cultivation of the respondents was range from 0 to 20. Zero (0) indicating no knowledge and 20 indicating very high knowledge on mushroom cultivation. The variable appears in item No. 6 in the interview schedule (Appendix-A).

3.5.1.7 Attitude towards Mushroom

The belief about mushroom of a farmer was measured on eight items of statements, four of these items being stated positively and other four negatively. A 5-point Likert scale was used to measure the extent of agreement and disagreement by checking any one of the responses 'strongly agree', 'agree', 'undecided', 'disagree', and 'strongly disagree'. For positive statements, scores assigned to the responses were 5, 4, 3, 2 and 1 respectively. For negative statements, the scoring system was reversed. The range of scores for the scale could range from 8 to 40 where 8 indicated very low belief about mushroom and 40 very high belief about mushroom. The belief about mushroom

score of an individual is the sum of scores for all the statements in the scale. The variable appears in item number No. 7 in the interview schedule (Appendix-A).

3.5.1.8 Credit Availability

Credit availability of a respondent was measured in terms of the amount of money received by his/her as loan from different sources. It was expressed in thousand taka. This variable appears in question no. 8 of the interview schedule (Appendix-A).

3.5.1.9 Training Received

Training received was determined by the total number of days of training received by the farmers from any organization in their entire lifetime. If a respondent took three days training on agriculture from GOs, NGOs or any other organization, then his/her training exposure score was 3 and so on. This variable appears in question no. 9 of the interview schedule (Appendix-A).

3.5.1.10 Satisfaction for Market Value of Mushroom

Sale price of mushroom was determined by asking farmers about their satisfaction about mushroom sales price. Three point rating scale was used in this regard. By asking the farmers responses were assigned as satisfied, no opinion and not satisfied weighing the scores as 2, 1 and 0 respectively. This variable appears in question no. 10 of the interview schedule (Appendix-A).

3.5.1.11 Extension Contact

The extension contact score was computed for each respondent on the basis of his/her extent of contact with 15 selected extension media among which 10 of them belong to individual contact, two of them under group contact and rest three of them under mass contact category. For measuring the extension contact score was assigned for the extension media 0, 1, 2 and 3 for the extent of contact 'not at all', 'rarely', 'occasionally' and 'frequently' respectively. Extension media contact score was determined by summing the scores of all the 15 communication media. Extension media contact score could range from 0 to 45, where 0 indicated no media contact and 45 indicated the highest media contact. The variable appears in the item No. 11 in the interview schedule (Appendix-A).

3.5.1.12 Organizational Participation

Organizational participation score of a respondent was computed on the basis of his/her participation in different organizations operating in the study area. The researcher identified 10 such organizations as shown in item No. 12 in the interview schedule (Appendix-A). For computing organizational participation of a respondent the following formula was used (Mondol, 2009):

$$\text{Organizational participation score} = \sum (RS \times D)$$

Where,

RS=Rank status

D= Duration score

Scores against the status of participation of an individual in an organization is as follows

Nature of participation	Scores assigned
No participation	0
As a member	1
As an executive member	2
As a chief executive	3

Duration score was rather fixed to one unit for each year. Scores obtained by respondent on each of the organization, which indicated status of participation, were summed-up to get the organizational participation score.

3.5.2 Measurement of Dependent Variable

Barrier impeding mushroom cultivation was the dependent variable of the study. Several barriers may be responsible for impeding mushroom cultivation. Keeping this in mind, an effort was made to determine the barriers impeding mushroom cultivation which is considered as the dependent variable of the study. Twenty (20) such barriers were identified by pretesting and field visit among which 10 from cultivation barriers, 6 from economic barriers and 4 from other barriers which are directly and indirectly hindering mushroom cultivation. The farmers were asked to give their opinion on those 20 selected barriers. The rigorous process involved in the selection of barriers impeding mushroom cultivation by the farmers can be seen in item number No. 13 in Appendix A.

mushroom growers were asked for obtaining responses about the extent of barriers impeding mushroom cultivation. Each of the barriers was measured separately with 4-point rating scale. The weights assigned to the scale were 0 for ‘not at all’, 1 for ‘low’, 2 for ‘moderate’, and 3 for ‘high’. The total scores of a farmers sum up to get the barriers impeding mushroom cultivation scores. Thus, the score could range from 0 to 60, where 0 indicated no barrier and 60 indicated the highest barrier to mushroom cultivation.

For making comparative analysis of the 20 selected barriers impeding mushroom cultivation, an overall barrier impeding mushroom cultivation Index (BIMCI) was calculated. BIMCI was calculated by adopting the following formula:

$$\text{BIMCI} = P_n \times 0 + P_l \times 1 + P_m \times 2 + P_h \times 3$$

Where,

P_n = Percentage of farmers for not at all factors

P_l = Percentage of farmers for low factors

P_m = Percentage of farmers for moderate factors

P_h = Percentage of farmers for high factors

Thus, the possible value of BIMCI could range from 0 to 300, where 0 indicated no barrier and 300 indicated high barrier impeding mushroom cultivation.

3.6 Statement of Hypothesis

A hypothesis is a proposition, which can be put to a test to determine its validity. Hypotheses are always in declarative sentence form and they are related, either generally or specifically from variables to variables. In broad sense hypothesis are divided into two categories i.e. research hypothesis and null-hypothesis.

3.6.1 Research hypothesis

Research hypothesis (H_a) states anticipated relationships between concerned variables. Based on review of literature and development of conceptual framework, the research hypotheses were ‘there were relationships between each of the selected 12 characteristics of the farmers with the barriers impeding mushroom cultivation’.

3.6.2 Null hypothesis

Null hypothesis (H_0) states that there is no relationship between the concerned variables. The null hypothesis developed for this study was ‘there were no relationships between the selected 12 characteristics of the farmers and barriers impeding mushroom cultivation’.

3.7 Method and Process of Data Collection

Data for this research were collected by the researcher himself from the sample respondents through personal interviewing. Necessary co-ordination was obtained from Deputy Director of National Mushroom Development and Extension Center. To build rapport and motivation in the interview situations, the researcher endeavored to provide conditions that maximum trust maintained each respondeAlthough mushroom is a popular and nutritious food in many countries of the world, but the production and consumption of mushroom is limited in Bangladesh (Begum, 2008).nts interest and minimized status difference. Data were collected during 15 May to 15 June, 2016.

3.8 Data Processing and Analysis

3.8.1 Compilation of data

After completion of field survey, data were coded, compiled, tabulated and analyzed in accordance with the objectives of the study. In this process, all the responses in the interview schedule were given numerical coded value. Local units were converted into standard units and qualitative data were converted into quantitative ones by means of suitable scoring whenever necessary. The responses to the questions in the interview schedules were transferred to a master sheet to facilitate tabulation.

3.8.2 Categorization of respondents

For describing different characteristics, the respondents were classified into several categories. These categories were developed by considering the nature of distribution of data, general understanding prevailing in the social system and possible scores system. The procedure for categorization of data in respect of different variables will be elaborately discussed while describing those variables in Chapter 4.

3.8.3 Statistical Techniques Used

The data were analyzed in accordance with the objectives of the study. The analysis was performed using Statistical Package for Social Science (SPSS) computer package. Qualitative data were converted into quantitative data by means of suitable scoring technique wherever necessary. The statistical measures such as range, means, standard deviation, number and percentage distribution were used to describe the variables. Pearson's Product Moment Coefficient of Correlation (r) test was initially done. Linear regression analysis was also done to find out the contribution of the independent variables to the dependent variable.

CHAPTER 4

RESULTS AND DISCUSSION

In this Chapter the findings of the study and interpretation of the results have been presented in three sections. The first section deals with the selected personal characteristics of the farmers. The second section deals with the barriers impeding mushroom cultivation and the third deals with the contribution of the selected characteristics with barriers impeding mushroom cultivation.

4.1 Selected Characteristics of the Farmers

A variety of attributes that aggregate in human life influenced on their activity directly and indirectly. For this reason, it can be assumed that different characteristics of farmers may influence the barriers impeding mushroom cultivation and hence 12 selected characteristics were considered as independent variables in this regard. The characteristics of the farmers were classified into suitable categories for description and interpretation in relation to barriers impeding mushroom cultivation (Table 4.1).

Table 4.1 Salient features of the selected characteristics of the farmers (n=114)

Characteristics	Scoring method	Range	Categories	Respondents		Mean	SD
		Observed (Possible)		No.	Percent		
Age	No. of year	22-60 (Unknown)	Young aged (≤ 35)	25	21.90	42.89	9.01
			Middle aged (36-50)	65	57.00		
			Old aged (> 50)	24	21.10		
Education	Year of schooling	2-16 (Unknown)	Primary level (1-5)	29	25.40	9.17	3.98
			Secondary level(6-10)	37	32.50		
			Above secondary level (> 10)	48	42.10		
Family size	No. of members	2-8 (Unknown)	Small (≤ 3)	34	29.80	4.69	1.89
			Medium (4-6)	55	48.20		
			Large (> 6)	25	21.90		
Experience in mushroom cultivation	No. of year	0.5-6 (Unknown)	Low (≤ 2)	61	53.50	2.79	1.57
			Medium (3-4)	31	27.20		
			High (> 4)	22	19.30		

Annual family income	('000' Tk.)	30-728 (Unknown)	Low income (≤ 58)	8	7.00	196.52	138.94
			Medium income (59-335)	95	83.30		
			High income (>335)	11	9.60		
Knowledge on mushroom cultivation	Score	8-16 (0-20)	low (≤ 10)	22	19.30	12.57	2.45
			Medium (11-15)	76	66.70		
			High (>15)	16	14.00		
Attitude towards mushroom	Score	12-33 (8-40)	low (≤ 18)	25	21.90	23.60	5.80
			Medium (19-29)	70	61.40		
			High (>29)	19	16.70		
Credit availability	('000' Tk.)	0-45 (Unknown)	No credit (0)	17	14.90	22.88	15.14
			low (≤ 8)	0	0		
			Medium (9-38)	70	61.40		
			High (>38)	27	23.70		
Training received	No. of days	0-60 (Unknown)	No training (0)	12	10.50	13.55	17.16
			Low (≤ 2)	30	26.30		
			Medium (3-7)	30	26.30		
			High (>7)	42	36.80		
Satisfaction for market value of mushroom	Score	0-2 (0-2)	No opinion (0)	17	14.90	1.10	.62
			Satisfied (1)	68	59.60		
			Highly satisfied (2)	29	25.40		
Extension contact	Score	11-35 (0-45)	Low (≤ 17)	31	27.20	24.43	6.99
			Medium (18-31)	68	59.6		
			High (>31)	15	13.2		
Organizational participation	Score	10-24 (0-30)	Low (≤ 13)	29	25.4	17.61	4.64
			Medium (14-22)	58	50.9		
			High (>22)	27	23.7		

4.1.1 Age

The age of the farmers ranged from 22 to 60, the mean being 42.89 and the standard deviation is 9.01. According to age the farmers were classified into three categories are 'young aged' (up to 35), 'middle aged' (36-50) and 'old aged' (>50) based on their observed score (Table 4.2).

Table 4.2 Distribution of the respondents according to their age

Categories (Years)	Respondents	
	Number	Percent (%)
Young aged (up to 35)	25	21.90
Middle aged (36-50)	65	57.00
Old aged(> 50)	24	21.10
Total	114	100

Data contained in Table 4.2 reveals that more than half (57.0 percent) of the respondents were middle aged compared to 21.9 percent of the respondents belonged to the young aged categories and 21.1 percent were in the old aged category. These findings indicated that the majority of the farmers were middle aged.

4.1.2 Education

The educational qualification scores of the farmers ranged from 2 to 16, the mean being 9.17 and standard deviation 3.98. Based on educational qualification scores the respondents were classified into three categories such as ‘primary level’ (1-5), ‘secondary level’ (6-10) and ‘above secondary level’ (>10) as presented in Table 4.3.

Table 4.3 Distribution of the respondents according to their education

Categories (Years)	Respondents	
	Number	Percent (%)
Primary education (1-5)	29	25.40
Secondary education (6-10)	37	32.50
Above secondary level (>10)	48	42.10
Total	114	100

Data presented in Table 4.3 indicate that highest proportion (42.1 percent) of the farmers had above secondary level education, 25.4 percent had primary education and 32.5 percent of the farmers had secondary education level. The study revealed that there

were no illiterate farmers in the study area. But the literacy rate of our country is about 59.82 percent (BBS, 2014).

4.1.3 Family Size

The family size scores of the farmers ranged from 2 to 8. The average family size was 4.69 with a standard deviation of 1.89. The respondents were classified into three categories like ‘small’ (≤ 3), ‘medium’ (4-6) and ‘large’ (>6) are presented in Table 4.4.

Table 4.4 Distribution of the respondents according to their family size

Categories (no. of members)	Respondents	
	Number	Percent (%)
Small (≤ 3)	34	29.80
Medium (4-6)	55	48.20
Large (>6)	25	21.90
Total	114	100

The data furnished in the Table 4.4 revealed that near about half (48.2 percent) of the respondents had medium family size, 29.8 percent had small family size and 22.9 percent had large family. The national average family size in Bangladesh is 4.85 (BBS, 2014) which is near the mean value of the present study (4.69). Almost similar result was found in the study of Muhammad (2014), Noman (2012), Akanda (2005), Miah (2002) and Haider (2001).

4.1.4 Experience in Mushroom Cultivation

The experience in mushroom cultivation scores of the farmers ranged from 0.5 to 6. The average experience in mushroom cultivation was 2.79 with a standard deviation of 1.57. The respondents were classified into three categories like ‘Low (≤ 2), ‘medium’ (3-4) and ‘High (>4)’ as presented in Table 4.5.

Table 4.5 Distribution of the respondents according to their experience in mushroom cultivation

Categories (No. of years)	Respondents	
	Number	Percent (%)
Low (≤ 2)	61	53.50
Medium (3-4)	31	27.2
High (> 4)	22	19.3
Total	114	100

The data furnished in the Table 4.5 revealed that more than half (53.5 percent) of the respondents had low experience in mushroom cultivation, 27.2 percent had medium experience in mushroom cultivation and 19.3 percent had high experience in mushroom cultivation. The results indicated that most of the farmers had low experience.

4.1.5 Annual Family Income

The family income scores (taka in thousands) of the farmers ranged from 30 to 728 with a mean of 196.52 and standard deviation of 138.94. Based on the annual income the farmers were classified into three categories such as ‘low income’ (≤ 58), ‘medium income’ (59-335), ‘high income’ (> 335) as shown in Table 4.6.

Table 4.6 Distribution of the respondents according to their annual family income

Categories (‘000’ tk)	Respondents	
	Number	Percent (%)
Low (≤ 58)	8	7.0
Medium (59-335)	95	83.3
High (> 335)	11	9.6
Total	114	100

Data furnished in Table 4.6 indicate that the highest proportion (83.3 percent) of the farmers had medium income compared to 7 percent under low and only 9.6 percent under high income group.

4.1.6 Knowledge on Mushroom Cultivation

Knowledge about mushroom cultivation score of the farmers ranged from 8 to 16 against the possible range from 0 to 20 with a mean of 12.57 and standard deviation of 2.45. Based on knowledge about mushroom cultivation score, the farmers were classified into three categories such as ‘low (≤ 10)’, ‘medium (11-15)’ ‘high (> 15)’ as shown in Table 4.7.

Table 4.7 Distribution of the respondents according to their knowledge on mushroom cultivation

Categories (Score)	Respondents	
	Number	Percent (%)
Low (≤ 10)	22	19.3
Medium (11-15)	76	66.7
High (> 15)	13	14.0
Total	114	100

The results from Table 4.7 revealed that more than half (66.7 percent) of the respondents had medium knowledge about mushroom cultivation, while 19.3 percent had low and 14.0 percent had high knowledge about mushroom cultivation.

4.1.7 Attitude towards Mushroom

The belief about mushroom scores of the farmers ranged from 12 to 33, against the possible score 8 to 40. The mean and standard deviation were 23.60 and 5.80 respectively. The respondents were classified into three categories based on their belief about mushroom as ‘low’ (≤ 18), ‘medium’ (19-29) and ‘high’ (> 29) as shown in Table 4.8.

Table 4.8 Distribution of the respondents according to their attitude towards mushroom

Categories (Score)	Respondents	
	Number	Percent (%)
Low (≤ 18)	25	21.9
Medium (19-29)	70	61.4
High visit (>29)	19	16.7
Total	114	100

Data presented in Table 4.8 showed that majority (61.4 percent) of the farmers had medium belief about mushroom, 21.9 percent had low belief about mushroom and 16.7 percent had high belief about mushroom. The findings indicate that above three-fourths (78.1%) of the farmers had medium to high belief about mushroom.

4.1.8 Credit Availability

The credit availability scores of the respondents ranged from 0 to 45 and average was 22.88 with a standard deviation of 15.14. Based on the credit availability, the respondents were classified into four categories such as ‘no credit’ (0), ‘low’ (≤ 8), medium (9-38) and high (>38). However, it was observed that the respondents obtained credit from different organizations at a higher rate of interest, i.e. 12.50 percent.

Table 4.9 Distribution of the respondents according to their credit availability

Categories (‘000’ tk)	Respondents	
	Number	Percent (%)
No credit (0)	17	14.9
Low (≤ 8)	0	0
Medium (9-38)	70	61.4
High (>38)	27	23.7
Total	114	100

Data presented in the Table 4.9 indicate that the highest proportion (61.4 percent) of the respondents get medium amount of credit, while 14.9 percent get no credit and 23.7 percent get high amount of credit.

4.1.9 Training Received

The training received score of the respondents ranged from 0 to 60, the average being 13.55 and standard deviation of 17.16. Based on training received score, the respondents were classified into four categories such as ‘no training’ (0), ‘low’ (≤ 2), ‘medium’ (3-7) and ‘high’ (> 7) as shown in Table 4.10.

Table 4.10 Distribution of the respondents according to their training received

Categories (no. of days)	Respondents	
	Number	Percent (%)
No training(0)	12	10.5
Low (≤ 2)	30	26.3
Medium (3-7)	30	26.3
High (> 7)	42	36.8
Total	114	100

Data contained in Table 4.10 shows that most of the respondent (36.8%) had received high training, 10.5 percent received no training, 26.3 percent had received low training and 26.3 percent had received medium training.

4.1.10 Satisfaction for Market Value of Mushroom

Sale price of mushroom score of the respondents ranged from 0 to 2 against the possible range of 0 to 2, the average being 1.10 and standard deviation of 0.62. Based on sale price of mushroom score, the respondents were classified into three categories such as ‘no opinion’ (0), ‘satisfied’ (1), and ‘highly satisfied’ (2) as shown in Table 4.11.

Table 4.11 Distribution of the respondents according to their satisfaction for market value of mushroom

Categories (Score)	Respondents	
	Number	Percent (%)
No opinion (0)	17	14.9
Medium (1)	68	59.6
High (2)	29	25.4
Total	114	100

Data contained in Table 4.11 revealed that most of the respondents (59.6 percent) are satisfied with the sale price of mushroom followed by 14.9 percent had no opinion and 25.4 percent are highly satisfied with the sale price of mushroom.

4.1.11 Extension contact

The extension contact scores of the farmers ranged from 11 to 35, against the possible score 0 to 45. The mean and standard deviation were 24.43 and 6.99 respectively. The respondents were classified into three categories based on their extension contact as ‘low’ (≤ 17), ‘medium’ (18-31) and ‘high’ (> 31) as shown in Table 4.12.

Table 4.12 Distribution of the respondents according to their extension contact

Categories (Score)	Respondents	
	Number	Percent (%)
Low (≤ 17)	31	27.2
Medium (17-31)	68	59.6
High (> 31)	15	13.2
Total	114	100

Data presented in Table 4.12 shows that majority (59.6 percent) of the farmers had medium extension contact, 27.2 percent had low extension contact and 13.2 percent

had high extension contact. The findings indicate that near about three-fourths (72.8 percent) of the farmers had medium to high extension contact.

4.1.12 Organizational participation

The farmer's organizational participation scores ranged from 10 to 24 against the possible range of 0 to 30 with an average score being 17.61 and standard deviation of 4.64. On the basis of actual scores of the respondents, they were classified into three categories such as 'low' (≤ 13), 'medium' (14-22) and 'high' (> 22) as shown in Table 4.13.

Table 4.13 Distribution of the respondents according to their organizational participation

Categories (Score)	Respondents	
	Number	Percent (%)
Low (≤ 13)	29	25.4
Medium (14-22)	58	50.9
High (> 22)	27	23.7
Total	114	100

Data in Table 4.13 revealed that about half (50.9 percent) of the farmers had medium, 25.4 percent had low and 23.7 percent had high organizational participation. This finding indicates that near about three-fourths (74.6 percent) of the farmers had medium to high organizational participation.

4.2 Barriers impeding Mushroom Cultivation

For having the better understanding regarding barriers impeding mushroom cultivation, it was necessary to have an idea about the comparative barriers facing in 20 selected barriers impeding mushroom cultivation.

4.2.1 Comparison among selected barriers impeding mushroom cultivation

The selected 20 barriers were calculated through a Barriers impeding Mushroom Cultivation Index (BIMCI). The computed BIMCI of the 20 selected barriers ranged

from 76.40 to 186.90 against a possible range of 0 to 300. The rank order of each of the barriers was made on the basis of BIMCI values which are shown in Table 4.14.

Table 4.14 Distribution of the farmers according to barriers impeding mushroom cultivation

Sl. No.	Name of the barriers	Percent of farmers				BIMCI	Rank order
		Not at all	Low	Moderate	High		
A. Cultivation barriers							
1.	Unavailability of quality spawn packets timely	9.60	39.50	40.40	10.50	151.80	9
2.	Low spawn germination rate	9.60	29.80	50	10.60	161.60	8
3.	Insect infestation	10.50	11.40	66.70	11.40	179	4
4.	Attack of pests	9.60	9.60	70.20	10.60	181.80	3
5.	Lack of proper knowledge about irrigation	9.60	49.10	30.70	10.60	142.30	10
6.	Lack of proper knowledge about fertilizer application	20.20	49.10	20.20	10.50	121	13
7.	Low technical knowledge about mushroom cultivation	14	0	71.10	14.90	186.90	1
8.	Shortage of organic manure for mushroom cultivation	20.20	49.10	20.20	10.50	121	14
9.	Lack of knowledge on proper doses of pesticides	8.80	26.30	46.50	18.40	174.50	5
10.	Difficulties in proper and timely intercultural operations	14	14	57	15	173	6
B. Economic barriers							
11.	Mushroom cultivation is more costly than other crops	35.10	36	19.30	9.60	103.40	17
12.	Inadequate credit supply of mushroom cultivation	19.30	49.10	21.10	10.50	122.80	11
13.	High rate of interest of mushroom cultivation credit	39.50	39.50	10.50	10.50	92	18
14.	Complexity to get mushroom cultivation credit	36.80	50	13.20	0	76.40	20
15.	Market facilities is not well developed for mushroom	16.70	16.70	33.30	33.30	183.20	2
16.	Transportation facilities is not well developed	43.90	34.20	21.90	0	78	19
C. Other barriers							
17.	Eating of mushroom is not socially well habituated	19.30	49.10	21.10	10.50	122.80	12
18.	Lack of energetic farmers	28.90	39.50	21.10	10.50	113.20	15
19.	Demand of mushroom in market is low	12.30	24.60	50	13.10	163.90	7
20.	Poisonous effect may cause harmful effect on health	28.90	39.50	21.10	10.50	113.20	16

The findings contained in Table 4.14 indicated that the highest barriers impeding mushroom cultivation was found on ‘low technical knowledge about mushroom cultivation’ (BICMI= 186.90). The result might be due to that the mushroom cultivating farmers may lack sufficient technical knowledge.

The second highest barriers impeding mushroom cultivation was found on ‘market facilities is not well developed for mushroom’ (BICMI= 183.20). The result might be due to that mushroom marketing is not popular and different from general marketing system.

The third barriers impeding mushroom cultivation was observed on ‘attack of pests’ (BICMI= 181.80). This result might be due to that pest attack may hinder proper cultivation of mushroom.

The last and lowest barriers impeding mushroom cultivation was found on ‘complexity to get mushroom cultivation credit’ (BICMI= 76.40).

4.2.2 Overall barriers impeding mushroom cultivation

The overall barriers impeding mushroom cultivation were determined on the basis of their actual scores. Thus, the observed overall barriers impeding mushroom cultivation scores of the farmers ranged from 5 to 52 against the possible score of 0 to 60. The mean and standard deviation were 27.61 and 9.01 respectively. The respondents were classified into three categories namely ‘low barriers ’ (≤ 19), ‘medium barriers ’ (20-37) and ‘high barriers ’ (> 37) on the basis of their overall barriers impeding mushroom cultivation scores as shown in Table 4.15.

Table 4.15 Distribution of the farmers according to overall barriers impeding mushroom cultivation

Range		Categories	Respondents		Mean	SD
Observed	Possible		Number	Frequency		
5-52	0-60	Low barriers (≤ 19)	13	11.40	27.61	9.01
		Medium barriers (20-37)	85	74.60		
		High barriers (> 37)	16	14		
		Total	114	100		

The highest proportion (74.60%) of the farmers faced medium barriers of mushroom cultivation compared to 11.4 percent faced low and 14.0 percent faced high barriers of

mushroom cultivation. The findings revealed that above three fourth (88.6 percent) of the farmers faced medium to high barriers of mushroom cultivation. Therefore, it can be said that the farmers are in a threat of extinction of mushroom cultivation in the study area.

4.3 Contribution of the Selected Characteristics of the Respondents on Barriers Impeding Mushroom Cultivation

For this study twelve characteristics of the respondent were selected and each of the characteristics was treated as independent variable. The selected characteristics were age, education, family size, experience in mushroom cultivation, annual family income, knowledge on mushroom cultivation, attitude towards mushroom, credit availability, training received, satisfaction for market value of mushroom, extension contact and organizational participation. Barriers' impeding mushroom cultivation was the only dependent variable of this study.

Pearson product moment correlation was initially done to find out the relationship between each of the selected characteristics of the mushroom cultivating farmers and the barriers impeding mushroom cultivation as perceived by them. It was found that 10 variables namely education, family size, experience in mushroom cultivation, annual family income, knowledge on mushroom cultivation, attitude towards mushroom, credit availability, satisfaction for market value of mushroom, extension contact and organizational participation had negative significant relationship with barriers impeding mushroom cultivation. The result has been shown in appendix B.

Then full model regression analysis was initially run with the 12 independent variables. But it was observed that the full model regression results were misleading due to the existence of interrelationships among the independent variables. So that, in order to avoid the misleading results and to determine the best explanatory variables, the method of multiple regressions was administered and 12 independent variables were finally fitted together in enter multiple regression analysis which shown in Table 4.16.

Table 4.16 Table showing multiple regression analysis between the dependent variables and independent variables of the study

Dependent variable	Independent variable	B	P	R ²	Adj. R2	F
Barriers impeding mushroom cultivation	Age	-0.056	0.409	0.569	0.518	11.132
	Education	-0.058	0.431			
	Family size	-0.088	0.217			
	Experience in mushroom cultivation	-0.162	0.050*			
	Annual family income	0.037	0.607			
	Knowledge on mushroom cultivation	-0.277	0.000***			
	Attitude towards mushroom	-0.376	0.000***			
	Credit availability	-0.197	0.010**			
	Training received	-0.104	0.136			
	Satisfaction for market value of mushroom	0.017	0.810			
	Extension contact	-0.047	0.533			
	Organizational participation	-0.009	0.911			

***Significant at $p < 0.01$;

**Significant at $p < 0.05$;

*Significant at $p < 0.1$.

Information contained in Table 4.16 show that there is a significant contribution of respondents' experience in mushroom cultivation, knowledge on mushroom cultivation, attitude towards mushroom, credit availability to barriers impeding mushroom cultivation. Of these, knowledge on mushroom cultivation and attitude towards mushroom were the most contributing factor (significant at 1% level of significance). Credit availability (significant at 5% level of significance) and experience in mushroom cultivation (significant at 10% level of significance) were also the important contributing factors to barriers impeding mushroom cultivation.

57 percent ($R^2=0.569$) variation of the barriers impeding mushroom cultivation can be attributed to mushroom growers' experience in mushroom cultivation, knowledge on mushroom cultivation, attitude towards mushroom, credit availability making this an

excellent model (Table 4.16). The F value indicates that the model is significant ($p < 0.000$).

However, each predictor may explain some of the variance in barriers of mushroom cultivation simply by chance. The adjusted R-square value penalizes the addition of extraneous predictors in the model, but values of 0.518 still show that the variance in barriers of mushroom cultivation can be attributed to the predictor variables rather than by chance, and that both are suitable models (Table 4.16). In summary, the models suggest that the respective authority should consider the mushroom growers' experience in mushroom cultivation, knowledge on mushroom cultivation, attitude towards mushroom, credit availability and in this connection some predictive importance has been briefly discussed below:

4.3.1 Experience in mushroom cultivation

From multiple regression, it was concluded that experience in mushroom cultivation had significant negative contribution to the barriers impeding mushroom cultivation. This implies that with the increase in the experience in mushroom cultivation the barriers impeding mushroom cultivation is decreased.

Experience plays an important role in mushroom cultivation. The findings showed that less experienced mushroom growers face high barriers than the medium and high experienced growers.

4.3.2 Knowledge on mushroom cultivation

Multiple regression showed that the knowledge on mushroom cultivation of mushroom growers had significant negative contribution to the barriers impeding mushroom cultivation. This implies that the increase of knowledge level of the mushroom grower's will decrease the barriers impeding mushroom cultivation.

Higher knowledge level of the mushroom growers does influence the mushroom cultivation and the mushroom growers who know well about mushroom cultivation procedure face minimum barriers than those who have not enough knowledge on mushroom cultivation.

4.3.3 Attitude towards mushroom

From multiple regression, it was found that attitude towards mushroom had significant negative contribution to the barriers impeding mushroom cultivation. This implies that with the increase of attitude towards mushroom the respondent's barriers are decreased.

A positive attitude towards mushroom helps a grower to meet the challenges of mushroom cultivation.

4.3.4 Credit availability

From multiple regression, it was concluded that credit availability had significant negative contribution to barriers impeding mushroom cultivation. This implies that with the increase in the credit availability of mushroom growers barriers are increased.

CHAPTER 5

**SUMMARY OF FINDINGS,
CONCLUSION AND
RECOMMENDATIONS**

5.1 Summary of Findings

5.1.1 Selected characteristics of the farmers

5.1.1.1 Age

The age of the farmers ranged from 22 to 60, the mean being 42.89 and the standard deviation is 9.01. More than half of the respondents (57.0%) were middle aged compared to 21.90 percent of the respondents belonged to the young aged category and 21.10 percent were in the old aged category.

5.1.1.2 Education

The educational qualification scores of the farmers ranged from 2 to 16, the mean being 9.17 and standard deviation 3.98. Highest proportion of the farmers (42.10%) had above secondary education, 25.40 percent had primary education and 32.50 percent of the farmers had secondary education level.

5.1.1.3 Family size

The family size scores of the mushroom growers ranged from 2 to 8. The average family size was 4.69 with a standard deviation of 1.89. Near about half of the respondents (48.20%) had medium family size, 29.80 percent had small family size and 22.90 percent had large family.

5.1.1.4 Experience in mushroom cultivation

The experience in mushroom cultivation scores of the farmers ranged from 0.5 to 6. The average experience in mushroom cultivation was 2.79 with a standard deviation of 1.57. More than half (53.5 percent) of the respondents (53.50%) had low experience in mushroom cultivation, 27.20 percent had medium experience in mushroom cultivation and 19.30 percent had high experience in mushroom cultivation.

5.1.1.5 Annual family income

The family income scores (taken in thousands) of the farmers ranged from 30 to 728 with a mean of 196.52 and standard deviation of 138.94. Highest proportion of the farmers (83.30%) had medium income compared to 7 percent under low and only 9.60 percent under high income group.

5.1.1.6 Knowledge on mushroom cultivation

Knowledge about mushroom cultivation score of the farmers ranged from 8 to 16 against the possible range from 0 to 20 with a mean of 12.57 and standard deviation of 2.45. More than half of the respondents (66.70%) had medium knowledge on mushroom cultivation, while 19.30 percent had low and 14.0 percent had high knowledge on mushroom cultivation.

5.1.1.7 Attitude towards mushroom

The attitude towards mushroom scores of the farmers ranged from 12 to 33, against the possible score 8 to 40. The mean and standard deviation were 23.60 and 5.80 respectively. Majority of the farmers (61.40%) had medium attitude towards mushroom, 21.90 percent had low attitude towards mushroom and 16.7 percent had high attitude towards mushroom.

5.1.1.8 Credit availability

The credit availability scores of the respondents ranged from 0 to 45 and average was 22.88 with a standard deviation of 15.14. Highest proportion of the respondents (61.40%) got medium amount of credit, while 14.90 percent got no credit and 23.70 percent got high amount of credit.

5.1.1.9 Training received

The training received score of the respondents ranged from 0 to 60, the average being 13.55 and standard deviation of 17.16. Most of the respondent (36.80 percent) had received high training, 10.50 percent received no training, 26.30 percent had received low training and 26.30 percent had received medium training.

5.1.1.10 Satisfaction for market value of mushroom

Sale price of mushroom score of the respondents ranged from 0 to 2 against the possible range of 0 to 2, the average being 1.10 and standard deviation of 0.62. Most of the respondents (59.60%) were satisfied with the market value of mushroom

followed by 14.90 percent had no opinion and 25.40 percent are highly satisfied with the market value of mushroom.

5.1.1.11 Extension contact

The extension contact scores of the farmers ranged from 11 to 35, against the possible score of 0 to 45. The mean and standard deviation were 24.43 and 6.99 respectively. Majority of the farmers (59.60%) had medium extension contact, 27.20 percent had low extension contact and 13.20 percent had high extension contact.

5.1.1.12 Organizational participation

The farmer's organizational participation scores ranged from 10 to 24 against the possible range of 0 to 30 with an average score being 17.61 and standard deviation of 4.64. About half of the farmers (50.90%) had medium, 25.4 percent had low and 23.7 percent had high organizational participation.

5.1.2 Barriers Impeding Mushroom Cultivation

5.1.2.1 Comparison among selected barriers impeding mushroom cultivation

The computed BIMCI of the 20 selected barriers ranged from 76.4 to 186.9 against a possible range of 0 to 300. Low technical knowledge about mushroom cultivation, market facilities is not well developed and attack of pest were found as the highest three barriers impeding mushroom cultivation respectively. The last and lowest barriers impeding mushroom cultivation was found on 'complexity to get mushroom cultivation credit'.

5.1.2.2 Overall barriers impeding mushroom cultivation

The observed overall barriers impeding mushroom cultivation scores of the farmers ranged from 5 to 52 against the possible score of 0 to 60. The mean and standard deviation were 27.61 and 9.01 respectively. The highest proportion of the farmers (74.60%) faced medium barriers impeding mushroom cultivation compared to 11.40 percent faced low and 14 percent faced high barriers impeding mushroom cultivation.

5.1.3 Contribution of the selected characteristics of the respondents on barriers impeding mushroom cultivation

Out of 12 independent variables only 4 variables namely experience in mushroom cultivation, knowledge on mushroom cultivation, attitude towards mushroom and credit availability had significant negative contribution to barriers impeding

mushroom cultivation.

5.2 Conclusions

Based on the findings and their logical interpretations in the light of relevant facts the researcher has drawn the following conclusions:

1. The highest proportion of the farmers faced medium barriers impeding mushroom cultivation. Therefore it may be concluded that the farmers faced serious problems which may create hindrance in cultivating mushroom.
2. The highest barriers impeding mushroom cultivation was found on low technical knowledge about mushroom cultivation. It may be concluded that the farmers does not have sufficient knowledge about mushroom cultivation.
3. Among the 12 selected characteristics of the farmer's 10 characteristics had negative significant relationship with the barriers impeding mushroom cultivation. It may, therefore be concluded that the above characteristics of the farmers significantly contribute to decrease mushroom cultivation.
4. Experience in mushroom cultivation and Knowledge about mushroom cultivation showed negative significant relationship with barriers impeding mushroom cultivation. This leads to conclude that the higher the Experience in mushroom cultivation and knowledge about mushroom cultivation the lower the barriers impeding mushroom cultivation.

5.3 Recommendations

5.3.1 Recommendations for policy implementation

On the basis of the findings and conclusion of the study, the following recommendations for policy implementation are made.

1. As majority of the farmers were found to face medium barriers impeding mushroom cultivation, the Ministry of agriculture and other concerned departments should come up with appropriate programs that the farmers can maximize their profit from mushroom cultivation.
2. Appropriate measures should be taken for ensuring easy availability of inputs at reasonable prices for mushroom cultivation.

3. Proper guidance and necessary help should be given to mushroom farmers so that they can overcome their constraints in getting credit through increasing the credit facility from commercial banks and other financial institutions at low interests.
4. The National Mushroom Development and Extension Center and other NGOs should strengthen their extension services to overcome the barriers impeding mushroom cultivation. In case of extension services, adequate motivational program through meeting at result demonstration, group discussion and other educational activities should be provided for increasing mushroom cultivation.
5. Government should provide training and assistances to remove the barriers impeding mushroom cultivation.

5.3.2 Recommendations for further study

Considering the scope and limitations of the study, the following recommendations are made for further study:

1. The present study was conducted in two unions of Savar municipality under Dhaka district. Similar study may be undertaken in other parts of the country, which could be helpful for more understanding and generalization of the issues.
2. The present investigation included 20 barriers impeding mushroom cultivation. Again, each of these barriers may be taken as individual aspect of the study.
3. There is a need for investigation of the barriers impeding mushroom cultivation such as: barriers related to technology, barriers with research system and ICT etc. Again, each of these aspects of barriers may be taken as individual aspect of the study.
4. The present study explored the relationships of 12 independent variables with barriers impeding mushroom cultivation. Further research may be conducted by selecting other independent variables to observe relationships with the same.
5. Review of literature indicated that there is no direct research especially attitude of farmers towards mushroom cultivation. Further research may be conducted on the farmers' attitude towards mushroom cultivation.

6. 10 characteristics of the farmers showed significant relationships with barriers impeding mushroom cultivation. Hence, further investigation is necessary to find out such relationships between the concern variables to authentic the present study.

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Appendix A

An English Version of the Interview Schedule

Department of Agricultural Extension Education and Information System

Sher-e-Bangla Agricultural University
Dhaka-1207

An interview schedule of the research study entitled

'BARRIERS IMPEDING MUSHROOM CULTIVATION'

Date: -----

Serial No.

Name of Respondent -----Father's/Husband's Name -----

Address: -----

(Please answer the following questions and put tick (✓) whenever necessary)

1. Age: Please mention of your present age? Years

2. Education: Mention your educational qualification.

a) Can't read and write

b) Can sign name only

c) Passed class

3. Family size: Please mention your total number of family members (including yourself).

Male	-----	Female	-----	Total=	-----
------	-------	--------	-------	--------	-------

4. Experience in mushroom cultivation

How many years you are involved in mushroom cultivation?Years.

5. Annual family income: Please mention your annual family income according to the following sources.

Sl. No.	Sources of income	Production (local unit)	Market price (Tk./local unit)	Total (Tk.)
A. Agricultural				
1.	Rice			
2.	Maize			
3.	Wheat			
4.	Potato			
5.	Fruits and vegetables			
6.	Mushroom			
7.	Fish			
8.	Poultry			
9.	Dairy			
10.	Land lease			
B. Non-Agricultural				
1.	Service			
2.	Business			
3.	Others (if any)			
Total=				

6. Knowledge on mushroom cultivation: Please answer the following questions

Sl. No.	Questions	Total Marks	Obtained
1.	Mention two edible varieties of mushroom.	2	
2.	Mention two main benefits of eating mushroom.	2	
3.	What is the suitable climatic condition for mushroom cultivation?	2	
4.	Mention the planting time of mushroom.	2	
5.	Mention two special intercultural operations in mushroom cultivation.	2	
6.	Mention two harmful insects of mushroom.	2	
7.	Mention two diseases of mushroom.	2	
8.	What are the symptoms of mushroom maturity?	2	
9.	Mention two medicinal values of mushroom.	2	
10.	How do you preserve mushroom?	2	
Total		20	

7. Attitude towards mushroom: Please state the degree of your agreement or disagreement to each of the following statements.

Sl. No.	Statements	Nature of opinion				
		SA	A	U	D	SD
1.(+)	Mushroom cultivation is a profitable business than other crops					
2. (-)	Mushroom cultivation need more investment					
3.(-)	It is difficult to maintain all the environmental conditions for mushroom cultivation					
4.(+)	Mushroom has medicinal values, so I like to cultivate it					
5. (-)	Many technical problems occurred in mushroom cultivation. So I do not want to cultivate mushroom.					
6. (+)	I want to develop my economic conditions through mushroom cultivation					
7(-)	It is very laborious and risky job					
8(+)	Mushroom cultivation can make a healthy family as it contains several nutrition					

SA= Strongly Agree, A= Agree, U= Undecided, D= Disagree, SD= Strongly Disagree

8. Credit availability: Did you receive credit from different organization for income generating activities? If yes, please mention the sources of receiving your credit with amount.

Sl. No.	Sources of credit	Amount (Tk.)
1.	Relatives	
2.	Banks	
3.	NGOs	
4.	Others (if any)	
Total		

9. Training received: Have you received any training during the last three years?

Yes No

If yes, please furnish the following information

Sl. No.	Name of Organization(s)	Topics	Duration (Days)
1.			
2.			

10. Satisfaction for market value of mushroom: Are you satisfied with the sale price of mushroom? How much you are satisfied with the selling price of mushroom?

Satisfied	
No opinion	
Not satisfied	

11. Extension contact: Please indicate the extent of your contact with following extension media.

Sl. No.	Extension media	Not at all	Extent of contact		
			Rarely	Occasionally	Frequently
A. Individual Contact					
1.	Model Mushroom farmer (times/week)	0	1	2	≥ 3
2.	Neighbor (times/week)	0	1-2	3-4	≥ 5
3.	Local leader (times/week)	0	1	2	≥ 3
4.	Agricultural input dealer (times/season)	0	1-3	4-5	≥ 6
5.	Sub-Assistant Agricultural Officer (times/season)	0	1-2	3-4	≥ 5
6.	Agricultural Extension Officer (times/year)	0	1-2	3-4	≥ 5
7.	Upazila Agricultural Officer (times/year)	0	1	2-3	≥ 4
8.	Deputy Director of mushroom centre (times/year)	0	Do	Do	Do
9.	Program Coordinator of mushroom centre (times/year)	0	Do	Do	Do
10.	Trainer of mushroom centre (times/year)	0	Do	Do	Do
B. Group contact					
1.	Participate in field day (times/year)	0	0.5	1	≥ 2

2.	Participate in result demonstration meeting (times/year)	0	Do	Do	Do
C.	Mass Contact				
1.	Visit to agricultural fair (times/year)	0	0.33	0.50	≥ 1
2.	Watching agricultural TV program (times/month)	0	1	2-4	≥ 5
3.	Reading agricultural booklets or magazines (No./year)	0	1	2-3	≥ 4

12. Organizational participation: Please indicate your involvement in the following organizations.

SL. No.	Name of organization	No Participation	Type of participation		
			As a member	As an executive member	As a chief executive
1.	School/ Madrasa committee				
2.	Mosque /Mondir committee				
3.	Local government organization				
4.	Youth club				
5.	Bazar committee				
6.	Business samitte				
7.	Union parishad				
8.	NGO group				
9.	Village defense party				
10.	Others (if any)				

13. Barriers impeding mushroom cultivation: Please mention the extent of barriers you have faced in mushroom cultivation influenced by the following factors

Sl. No.	Name of the barriers	Extent of barriers in mushroom cultivation			
		Not at all	Low	Moderate	High
A. Cultivation barriers					
1.	Unavailability of quality spawn packets timely				
2.	Low spawn germination rate				
3.	Insect infestation				
4.	Attack of pests				
5.	Lack of proper knowledge about irrigation				
6.	Lack of proper knowledge about fertilizer application				
7.	Low technical knowledge about mushroom cultivation				
8.	Shortage of organic manure for mushroom cultivation				
9.	Lack of knowledge on proper doses of pesticides				
10.	Difficulties in proper and timely intercultural operations				
B. Economic barriers					
11.	Mushroom cultivation is more costly than other crops				
12.	Inadequate credit supply of mushroom cultivation				
13.	High rate of interest of mushroom cultivation credit				
14.	Complexity to get mushroom cultivation credit				
15.	Market facilities is not well developed for mushroom				
16.	Transportation facilities is not well developed				
C. Other barriers					
17.	Eating of mushroom is not socially well habituated				
18.	Lack of energetic farmers				
19.	Demand of mushroom in market is low				
20.	Poisonous effect may cause harmful effect on health				

Thank you for your kind co-operation.

Signature of interviewer

Appendix B

Correlation between dependent and independent variables

	Age	Education	Family size	Experience in mushroom cultivation	Annual family income	Knowledge about mushroom cultivation	Belief about mushroom	Credit availability	Training received	Sale price of mushroom	Extension contact	Organizational participation	Factors of decreasing mushroom cultivation
Age	1												
Education	.162	1											
Family size	.061	.218*	1										
Experience in mushroom cultivation	.017	.208*	.233*	1									
Annual family income	.103	.165	.186*	.071	1								
Knowledge about mushroom cultivation	.176	.236*	.126	.173	.052	1							
Belief about mushroom	.009	.292**	.147	.116	.292**	.264**	1						
Credit availability	.049	.125	.217*	.074	.222*	.202*	.387**	1					
Training received	.081	.163	.083	.085	.256**	-.006	.113	-.028	1				
Sale price of mushroom	.038	.162	.198*	.191*	.188*	.223*	.203*	.134	.062	1			
Extension contact	-.051	.215*	-.017	-.026	.061	.298**	.344**	.250**	.071	.144	1		
Organizational participation	-.025	.178	.208*	.551**	.078	.179	.243**	.201*	.085	.196*	.178	1	
Factors of decreasing mushroom cultivation	-.137	-.340**	-.274**	-.308**	-.201*	-.489**	-.590**	-.439**	-.168	-.216*	-.316**	-.317**	1

** . Correlation is significant at the 0.01 level (2-tailed). * . Correlation is significant at the 0.05 level (2-tailed).