

Problems and Prospects of Quality Mushroom Supply for Domestic Market

Mehnaj Rahman



**Department of Agribusiness and Marketing
Faculty of Agribusiness Management
Sher-e-Bangla Agricultural University
Dhaka-1207**

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Problems and Prospects of Quality Mushroom Supply for Domestic Market

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Mehnaj Rahman

Reg. No.-12-5170

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APPROVED BY



Sajeeb Saha

Associate Professor
Department of Agribusiness
and Marketing
Sher-e-Bangla Agricultural
University
Supervisor

Dr. Md. Nazrul Islam

Professor
Department of Horticulture
Sher-e-Bangla Agricultural
University
Co-Supervisor

Bisakha Dewan

Chairman
Examination Committee

LETTER OF TRANSMITTAL

15 May, 2019

Bisakha Dewan

Chairman and Assistant Professor

Department of Agribusiness and Marketing

Sher-e-Bangla Agricultural University

Subject: Prayer for Acceptance of the Thesis Paper.

Respected Sir,

I am pleased to put forward the thesis on “Problems and Prospects of Quality Mushroom Supply for Domestic Market”. This thesis is an indispensable part of the successful completion of my MBA program. While making this thesis, I got familiar with multifarious aspects of Marketing tools, effectiveness of both traditional marketing & innovative marketing and over all mushroom cultivation status in Bangladesh. I have tried my best to make the whole thesis informative, efficient as well as fruitful on the basis of information.

I wish to express my sincere gratitude and appreciation to the almighty Allah for keeping me mentally and physically sound to prepare this thesis. Also, I convey my best regards to you for your tireless support and assistance without which this thesis would not be possible. I tried my best to make this thesis look like a professional one and cover up all the related information that help to make balance between personal life and the working areas. I do hope that you will evaluate it with your own graciousness.

Sincerely Yours,

Mehnaj Rahman

Reg.No.-12-5170

MBA(Marketing)

Department of Agribusiness and Marketing

Faculty of Agribusiness Management

Sher-e-Bangla Agricultural University

CERTIFICATE OF THE SUPERVISOR



To Whom It May Concern

This is to certify that the thesis on “Problems and Prospects of Quality Mushroom Supply for Domestic Market” for the degree of Masters of Business Administration (M.B.A), major in Marketing from Sher-e-Bangla Agricultural University carried out by **Mehnaj Rahman, Reg. No.- 12-05170** under my supervision. No part of the thesis paper has been submitted for any degree, diploma, title, recognition before.

.....
Sajeed Saha
Associate Professor
Department of Agribusiness and Marketing
Sher-e-Bangla Agricultural University
Dhaka-1207

DECLARATION OF THE STUDENT

I do hereby solemnly declare that the work presented in this thesis paper titled “Problems and Prospects of Quality Mushroom Supply for Domestic Market” is an original work done by me under the supervision of *Sajeeb Saha*, Assistant Professor, Department of Agribusiness and Marketing and co-supervisor, *Dr. Md. Nazrul Islam*, professor, Department of Horticulture, Sher-e-Bangla Agricultural University. No part of this thesis has been previously submitted to any other University/ College/ Institution/ Organization for any academic certificate/ degree/ diploma/ qualification.

I further undertake to assure the department against any loss or damage arising from breach of the forgoing obligation, if any.

Mehnaj Rahman

Reg.No.-12-5170

MBA(Marketing)

Department of Agribusiness and Marketing

Faculty of Agribusiness Management

Sher-e-Bangla Agricultural University

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The Acronyms

BARC	:	Bangladesh Agricultural Research Council
FAO	:	Food and Agriculture Organization
JOCV	:	Japanese Overseas Cooperative Volunteer
UNDP	:	United Nations Development Programme
SWOT	:	Strengths, Weaknesses, Opportunities, and Threats.
SSA	:	Sub-Saharan African
PCI	:	Problem confrontation Index
BCR	:	Benefit Cost Ratio

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ABSTRACT

The purpose of the study was to find out problems of mushroom production and marketing of different stakeholders in Bangladesh and find out the ways of improving mushroom marketing system for domestic markets. Lack of capital, poor quality seed, insect attack, high temperature in summer, inability to choose right variety, low temperature in winter, inappropriate trimming of production and heavy rainfall are the major problems during production. And high transportation cost, lack of promotion, large number of middlemen, limited wholesale market, absence of market place and absence of storage facilities are the major problems during marketing.

The study was conducted in Savarupazila under Dhaka district. Data were collected from randomly selected 121 farmers using an interview schedule. The relationships between socio-demographic determinants and the outcome were examined by the using Two-way contingency tables and the Pearson's chi-squared test. Each independent variable was compared individually against the dependent variable to test for an interaction. Of the Determinants, those were found to be associated with the outcome in the bivariate analysis with $p < 0.001$ were later included in the multivariate logistic regression to evaluate independent effects. Finally, a multivariate technique named as logistic regression analysis is used to investigate the associations between each predictor variable and the outcome variable of the respondents. The result was presented as odds ratio (ORs) and 95% confidence interval (CI). SPSS v20.0 software was used for data analysis. And effective policy regarding mushroom cultivation and marketing, government incentives and capital at low interest rate, promotion by government and NGOs, removing middlemen, proper monitoring, training for the growers, and expansion of market are the major findings as suggestions to improve the mushroom marketing system for domestic markets.

Chapter One: Introduction

Chapter- 01: Introduction

1.1:Prelude

The desire for greater sustainability; improving food security by increasing diversity; and developing more reliable sources of income especially for small-scale farmers, suggests mushroom farming may be one of the viable options. It provides an efficient and economically-viable biotechnology (*Bradley, 2013*), which can give consistent growth with high biological efficiency (*Jonathan et al., 2012*). Mushroom (*Agaricusbisporus*) production is a lucrative and profitable cottage industry for low income rural households (*Lelley, 1988*) and this industry is providing full or part time employment to rural and urban poor and marginal people in many developing countries. Now mushroom is being cultivated in more than 100 countries of the world. 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. The edible mushrooms are also good source of protein, vitamins and minerals (*Barmonet al., 2012*).

A mushroom is the fleshy, spore-bearing fruiting body of a fungus, typically produced above the ground on soil or on its food source, mostly in forests. It is perhaps the most well-known and documented edible forest product. The word “mushroom” means different things for different people in different countries. Since ancient times, man has been interested in mushrooms, which were called “food of gods” by the Romans. The Greeks regarded them as providing strength for warriors in battles. Mushrooms are mysterious, cultural, traditional and legendary (*Zhang et al., 2014*).

Many people are intrigued by mushrooms’ nutritional and medicinal properties, in addition to their culinary appeal. Mushrooms contain many essential amino acids; white button mushrooms, for example, contain more protein than kidney beans. Shiitake mushrooms are less nutritious, but are still a good source of protein (*Royse and Schisler, 1980*). As a group, mushrooms also contain some unsaturated fatty acids, provide several of the B vitamins, and vitamin D. Some even contain significant vitamin C, as well as the minerals potassium, phosphorus, calcium, and magnesium (*Park, 2001*). Asian traditions maintain that some specialty mushrooms provide health benefits. Chinese doctors use at least 50 species (*Beetzet al., 2014*).

The number of mushroom species on the earth is estimated to be 140000 and only 10% are known. The proportion of useful mushrooms among the undiscovered and unexamined mushrooms may be 5%, which can be of possible benefit to mankind (*Imtiaj et al., 2008*). Mushrooms are worldwide edible fungi 5,000 varieties have been found in the world and of those nearly 100 varieties are under the condition of potted artificially, but most of those varieties are still in natural state (*Sun et al., 2008*).

World production of mushroom is growing and now exceeds ten million tons in which 8.19 million tons produced in Asia. The production of southern Asia was 0.19 million ton in which the production of India was 0.029 million ton (*FAO, 2016*). However, the data on mushroom production of Bangladesh is not available.

Bangladesh is an agrarian and one of the most densely populated country in the world. Nearly all the arable area of the country has been brought under the plough and further agricultural expansion is almost impossible. On the other hand, the unemployed population in our country is 2.2 million out of which 0.8 million is female (*Kader, 2006*). The fruits and vegetables produced by the country can fulfill 65-70% of the national demand. A significant portion of fruits and vegetables are lost after harvest, as a result the available fruits and vegetables fulfill only 50% of our requirement (*Muzammel et al., 2005*). In this situation, mushroom cultivation can be a new hope for Bangladesh. (*Rahman et al., 2017*). Because the weather condition of Bangladesh is convenient for mushroom cultivation. On the other hand, it does not require any cultivable land and can be grown in room by racking vertically. As a result, its capital return as well as benefit per unit area is higher than any other vegetable in our country. It requires little capital, short time and trouble-free technique for cultivation. For that reason all types of people can participate in its cultivation. Hence, it can also generate huge employment opportunities for unemployed. The ingredients required for mushroom cultivation like sawdust, paddy straw, wheat straw, sugarcane baggage, waste paper, used cotton, dervishes etc. are always available and cheap and no materials are not required to import from abroad for its cultivation. Moreover, no chemical components are necessary for its cultivation. It is an organic and ecofriendly vegetable. Worn substrate of mushroom cultivation is one of the best sources of organic matter in the soil. Its cultivation may be “a lifeboat” for survival of the landless people who do not have any source other than their houses. Its cultivation can transfer as a cottage industry and create a huge prospect for export (*Shakil et al., 2014*).

In Bangladesh mushroom cultivation was initiated in 1979 with the assistance of Japanese Overseas Cooperative Volunteer (JOCV) whereas the commercial mushroom cultivation was started by Bangladesh Agricultural Research Council (BARC) and Mushroom Culture Centre at Savarin early 1980s (*Alom et al., 2010*). There is a huge prospect of mushroom cultivation in the country because of its climatic condition which is fairly favorable for high volume of mushroom production (*Begum et al., (2008)*). It supplements farm income for the small family farms not having enough land to produce crops and raise animal while making use of by products or co-products from other crops. Intensive type of mushroom production could be an alternative job opportunity that would provide substantial amount on low investment to lead a descent life style in Bangladesh.

1.2: Background of the Study

Market linkage is the most appropriate in the context of the farmers' involvement and the market to supply goods to consumers (*Kit et al., 2006; and Shepherd, 2007*). Usually, marketing channel links the producers and consumers, and there by supplying goods from producers to consumers. A large number of intermediaries are involved in the marketing channels and they earn their daily livelihoods.

Marketing agricultural product is considered to be a very challenging and complex effort. It involves moving of products from farm-gate to retail consumers. It is a dynamic process and involves a number of ownership changes and economic activities such as harvesting, processing, storage, transportation and retailing. Furthermore, the marketing of agriculture food products requires some public rules such as grading and standards, food safety policies, market information and future markets. The marketing of agriculture food products is very different from marketing of agriculture commodities in general. Some uniqueness of agriculture food products is their short shelf life, non-uniform size, color, physical shape and taste. The other important distinguishing characteristic of agriculture food products is the remoteness of the farm form the final consumer. Thus, these characteristics require special handling treatments and marketing strategies (*Haimid et al., 2014*).

1.2.1: Marketing Strategies

Marketing strategy is how a company reaches its marketing objectives, which is where the company intends to be in the future (*Mercer, 1999*). The marketing strategy outlines the way in which the marketing mix is used to attract and satisfy the target market and achieve the company's goals (*Evans and Berman, 1997*). There are many factors that affect the marketing strategy, such as the volatility of the economy, versatile and changes of technology, the socio-economic and lifestyle changes and political situation within a country. Thus, the company has to consider these factors when establishing their marketing strategies.

The marketing strategies involve many activities such as planning, budgeting, control of products, promotion, distribution and pricing (*Lindgren and Shimp, 1996*). In these activities, the company has to analyze the market opportunities that includes the prospect customers in the market who need the product, how to satisfy their needs, the selection of target markets based on their special requirements and how to position the products for selected target markets. The marketing strategy is a game plan, by which marketing objectives will be achieved through planning, budgeting and controlling the following factors:

- Product-promotion of products that suit the consumers want.
- Price-the suitable and affordable prices.
- Promotion (advertising)-getting the product known.
- Placement-where the product is sold.

The process of marketing strategies is how a company uses these factors to reach its consumers and achieve a competitive advantage. These factors are crucial and will lead to a successful business. The process can be divided into three steps (*Lindgren and Shimp, 1996*). Firstly, the company has to analyze the market opportunities from consumers' needs and wants. Secondly, the selection of a target market that the company has the competitive advantage. Thirdly, penetrate the market that can increase sales and market shares in the existing markets.

1.2.2: Marketing Mushrooms

Marketing is the most important consideration of all. If the cultivators can't sell their mushrooms at a price that ensures a reasonable profit margin, they don't want to invest in this enterprise. Spending some time—and even some money—educating themselves about marketing their potential product. Market research and evaluation is perhaps the most challenging part of developing a new enterprise (*Beetz and Kustudia, 2004*).

1.2.3: The Mushroom Business

The key to the mushroom business is to have established buyers and be capable of consistent production. New growers might encounter an uphill educational experience for two or three years. It is prudent to start small. The following business tips for people contemplating commercial production are-

- Make the market drive your production. Talk to potential buyers about volume and prices.
- Explore various marketing options: brokers, distributors, farmers' markets, restaurants, grocery stores, food service operations, and co-ops.
- Consider reselling other growers' mushrooms to offer more variety and larger volume.
- Talk to other producers and perhaps a consultant about production systems.
- Consider buying used equipment to reduce initial capital investment.
- Strike a balance between undercapitalizing and a heavy debt load (*Naegely, 2000*).

1.2.4: Market Research

The goals of market assessment are to project the sales volume and gross income of a new enterprise, to analyze its potential profitability and cash flow, and to gather information about potential buyers and competitors (to help develop a market strategy). Many specialty mushrooms can be cultivated, but the market, though growing, is still limited. If the cultivators are thinking about starting a commercial mushroom enterprise, begin at the end: to whom will they sell them? The cultivators cannot make money in any business if they don't have buyers for their product. Learn who buys mushrooms, what kinds they want, and where they shop. The producers must thoroughly investigate the demand for each mushroom species or product— as well as the available marketing outlets— before committing large amounts of capital to the enterprise.

Checking the local situation by themselves. Some common methods for conducting initial research include observation of buyers, surveys of stores, personal interviews with growers, and test marketing (once you have an experimental product). Another function of market research is to evaluate the competition. This will help the farmers to determine what market already exists and identify any niches they could fill. To find out more about your competitors, use their products. Talk to them. You may be surprised how much information they will share (*Beetz and Kustudia, 2004*).

1.2.5: Market Channels

Explore as many marketing strategies as appeal to you. Below are some possibilities-

- Market the fresh or dried product directly to your customers (at farmers' markets, to gourmet chefs, over the Internet, through mail-order offerings)
- Add value to the mushroom by creating processed products (mushroom sauces, dried entrée mixes, teas, extracts)
- Wholesale as fresh produce (on contract or by the batch) (*Beetz and Kustudia, 2004*).

1.2.6: Direct Marketing

If you can sell your mushrooms or mushroom products directly to an end user, you will naturally receive a better price than if you sell to a wholesaler. Direct marketing of mushrooms at local farmers' markets, to restaurants, or in supermarkets is possible in many locations. When competing in local markets, excellent service, top quality, and consistent supply, rather than the lowest price, might win the sale, particularly with gourmet chefs. Some chefs specialize in locally grown foods and may be interested for that reason. Others are willing to pay for fresh, premium produce. In any case, establishing a relationship with the buyer and reliably delivering a quality product are essential for this type of marketing.

Local grocery stores are another potential buyer of fresh mushrooms. However, an Arkansas grower found that local grocery chains were interested in her shiitake mushrooms only if she could assure them of a year-round supply. She decided that she had to add indoor production in order to meet this requirement. Natural foods stores are a market that may be more tolerant of seasonal supply. Any chef or grocer will require assurances of both quality and regular supply before switching from established wholesale sources.

Although the wholesaler with an established account creates stiff competition, the small, efficient producer might still have an advantage in some niche markets. For instance, shiitakes grown on logs are generally of higher quality and have a longer shelf life than

Shiitakes grown on sawdust substrates (the most common mass-production method). Log-grown shiitakes earn prices from three to eight times higher than those grown on sawdust substrates (*Anon., 2003*). Find the buyer to whom quality matters, and you will have found a market for your product.

Locally-grown oyster mushrooms have an advantage because oysters have a very limited shelf life and are too fragile to ship easily. The grower with direct, local sales can supply a fresher product that arrives in better condition (*Beetz and Kustudia, 2004*).

1.2.7: Wholesale Markets

Selling fresh mushrooms to a wholesaler will mean a lower price than if you market directly. However, for growers who choose not to involve themselves in direct sales, there are established wholesale markets for mushrooms. Small-scale commercial production of white button mushrooms and other *Agaricus* varieties such as portabellas and criminis is not recommended for the beginner, except on a small scale for direct marketing. A significant capital outlay and a high level of management skills are required to begin production, and at current prices, recovery of the initial investment might not be possible (*Beetz and Kustudia, 2004*).

1.2.8: Adding Value to Fresh Mushrooms

Adding value to fresh mushrooms usually means either developing a processed product, such as a sauce, or drying surplus mushrooms for sale in the off-season, when prices are higher. A value-added product can be sold either directly to the consumer or to wholesalers. Drying shiitakes and other mushrooms is another way to add value and avoid the low prices of the peak season (*Beetz and Kustudia, 2004*).

1.2.9: Financial Analysis

As a part of market research, one needs to do a financial analysis of the potential enterprise. Develop an enterprise budget with as much detail as one can provide. As with many farm enterprises, mushroom production is often only marginally profitable when labor and management costs are taken into consideration. If you are considering several mushroom species, do a financial analysis of each one separately. Try to anticipate every cost so that you can construct an accurate financial picture. Include an educational or marketing component in your budget, allowing for free samples or flyers with information and recipes, especially if you are developing a new product or will be doing direct marketing.

If you are adding mushroom production to an integrated farming system, financial analysis is more difficult. Making a clear profit might not be as important as making use of off-season labor or the small logs from woodlot thinning to create a saleable product from what otherwise would have been waste. Only by developing a market niche for a high-quality fresh product or by producing a mushroom-based food item can a small-scale beginner hope to compete (*Beetz and Kustudia, 2004*).

1.3: ProblemStatement

The movement of the products from the producers to the ultimate consumers involves various types of costs such as packing, transporting, weighing charges, loading and unloading charges, losses in the transport, losses due to storage, spoilage, taxes, etc. These costs are called marketing costs and it depends upon the marketing channels. Marketing channel is defined as a set of interdependent organizations that help make a product or service available for use or consumption by the consumers (*Kotler, 2010*).

The chain of intermediaries through which the various farm commodities pass between producers and consumers is called marketing channel. The existence of the agricultural farm depends on the marketing channel mainly because the agricultural commodities move from farmers to ultimate consumers through various market intermediaries that operate in the marketing system and marketing efficiency. Usually, three intermediaries are involved in the channel for mushroom-producers, wholesalers and retailers. Producers of mushroom sell their product to nearby mushroom office, wholesalers and retailers. The wholesalers buy mushroom directly from producers and mushroom office and sell it to retailers or sometimes directly to consumers. The retailers buy mushroom from wholesalers or directly from producers and sell it to consumers. Researches on different aspects of its farming and marketing have got a good foot in many developing countries. However, despite having huge potentiality of its farming in Bangladesh, it has got less attention as a food item among the mass people. Compared to the other farming countries, only a few studies have been conducted on mushroom industry. But very few detailed studies have so far been conducted on the marketing channels of mushroom. Keeping in view these facts, the present study aims at understanding the problems in marketing of mushrooms by mushroom cultivators and the way to recover those problems faced by the cultivators.

In view of the above background and facts, the present study was undertaken with the title “Problems and Prospects of Quality Mushroom Supply for Domestic Market”. The study aimed at providing information regarding the following queries:

- What are the problems of mushroom marketing of different stakeholders in Bangladesh?
- What are the ways of improving mushroom marketing system for domestic markets?
- How the management system works in mushroom industry?
- Whether the farmers get financial support or not?

1.4: Research Aims and Objectives

The primary purpose of the study is detecting the problems and prospects of quality mushroom supply for domestic market. To support the key objective, some specific objectives take into consideration:

These objectives of the study are as follows:

- To find out problems of mushroom marketing of different stakeholders in Bangladesh.
- To find out the ways of improving mushroom marketing system for domestic markets.
- To learn some important aspects like management aspects- a controlled management, marketing aspects- make profit with consumer satisfaction, financial aspects- arrange the financial support, and - make people aware about good or bad products with reasonable price.

1.5: Contribution of the Study

The most common and significant aspect of research studies is that these studies generate new knowledge and information which are useful to a various range of users. The significance of this study goes in the same direction (*Lemon et al, 2012*). Firstly, it has an enormous significance to the researcher as it carries significant part of his academic life. Moreover, it is a great opportunity for the researcher to learn about how to conduct a research practically (*Peter et al, 2013*). Secondly the findings of the study are expected to be of great value to researchers’ extension service providers, students, farmers, consumers, marketers and other stakeholders. It is assumed that the recommendation of this study will be helpful for identifying and reducing hindrances of mushroom marketing and increasing mushroom protein supply in the country.

1.6: Limitation of the Study

The study is mainly based on primary data. Moreover, enough literature was not available to relay the area of study regarding world and Bangladesh perspective. The coverage of study is limited area of savarupazilla under Dhaka district only comprising of limited respondents.

Chapter Two: Literature Review

Chapter – 2: Literature Review

2.1: Introduction

Past studies pave the ways for future research endeavors. An acquaintance with earlier pertinent studies was felt necessary to develop good understanding of the present study. A comprehensive and systematic review of the relevant literature is always a path finder to any research work. These literatures confirm and repudiate research outcomes with all possible reasons. Several research studies have been conducted on mushroom industry. However, all attempts have been made to collect relevant research studies as per the objectives framed for the present study. The relevant literature on all respect of the investigation which is having direct and indirect bearing on the study has been organized and presented in this chapter.

2.2: Studies on Marketing Problems and Strategies

Beetz and Kustudia (2004) described that the market for mushrooms continues to grow due to interest in their culinary, nutritional, and health benefits. They also show potential for use in waste management. However, as fungi, mushrooms have life cycles very different from those of green plants. The choice of species to raise depends both on the growth media available and on market considerations. Oyster mushrooms, which grow on many substrates, are easiest for a beginner. Shiitake mushrooms already have earned considerable consumer demand. Only two mycorrhizal mushrooms, morels and truffles, have been commercially cultivated. Mushroom cultivation offers benefits to market gardens when it is integrated into the existing production system. A careful analysis of potential markets must be the first step in deciding whether to raise mushrooms to sell. Many information resources are available for further research.

Zamil and Cadilhon (2009) presented a case study of an activity implemented under the FAO component of the Local Partnerships for Urban Poverty Alleviation Project, funded by UNDP in Bangladesh. In Mymensingh city the project is linking poor urban dwellers with a niche market for oyster mushroom. This small enterprise activity appears to be sustainable, in that it develops agricultural production to cater for the specific demand of an existing small marketing enterprise. As long as the trader finds a market for his mushroom, he has an incentive to collaborate with the project beneficiaries who supply the produce. This model is thus an example of mutual benefit between extremely small landholders and a trader through the catalytic effect of a development project.

Sun (2010) in his study, Porter's Five-Forces is used as the theoretical basis and SWOT as the analytical method to explore the competitive factors of the Chinese mushroom in the Japanese market. The conclusions for necessary competitive strategies will be identified by analyzing the questionnaires collected from experts. The conclusions were: If the Chinese mushroom exporters want to maintain and further develop their products in the Japanese market, they will have to maintain certain competitive advantages of their product, they must seek for better product quality by upgrading their production technologies.

Khan (2011) provides an analysis of the mushroom industry in the Utah with a focus on identifying opportunities for entry into the specialty mushroom market. Determining the strategic position of the mushroom industry requires the use of local information. In this study, a local survey of consumers in Northern Utah was used to generate specific information about consumer preferences and attitudes about mushrooms and how a new entrant might be positioned to address consumers' wants and needs related to mushrooms, and specifically specialty mushrooms. Regression analysis and trend analysis were also performed using data obtained either from the survey or secondary sources. This information is then used to base conclusions about the competitive position of potential entrants for specialty mushrooms into this market. The results of the survey depicted that respondents have a favorable attitude towards locally-produced commodities, are highly price conscious, and were mostly unaware of some of the most important attributes of mushrooms such as their nutritional and potential health values. Results of price and production trends of shiitake mushrooms indicated that this industry is still in the development stage, but characterized by intense rivalry among firms. The results of the logit analysis provided some insights about the ability to develop marketing strategies for mushrooms based on where they are produced. These results simply indicate that most respondents look favorably on locally-grown produce but that demographic characteristics can't be used to identify groups that are the most likely to want locally-grown produce. More respondents indicated a willingness to pay a premium for products containing the "Utah's Own" brand than simply "locally-grown".

Haimid, Rahim and Dardak (2013) carried out a research to understand the potential of mushroom industry in Malaysia. Particularly the issues and challenges that could slow down its development from the perspectives of growers. A qualitative research paradigm was applied involving 15 people who were involved in this industry. Specifically, a focus group discussion was used to gather information about their perception, expectation and

experience in cultivating and marketing fresh mushroom in Malaysia. Their study revealed that the three main issues of concern within this industry were related to production, marketing and government policies and initiatives. The production issues were related to managing the hot weather, supply of low quality seeds and the increase in production cost. In general, the demand for oyster mushroom is more than the quantity supplied by growers. Thus, there was no competition in marketing the oyster mushroom, especially in the Kiang valley area. The higher demand resulted in a higher price. The price of oyster mushroom determined by the marketers. However, the marketers still need to strategize the marketing effort by fulfilling the consumer needs and wants. The study also revealed also that R&D on the production system to overcome the environmental issue, introduction of new seeds, training and subsidy on the production house are some initiatives required from the government. The mushroom industry has the potential to be developed due to higher demand from local and global consumers.

Kalu, Nwachukwu, Ijioma and Evans-Kemka (2013) conducted a research aimed at investigating and ascertaining the problems facing mushroom availability and consumption in Owerri Municipal Council of Imo State Nigeria. Research questions and Null-hypothesis were formulated to elicit these problems. It was discovered among other things that the major problems facing mushroom consumption include: fungi misconception, unavailability and seasonal scarcity. People are therefore encouraged to go into entrepreneurship through commercial mushroom cultivation. This would no doubt go a long way in saving man from protein deficiency diseases and create employment opportunities for our teeming unemployed youths.

Mabuza, Ortmann and Wale ((2014) said that Mushrooms are highly perishable agricultural commodities, and as such their marketing is invariably associated with high transaction costs. Despite the mushroom enterprise gaining popularity in a number of sub-Saharan African (SSA) countries, where production is dominated by rural-based small-scale farmers, no research has been done to study the nature and complexity of transaction costs encountered by these producers in attempting to participate in mainstream supply chains. Their study used cross-section data obtained in 2011/2012 from mushroom producers in Swaziland to study the effects of transaction costs on producers' choice of marketing channels and the quantity of mushrooms supplied. Having used Cragg's model for analysis, the results indicatethatproducers' decisions of where to sell their mushrooms are significantly affected

by household labor endowment, production capacity, and access to cooling facilities and market information, and producers' bargaining position. Meanwhile, the quantities of mushrooms sold are significantly influenced by the difficulty in accessing reliable transport and producers' level of uncertainty in meeting buyers' quality requirements. The study concluded by highlighting potential interventions that could minimize marketing and transaction costs and further improve the general agricultural marketing environment in Swaziland.

Zhang, Geng, Shen, Wang and Dai (2014) described that Mushrooms traditionally collected from forests and now more cultivated have recently become the products of the fifth-largest agricultural sector in China. It was estimated that more than 25 million farmers in China are currently engaged in the collection, cultivation processing and marketing of mushrooms. The total value of mushroom products amounted to 149 billion RMB Yuan (24 billion USD) in 2011. The raw materials have expanded from a few hardwoods to a variety of woods and increasing more into agricultural residues and wastes. The average annual growth rate has been over 10% over the past 30 years in China. Their paper described the rapid growth of mushroom cultivation and its contribution to food security and rural sustainable development. The roles of bio-innovation, technological dissemination, and marketing are also examined. Mushrooms could potentially be very important in future food supplies and in new dimensions of sustainable agriculture and forestry.

Karthick and Hamsalakshmi (2016) conducted a research undertaken with the objectives of analyzing the marketing problems of the mushroom cultivators, the role of the intermediaries in the marketing of mushrooms, analyzing the storage problem and to find the motivational factors of the mushroom cultivators. A sample of 30 mushroom growers were randomly selected from list of mushroom growers obtained from Directorate of Horticulture. None of the mushroom growers were using promotional elements for marketing of their produce. All the mushroom growers were selling their produce in packaged form but without any brand name. Their article emphasized the need of canning and refrigeration facility for mushroom growers in case of higher production to stop distress sale and creating awareness among masses about nutritional importance of mushrooms to increase its consumption, Reduce market price of inputs, government incentives to mushroom cultivators, availability of good mushroom spawn, more extension and training for producers, easy loan program to the mushroom cultivators by the Government through the banks and most importantly

mushroom association to be formed by the mushroom cultivators.

Febrianda and Tokuda (2017) their paper aimed to learn the unique strategy and innovation from local mushroom enterprise which is very famous in Cianjur district, West Java, Indonesia in order to improve the business performance. Using technological (innovation) approach and qualitative method, this study concluded that there are two types of strategies, one relating to the technological part, and the other relating to the organization part. The technological focuses on attracting market and enhancing the yield productivity. The organization part focuses on developing capacity to fulfill the demand by making a contract agreement resembling contract farming with local society. For local society, the contract agreement has benefit to minimize both market failure and production problems under supervision support and without monopoly action. The strategies were capable of being successful innovation by interacting and cooperating with external sources, and performing certain adjustment with local condition.

2.3: Studies on Mushroom Production

Bashar (2006) carried out the study to determine the problems confronted by the farmers in mushroom cultivation and to explore the relationship between the selected characteristics of the farmers and their problem confrontation in mushroom cultivation. Farmers' 16 problems in mushroom cultivation were selected. The selected characteristics were: age, education, family size, mushroom cultivation experience, land possession, area under mushroom cultivation, annual family income, organizational participation, Cosmo politeness, extension contact, mushroom training exposure, mushroom cultivation knowledge and attitude towards mushroom cultivation. The study was conducted in Savarupazila under Dhaka district. Data were collected from randomly selected 100 farmers using an interview schedule. Scale score was used to determine farmers' problem in mushroom cultivation while a Problem confrontation Index (PCI) was used to make comparison among the 16 selected problems. Pearson's product Moment Correlation was used for the statistical analysis. Majority (65 percent) of the farmers were found confronted medium problem, while 24 percent of the farmers confronted low problem and 11 percent confronted high problem in mushroom cultivation. Among the thirteen selected characteristics of the farmers, eleven, namely age, education, land possession, mushroom cultivation area, annual family income, organizational participation, Cosmo politeness, extension contact, training exposure in mushroom cultivation, mushroom cultivation knowledge, and attitude towards mushroom cultivation showed

significant negative relationship with their problem confrontation in mushroom cultivation. The remaining two characteristics i.e. family size and experience in mushroom cultivation had no significant relationship with their problem confrontation. On the basis of Problem Confrontation Index (PCI) “boundless of the farmers to supply commodities to middle man in low price” ranked first which is followed by ‘high price of spawn, ‘complexity to get mushroom cultivation credit, low demand in the local market while lack of knowledge on proper doses of pesticide for pest control of mushroom ranked last.

Celik and Peker (2009) presents benefit/cost and SWOT analyses of mushroom production in developing countries as diversification of rural income; a case study in Konya, Turkey. Data were obtained through a survey method by application of 33 questioners. Benefit / Cost Analysis and SWOT analysis were used as methods. In research area, the average production area was determined as 1135.1 m². A majority (76.9 %) of the business in the province have four production periods annually. The average yearly output of the business was 45.4 kg/m², that periodic output was 11.6 kg/ m² and that compost output was 256.6kg/ton. The cost of 1kg mushroom as an average of business was USD 1.36 that its average sales price was USD 1.54. Strengthening mushroom production sector could be essential in order to enable the rural economy to keep its vibrancy and development, increasing and diversifying business and employment opportunities in the rural areas, and providing income opportunities for disadvantageous groups, small family farms.

Dias (2010) said that Mushroom cultivation is rapidly expanding in Brazil because Brazilians have discovered the medicinal and culinary value of mushrooms and their economic situation has improved. However, the horticultural technology for cultivating mushrooms under Brazilian conditions is lacking. For many years, the mushroom cultivation technology used in Brazil was adapted from developed countries whose materials and climate were different from those of Brazil. In order to exploit the Brazilian potential for mushroom cultivation it is essential to develop cultivation technology for family owned and operated rustic farms as well as for modern large scale industrial operations. Mushroom species cultivated in Brazil are discussed and some approaches for future research are suggested.

Poudel and Bajracharya (2011) described Nepal as predominantly agricultural country with almost 80 percent of population depending upon agriculture for their livelihood. The agriculture is traditional; subsistence based producing mostly food crop and very less amount of high value cash crop. The farmers are mostly of weak economic background, with small land holdings and lack of knowledge about technology. Though agricultural development for poverty alleviation and economic growth has been one of the focal points of national policies for a long time, there is still lack of implementation, adequate research and study done in this field. Climatic condition of the country varies from tropical in Terai region to alpine in Himalayan regions. 35 types of forest have been identified in Nepal. Biodiversity of Nepal is also remarkable with wide variety of species of flora and fauna. This gives opportunity for production of many high value products including mushroom. Due to this rich diversity, the potential for mushroom production for both food and medicinal purpose is immense. However resources endowed by the diversity have yet to be captured and utilized. This paper dealt with the study of current status of mushroom farming, its potentials and challenges.

Mabuza, Ortmann and Wale (2012) mentioned that with over 90% of mushroom producers having opted to participate in the industry through informal farmer groups, their paper sought to identify the key factors that unify members of informal collective initiatives. In contrast to formal organizations' which are regulated by law, informal groups are fully autonomous and not regulated by any legal instrument in Swaziland. Based on a conceptual framework that uses social capital dimensions to study collective action, trust, cooperation and communication were identified as the key elements responsible for ensuring cohesion in informal groups engaged in mushroom production. Further analysis indicated that trust is positively influenced by gender, age and religion, while cooperation was found to be influenced by members' dependence on mushrooms for food. Communication, on the other hand, was found to be positively influenced by the level of trust and member cooperation. The empirical evidence indicated that members from communities characterized by positive cognitive social capital are most likely to engage in voluntary collective action in an attempt to improve their livelihoods. The study, therefore, recommended that informal groups developed voluntarily by community members should be encouraged and embraced as an important element of Swaziland's development agenda.

Mkpado and Mbadiwe (2013) said that low cost artificial substrate mushroom production and marketing hold some potential to create wealth and reduce poverty among small-scale farmers as well as improve nutritional status of households' members. It offers a way to mitigate the effects of climate change on availability of endangered forest species like mushroom. The study was a capacity building mentorship to acquire and disseminate low cost artificial substrate mushroom cultivation in South Eastern Nigeria. The innovation acquired included major steps of low cost mushroom production such as: mushroom house construction, art of making a composted substrate, pasteurization, spawn maintenance, spawn production procedure, spawning, substrate supplementation, casing to trigger reproductive stage, watering or irrigation, monitoring the pinning processes to harvesting, harvesting and sorting and marketing. The up-scaling process involved selection and training of personnel who will continue to transfer the innovations to their clientele and students as well as training of selected students. Instruction manual was developed to ease the imparting of the technology to trainees. Workshops have been conducted to create more awareness and facilitate adoption and consumption of cultivated mushroom. Post-training evaluation included not only questions and answers but working on a small project to raise mushroom under supervision of the instructor who provided the material for the exercise. Results showed that the capacity building project was successful because the trainees subdivided into groups were able to raise mushroom. The experience showed that farmers are happy with the innovation. The paper opined among others that government and non-governmental agencies should invest in capacity building in mushroom cultivation and production to create jobs and improve households' nutrition.

Shakil, Tasnia, Munim and Mehedi (2014) conducted the research with the primary objective to alleviate poverty, unemployment and malnutrition through cultivating and selling mushroom. The study was analytical and theoretical in nature and based on the secondary data. However, personal interview has been conducted to the mushroom farmers to depict the cost and profitability of Mushroom cultivation. The study finds that Mushroom cultivation can open a new opportunity for landless and unemployed people as it does not require any cultivable land and can be grown in a room by racking vertically. One can earn nearly TK 4-5 thousands a month by investing only TK 10-15 thousands. So, it is possible to make a handsome profit by investing a small amount of capital and labor in Mushroomcultivation.

Rosmiza, Davies, Rosniza Aznie, Jabil, and Mazdi, (2016) their study attempts to evaluate the mushroom industry prospects in Malaysia. It also explores issues and challenges facing the mushroom industry in Malaysia by using a critical analysis and SWOT analysis. The main challenges include poor supply and the increasing price of raw material, for example sawdust; the poor quality of mushroom spawn, and the threat of diseases and pest attack. Several strategies are discussed to potentially improve the productivity of mushroom cultivation in Malaysia.

Shirur, Shivalingewda, Chandregowda and Rana (2016) carried out a research to assess component wise technology adoption and constraint analysis of enterprises in order to suggest precise policy interventions for bringing the mushroom industry to health and vibrancy. The research was conducted among the mushroom entrepreneurs in Karnataka State. The constraint analysis reveals that, non-availability of spawn, lack of technical information and exploitation by consultants are major constraints. The increasing labor wages calls for adoption of mechanization in various activities of mushroom cultivation. The higher cost on electricity has rendered the cultivation of button mushroom less profitable in the State. For mushroom cultivation to pick up the pace, there is need for capacity building of KVK staff about improved low cost cultivation technology for disseminating the same among the farmers and supply of quality spawn by State departments.

Rahman, Hossain, Ali & Afroz (2017) investigated the effectiveness of training programme on mushroom cultivation and to explore the relationships of each of the selected characteristics of the trained mushroom farmers with their effectiveness of training program. Data were collected from the trained mushroom farmers of selected eight villages of three upazilas of Cumilla district of Bangladesh during 01 to 16 March, 2016. The sample size of the study was 103 trained mushroom farmers and drawn from a population of 801 using proportionate random sampling technique. It was revealed that training program on mushroom cultivation was found medium effective among highest proportion (39.8%) of the trained mushroom farmers, while among 32% and 28.2% of them found low and high effective respectively. Pearson's Product Moment Correlation Co-efficient (r) was computed to explore the relationships between the effectiveness of mushroom training program and selected characteristics of the trained farmers.

Kumari, Singh, Singh, Laxmikant and Kumari (2018) conducted the study in Deoria district of Uttar Pradesh state. In this study, extent of adoption of twelve selected scientific cultivation of oyster mushroom practices were measured. The study revealed that the majority of respondents were found to be high level of adoption (54.44%) followed by medium and low. Majority of respondents had high use of fresh spawn (52.22%), high recommended appropriate seed rate (58.88%), high use of wheat straw in bagging (60.00%), low use of paddy straw (54.44%), high knowledge of sanitation (58.80%), low purchase of spawn through private agency (44.44%), high use of chemical in congenial media (45.55%), low use of boiling of congenial media (wheat straw) (47.77%), Majority 46.66 percent of respondents had high control of diseases (fungal and bacterial infection). Study revealed that lack of proper marketing channels was the most important constraints responsible for low rate of adoption, 'Distantly located markets' and 'lack of government support' were the other major constraints in this process. 'Non availability of quality spawns and risk involve due to perishable nature' were also observed as constraints by the mushroomgrowers.

2.4: Studies on Economic Impact ofMushroom

Kaldis, Kontogeorgakos and Gardeli (2002) dealt with the analysis of the production and market structure of the infant but rapidly developing Greek mushrooms sector. It shows that despite a number of internal constraints (i.e. use of costly technology, low productivity and excess capacity), the subsidies granted and the oligopoly situation prevailing in the market allow for profitable initiatives to appear. Domestic supply of fresh mushrooms cannot satisfy domestic demand and this imbalance allows for high marketing margins to appear. It IS expected that this situation will lead to a better utilization of the excess capacity or to new initiatives for production under lower-cost conditions by means of higher productivity. Consequently, the mushrooms business activities in Greece are presently regarded as a promising sector. The success of new competitors will depend on the effectiveness of production and marketing-mix.

Imtiaj and Rahman (2008) in their study the profitability of mushroom cultivation was found comparatively higher than that of rice and wheat, the most popular cash earning crops in Bangladesh. As funding to promote the production and consumption of mushrooms is limited, local government and NGOs can play vital role to develop mushroom agriculture to arise at industrial level which can create ample employment opportunities both in semi-urban and rural areas. This result suggests that the potential of mushroom cultivation could be a possible offer to alleviate poverty and develop the life style of the vulnerable people in Bangladesh.

Barmon et al. (2012) conducted a study during 2011 to estimate profit, benefit cost ratio (BCR) and household income of mushroom production and also to explore the problems of producing mushroom and its marketing channels in Bangladesh. Thirty samples were randomly selected and information on mushroom production was collected using comprehensive questionnaire from Savar Upazila in Dhaka district. Mushroom was found to be a profitable agricultural enterprise (22,888 taka per farm). The benefit cost ratio (BCR) was 1.55. The average family household income was about Tk. 43,731. Usually, three intermediaries (mushroom office, wholesalers and retailers) are involved in the marketing channels of mushroom. The marketing margin of mushroom for farm-gate to wholesalers and wholesalers to retailers were taka 50 and 70 per kg, respectively. It was revealed that rich and middle income group people were the main mushroom customers. Even though mushroom is a profitable enterprise, the producers faced numerous problems regarding mushroom production and marketing.

Sharma, Kumar and Guleria (2016) carried out the research in Mandi district of Himachal Pradesh. Out of 60 mushroom growers, 80 per cent raised only one crop of button mushroom in a year and most of the growers placed spawned compost bags in the month of October. The fixed cost of production /100 bags of button mushroom varied from 44.47 per cent on small farms to 22.42 per cent on large farms. The variable cost varied from 55.53 per cent on small farms to 77.58 per cent on large farms implying the economical use of fixed and variable resources by large growers. The gross returns per 100 bags basis ranged between Rs. 37,200 and Rs. 40,200 on small and large farms for button mushroom. The overall benefit cost ratio was 1.87:1. Break-even output varied from 279 kg to 147 kg for small and large growers and break-even point was at 93 and 42 compost bags for small and large growers respectively. Technological gap included the important parameters like temperature, relative humidity, CO₂ concentration, surface cleaning by formalin, storage temperature etc. The mushrooms

growers faced production, marketing, financial and institutional problems. However, the intensity of the production problems was much higher than others.

Easin, Ahmed, Alam, Reza and Ahmed (2017) presents the overall scenario of mushroom enterprises and its potentiality as a small -scale family business in generating supplementary income. Data were collected from 20 of the 100 total mushroom enterprises located at the Dogamora of Savarupazilain Dhaka using a semi-structured questionnaire. The study reveals that mushroom farming was the secondary or tertiary source of income for the entrepreneurs, most of which were young (less than 30 years old) comprising 70% man and 30% woman. The amount of investment on this farming was low ranging from BDT 5000 to \geq 100,000 (US\$65 to \geq US\$1285), consequently the production rate was also low, maximum 10 kg per day for the higher investment while 1-2 kg for the lowest. The corresponding monthly profit against the investment ranged from BDT 2400 to 20,000 (30-256 US\$). Financial analysis of mushroom farming in a bamboo made shade (15' x 6') showed an average monthly profit of BDT 12,339 and a benefit-cost ratio of 2.24. Despite of the potentiality of this sector, Bangladesh is in back foot due to lack of popularity, labeling, attractive packaging and spawn packets for seeding. Absence of organized marketing and market structure was found to force the entrepreneurs to sell the product to the middlemen. Considering the country's limited land and unemployed or underemployed population, strengthening the mushroom farming sector could be one of the viable options. Flourishing the sector would boost the rural economy and diversifying business and employment opportunities in the rural areas, and providing income opportunities for disadvantaged group and small family farms.

Chapter Three: Research Methodology

Chapter-03: Research Methodology

3.1: Forward

Research methodology is the structural configuration of the study for conducting the research within the framework of the objectives. It includes methods, tools, techniques and approaches for any research work. Methodology furnishes the building block and backbone of process of inquiry and reasoning data generation and processing. This chapter presents why and the study is conducted and what methods will be used. These questions were playing the role of roadmap for the entire study. The reader will be able to replicate this research by following this research methodology.

3.2: Research Approaches

It is a basic question, which research approach is to be followed to generate the outcome of the study. There are two approaches for deriving the findings of a study: inductive research approach and deductive research approach. These approaches are discussed below:

3.2.1: Inductive Research Approach

Inductive research approach is based on observation. Through this approach, firstly something is observed, and then the pattern of observation is checked. After that some potential hypothesis are set based on the pattern of observation. Then those hypotheses are tested and based on the findings some general statements or outcomes are set. So the work process of inductive approach is a bottom to top process (*Creswell, 2011*). Thus knowledge and information are expanded from a general observation to some research findings.

3.2.2: Deductive Research Approach

Deductive research approach is opposite to inductive research approach meaning it works from top to bottom basis. Here a theory is generated initially. Relevant hypothesis are set then. After that some observations are made. Lastly, the observations are confirmed or tested through the research (*Kumar, 2011*). So, this approach is based on critical reason where in every stage some options are deducted and the final answer is made through this deduction process.

3.2.3: Suitable Research Approach for the Study

In case of this study, initially an observation is made; some questions will be developed instead of hypothesis. And then these questions will be tested or surveyed among some respondents to find out general statement or research findings. Thus, this has been conducted in the form of inductive research approach.

3.3: Research Method

In order to address the research In general, two types of research methods are being used quantitative and qualitative. The researcher would like to go for qualitative method for the study. Qualitative data provides a rich, detailed picture to apprehend about why people act in certain ways, and their feelings about these actions. Researchers undertake qualitative research, a major methodology used in exploratory research, to define the problem or develop an approach (*Seale, 2004*). The scarcity of research on desirability versus undesirability of non-compliant purchase behavior toward indirect purchase calls for exploring the phenomenon in the context of university largely. Therefore by nature the study is exploratory type. Qualitative research provides insights and understanding of the problem setting (*Flick 2006*). This qualitative research paradigm was used because of four reasons (*Gubrium and Holstein, 1997*): naturalism (seeks to understand social reality in its own term), ethnomethodology (seeks to understand how social order is created through talk and interaction), emotionalism (concerns subjectivity and gaining access to inside experience) and postmodernism (emphasizes ‘method talk’). According to *Malhotra (2008)* it is not always possible or desirable to use fully structured or formal methods to obtain information from respondents. May be the problems and prospects of quality mushroom supply for domestic market are very deep and versatile. But presenting such facts in quantitative manner would express more meaning to the users. So, considering the nature of the variables and their relation, it has been decided to conduct the study under mixed method.

3.4: Study Population

A research population is also known as a well-defined collection of individuals or objects known to have similar characteristics. All individuals or objects within a certain population usually have a common, binding characteristic or trait (*Kothari, 2001*).

Mushroom cultivation center of DAE is located at Savar under Dhaka district. Farmers collect span from this center and cultivate mushroom. Therefore mushroom cultivators are closely populated in Savarupazilla. For this reason Savarupazilla was selected as the population of the study.

3.5: Sampling Technique

Sampling is a process used in statistical analysis in which a predetermined number of observations are taken from a larger population. The methodology used to sample from a larger population depends on the type of analysis being performed, it may contain simple random sampling or systematic sampling (*Kothari, 2001*).

As the type of the study is purposive, 121 respondents was selected by following random sampling method. Who are directly involved in mushroom industry as cultivators.

3.6: Tools & Techniques for Data Collection

3.6.1: Questionnaire

A cultivator survey was administered at Savarupazilla under Dhaka district on an opportunistic basis. The survey was administered to 121 respondents from May 1 to July 31, 2018. The survey consisted of eight sections. The first section designed to collect information about farm tomography. The second section created as to know the Socio-Economical Status of Farmers. The third section covers information about Technological Adoption and Productivity of the producers. The fourth section designed to know the existing marketing channels. The fifth, sixth, seventh and eighth section prepared to understand farmers' suggestion for good price or marketing, problems facing during production, the limitations of existing marketing strategies and their opinion for improving the marketing systems.

3.6.2: Secondary Data Collection

Secondary data collection means collecting data from different other sources where the actual respondents are absent (*Paneerselvam, 2012*). Such data is collected from different published sources such as newspaper, statistical report, annual reports, journal, article etc. and from electronic sources like different search engines, television, radio, internet etc. The secondary data were used from statistical yearbooks, local administrative and various related sources.

3.7: Data Processing, Analyzing and Interpreting

The information collected from the respondents were edited for adequacies and accuracies and cross examined before they were subjected to tabular analysis. The primary data were classified and tabulated in the light of stated objectives of the study and analyzed as per the suitable statistics. In this process, all the responses in the questionnaire were given numerical coded values. Qualitative data were converted into quantitative ones by means of suitable scoring whenever necessary. The analysis was performed using SPSS (Statistical Package for Social Sciences) computer package. Descriptive analysis such as range, number, percentage, mean, standard deviation and rank order were used whenever possible.

3.7.1: Chi- Square Independence Test

A chi-square independence test is used to test whether or not two variables are independent. This test is often used in social science research to determine if factors are independent of each other. In general, when running the test of independence, we ask, “Is Variable X independent of Variable Y?” It is important to note that this test does not test how the variables are related, just simply whether or not they are independent of one another. In chi-square independence test, we will calculate expected values, calculate a chi-square statistic, and compare it to the appropriate chi-square value from a reference to see if we should reject H_0 , which is that the variables are not related. Formally the hypothesis statements for the chi-square Test-of-Independence are:

H_0 : There is no association between the two categorical variables

H_1 : There is an association (the two variables are not independent)

The formula for calculating the value of the Chi-Square test of Independence:

Chi Square Test of Independence

$$\text{chi square} = \sum_{i=1}^n \frac{(O_i - E_i)^2}{E_i}$$

where, O_i is the observed frequency
 E_i is the expected frequency

$$E_i = \frac{r_{i\text{total}} * c_{i\text{total}}}{\text{grand}_{\text{total}}}$$

degrees of freedom, $df = (r - 1) * (c - 1)$
 where r = number of rows
 c = number of columns

Hypothesis testing: The critical value for the chi-square statistic is determined by the level of significance (typically .05) and the degrees of freedom. If the observed chi-square test statistic is greater than the critical value, the null hypothesis can be rejected.

3.7.2: Multinomial Logistic Regression

Multinomial Logistic Regression is the regression analysis to conduct when the dependent variable is nominal with more than two levels. Similar to multiple linear regression, the multinomial regression is a predictive analysis. Multinomial regression is used to explain the relationship between one nominal dependent variable and one or more independent variables.

Multinomial Logistic Regression

- We can model probability of each outcome as:

$$p_{ij} = \frac{e^{\sum_{j=1}^K \alpha + \beta_{kj} \cdot X_{kji}}}{\sum_{j=1}^J e^{\sum_{j=1}^K \alpha + \beta_{kj} \cdot X_{kji}}}$$

- i = cases, j categories, k = independent variables
- Solved by adding constraint
 - Coefficients sum to zero $\sum_{j=1}^J \beta_{jk} = 0$

To execute multinomial logistic regression model, here the duration of mushroom cultivation in years considered as dependent variable and the independent variables were Gender, Education, Occupation, Land size, Scientific cultivation, Source of capital, Source of information, Packaging and Sale. The study has launched with the following hypothesis:

Hypothesis

Null Hypothesis (H_0): There is no impact of the longevity of mushroom cultivation in years on the production and domestic marketing of mushrooms.

Alternative Hypothesis (H_1): There is impact of the longevity of mushroom cultivation in years on the production and domestic marketing of mushrooms.

Chapter Four: Results and Discussion

Chapter-04: Results and Discussion

4.1:Introduction

In this section of the study, the researcher has presented data analysis and findings of this study. But before going to the detail analysis, a brief description of collected data needs to be mentioned. Data has been collected from farmers of savar who cultivate mushroom. The reason of collecting data from the farmers is that it is the farmer who actually knows best about the problems of mushroom cultivation and marketing. 121 people have been surveyed from the relevant sector. All these people have been selected randomly. Respondents have been requested to participate voluntarily. Based on their response further analysis have been conducted.

4.2: Analysis and Findings

After collection of data from the farmers, data have been sorted and arranged for each option and each question basis. Then arranged data have been formed or grouped together in tables. Based on those tables different types of graphs, charts, bars etc. have been generated. All these graphs, charts and tables have been presented in the following sections. Along with these graphs and charts firstly the researcher mentioned the findings of the study and secondly the researcher critically analyzed and linked different factors with the participants' response.

4.2.1: Frequency Distribution of Gender

There were 121 respondents who cultivate mushroom under this survey of savarupazilaof Dhaka district. Among them only 17.4 percent of farmers are male and rest 82.6 percent farmers are female.

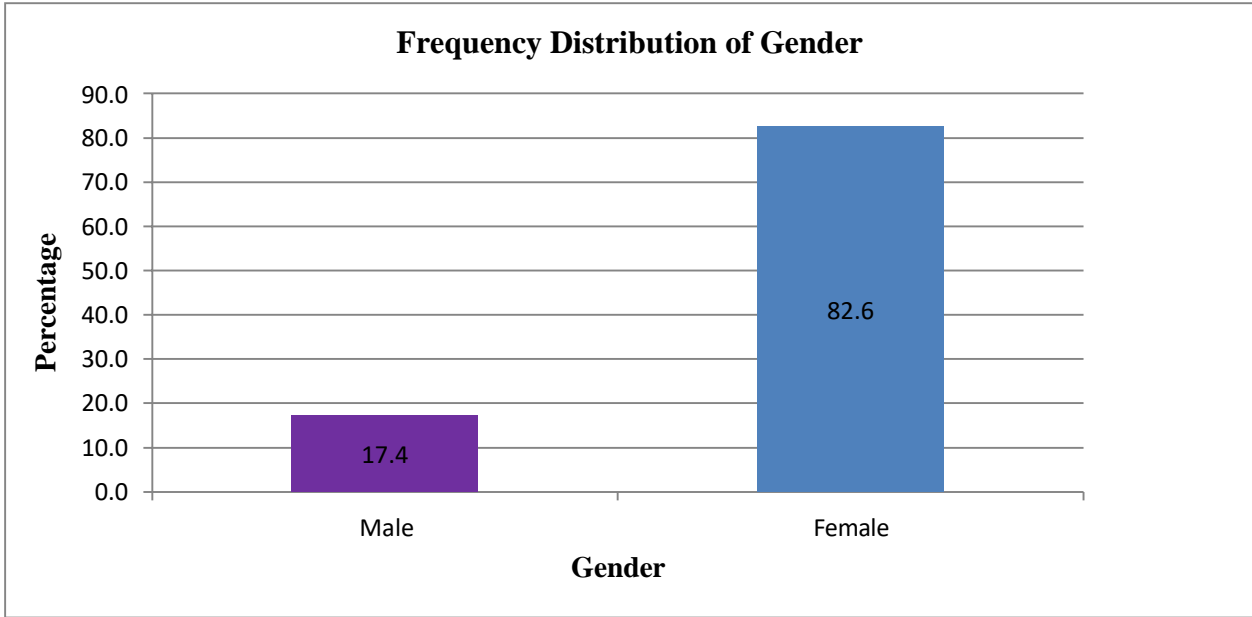


Figure 4.1: Frequency Distribution of Gender

4.2.2: Frequency Distribution of AgeGroup

Age of mushroom cultivators is quite different. And that’s why I categorized them into two groups mentioned below. Ages of the farmers who cultivate mushroom in savar, 72.7 percentages of them are below 40 and 27.3 percentages of them are above40.

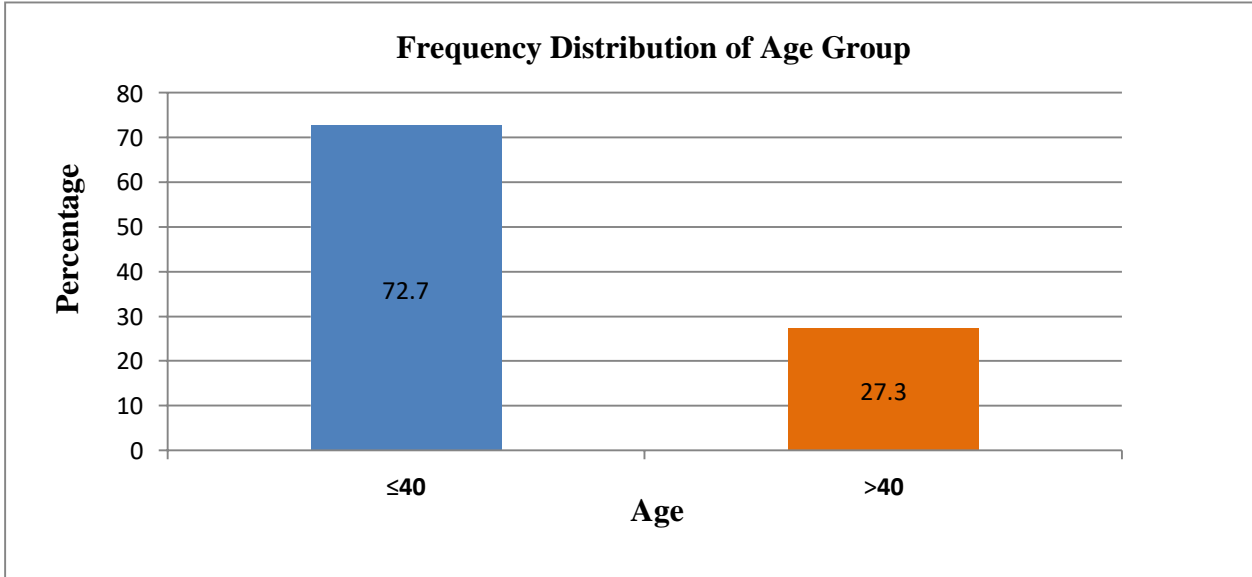


Figure 4.2: Frequency Distribution of age Group

4.2.3: Frequency Distribution of Education Level

To understand the farmer’s education level I grouped them into three categories as no education, primary and secondary and above. Among the farmers who cultivate mushroom in savar 23.1 percent of them have no formal education, 31.4 percent of them completed primary education and rest 55.5 percent have completed secondary school level or above.

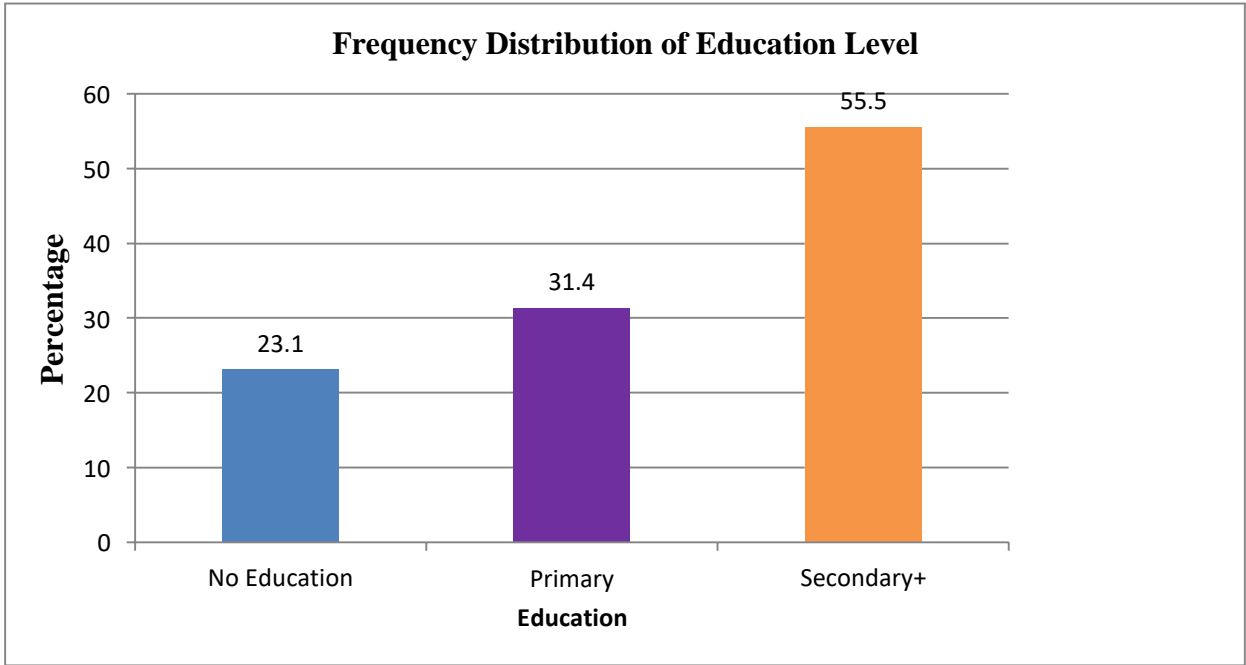


Figure 4.3: Frequency Distribution of Education Level

4.2.4: Frequency Distribution of Occupation

Mushroom cultivation is the main profession for 68.6 percent of farmers and rest 31.4 percent took it as secondary profession.

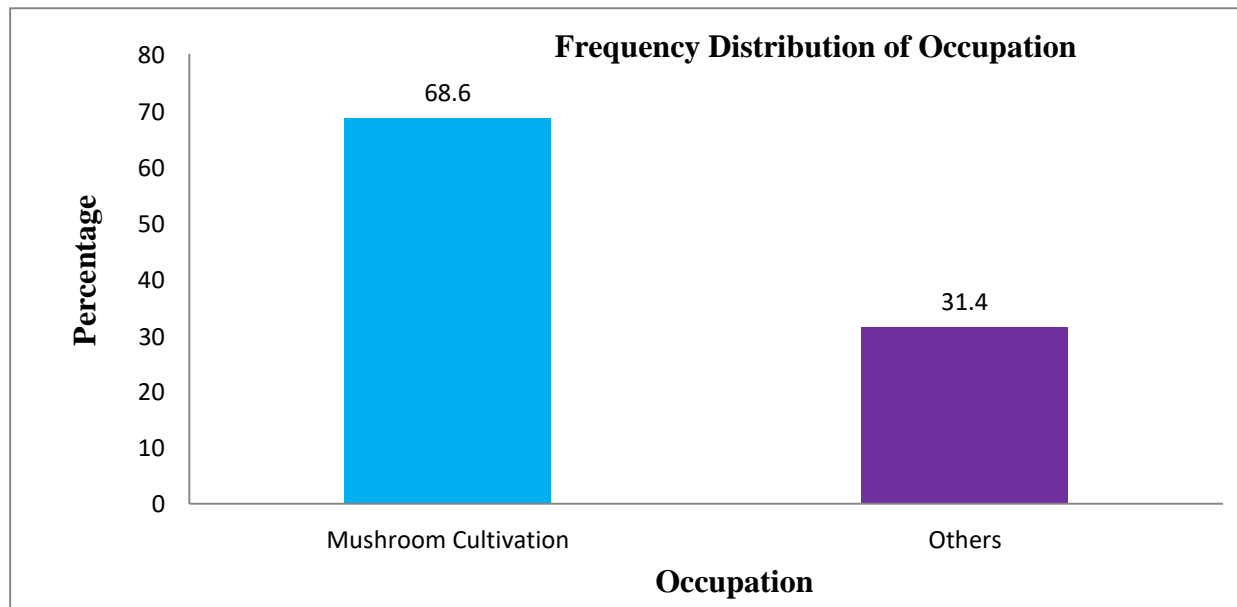


Figure 4.4: Frequency Distribution of Occupation

4.2.5: Frequency Distribution LandSize

Researcher has categorized farmers into five groups as landless, marginal, small holder, medium size holder and large farmer according to the calculation given below.

Farmer	Land Size
Landless	≤50 decimal
Marginal	50-125 decimal
Small holder	126-250 decimal
Medium size holder	251-5000 decimal
Large	>5000 decimal

50.4 percent, 22.3 percent, 14.0 percent, 9.1 percent and 4.1 percent of the mushroom cultivator of savar are landless, marginal, small holder, medium size holder and large farmer respectively.

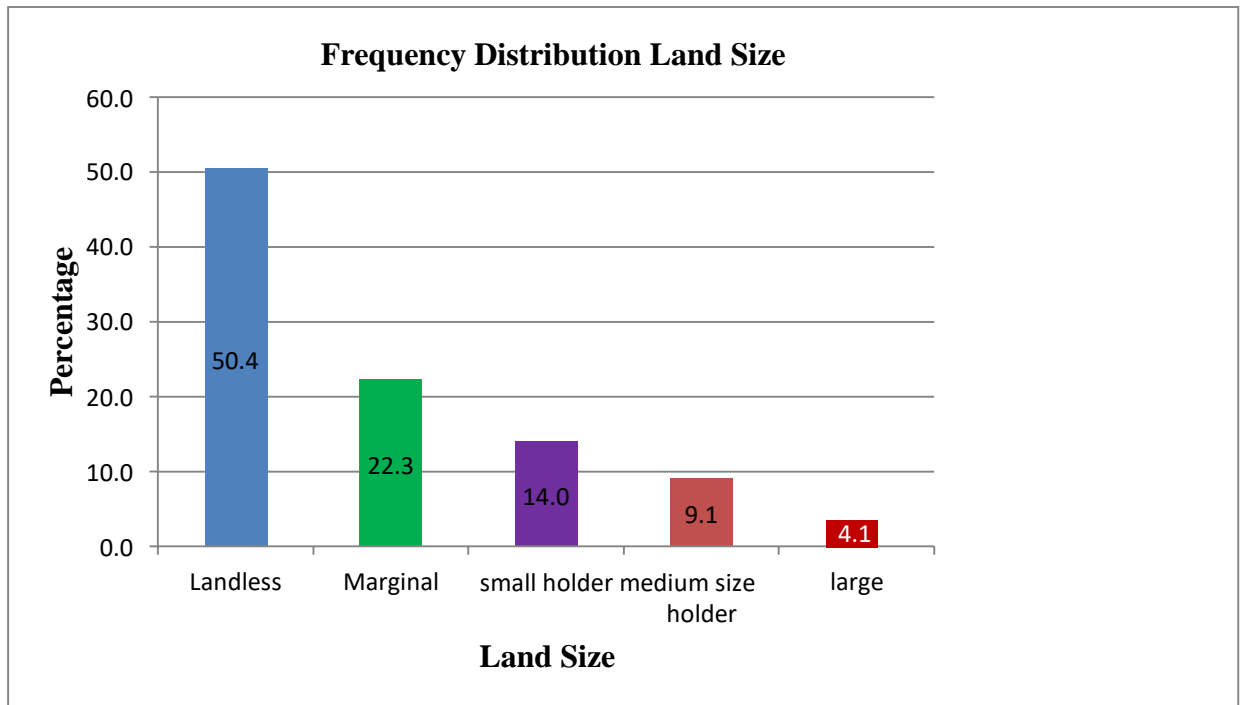


Figure 4.5: Frequency Distribution Land Size

4.2.6: Frequency Distribution of Cultivated Species

Mushroom growers of savar cultivate different species of mushrooms mentioned below. But most of the farmers like to cultivate mushroom species which can be grown throughout the whole year. 41.3 percent and 32.2 percent of the farmers said that they cultivate oyster (*Pleurotus ostreatus*) and Reishi (*Ganoderma lucidum*) respectively. 14.0 percent farmers said that they cultivate straw mushroom (*Vovariella volvacea*). And only 4.1 percent farmers said that they cultivate seasonal species like milky (*Calocybe indica*), bottom mushroom (*Agaricus bisporus*) and shiitake (*Lentinus edodes*).

Table 4.1: Frequency Distribution of Cultivated Species

Species	Frequency	Percent
Oyster	50	41.3
Reishi	39	32.2
Milky	5	4.1
Bottom mushroom	5	4.1
Shiitake	5	4.1
Straw mushroom	17	14.0
Total	121	100.0

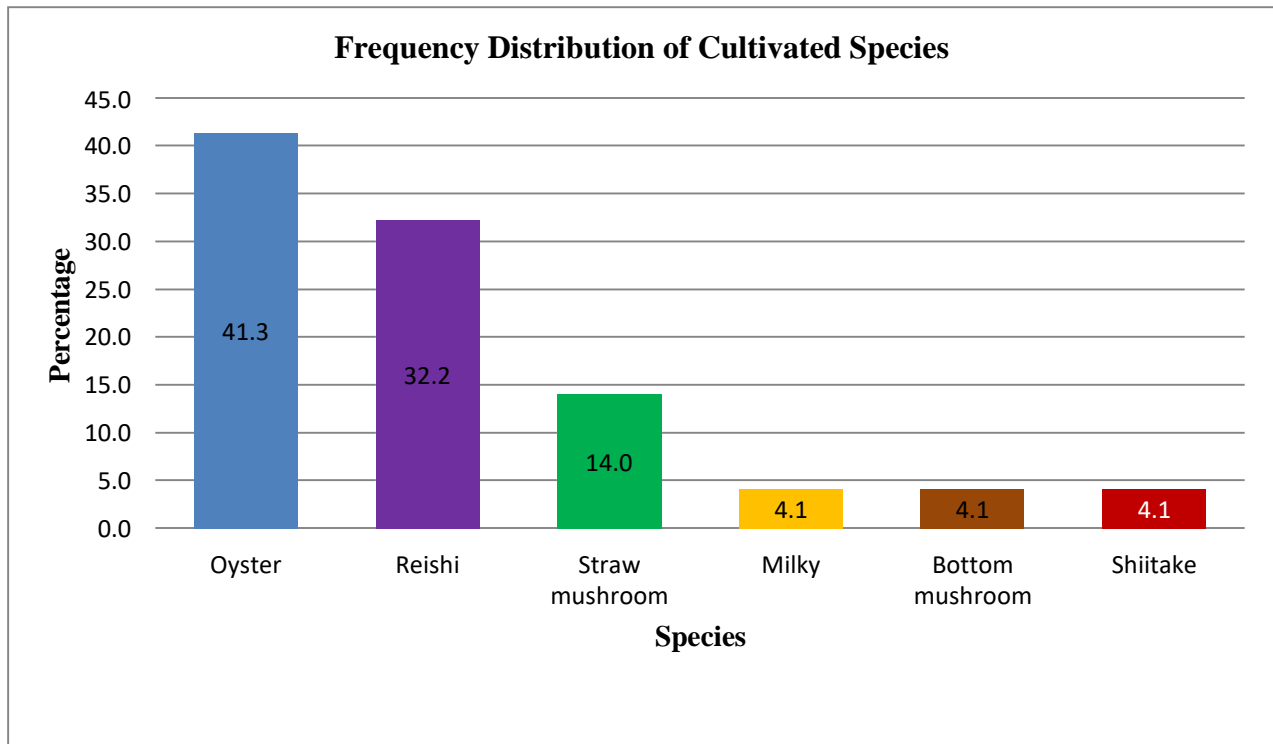


Figure 4.6: Frequency Distribution of Cultivated Species

4.2.7: Frequency Distribution of Source of Capital

Sources of Capital required for mushroom cultivation and marketing are own capital, bank loans and lending from others. Most of the farmers (63.3 percent) operate their function from their limited own sources. On the other hand only 13.2 percent farmers said that they take bank loan from different financial institutes. And 23.1 percent borrow money from their friends and relatives.

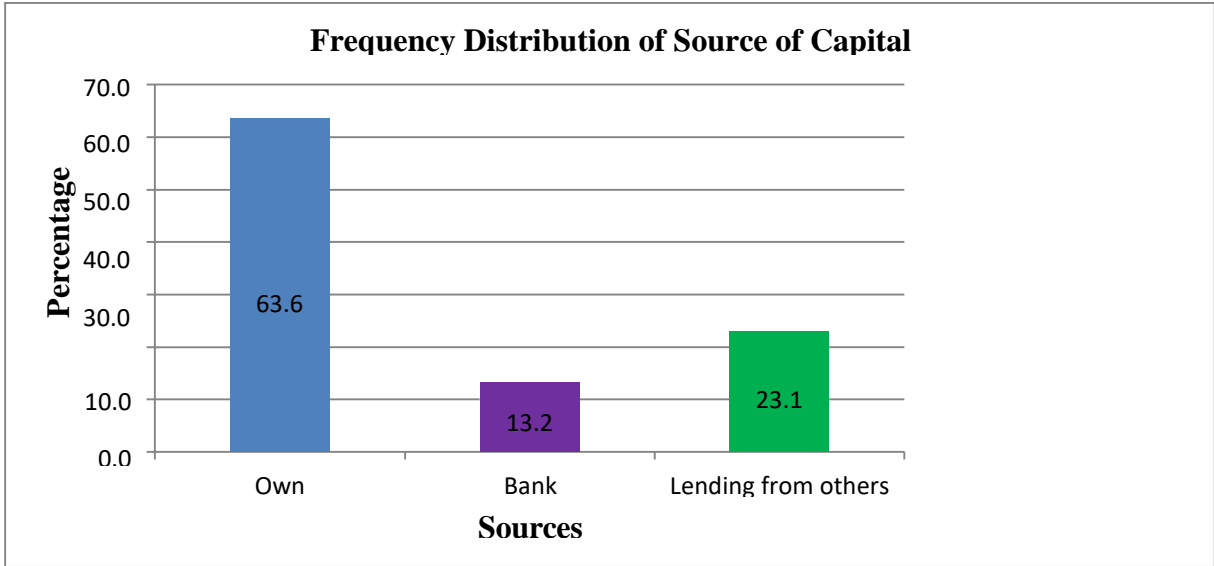


Figure 4.7: Frequency Distribution of Source of Capital

4.2.8: Frequency Distribution of Selling places of Mushroom

Majority (36.4 percent) of the farmers sell their produce to the middleman. 27.3 percent, 28.1 percent and 8.3 percent of the farmer sell their mushroom to local market, city market and hotels respectively.

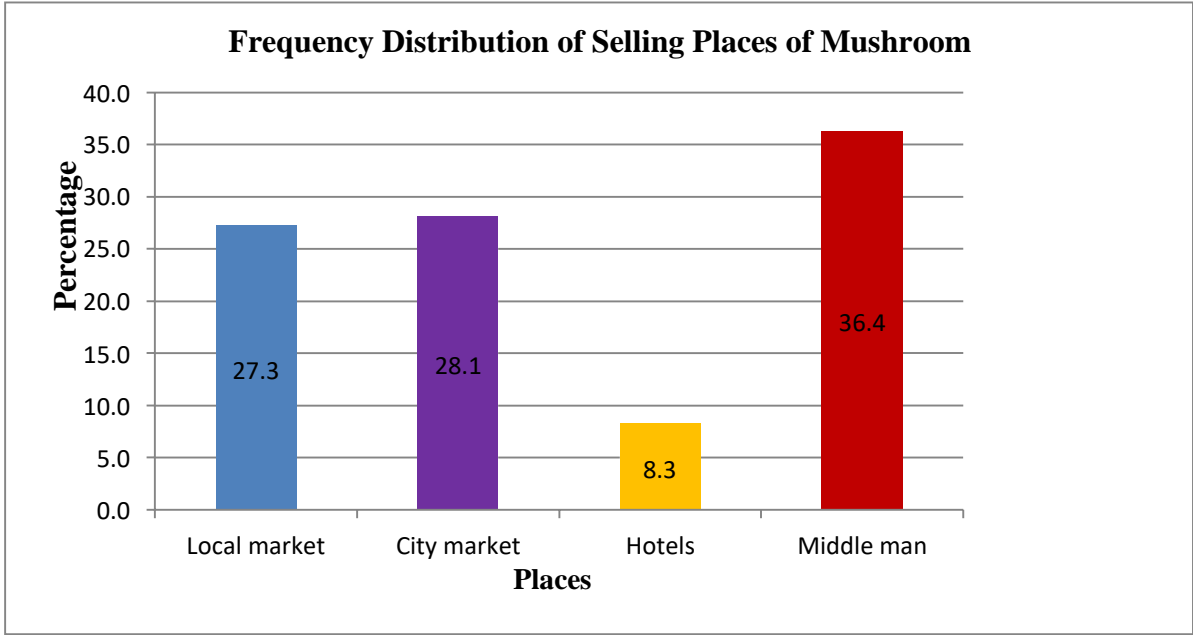


Figure 4.8: Frequency Distribution of Selling Places of Mushroom

4.2.9: Frequency Distribution of Using Packaging System

Most of the farmers (58.7 percent) don't have any packaging system for marketing their produce. Rest 41.3 percent use packaging but most of them aren't proper or scientific.

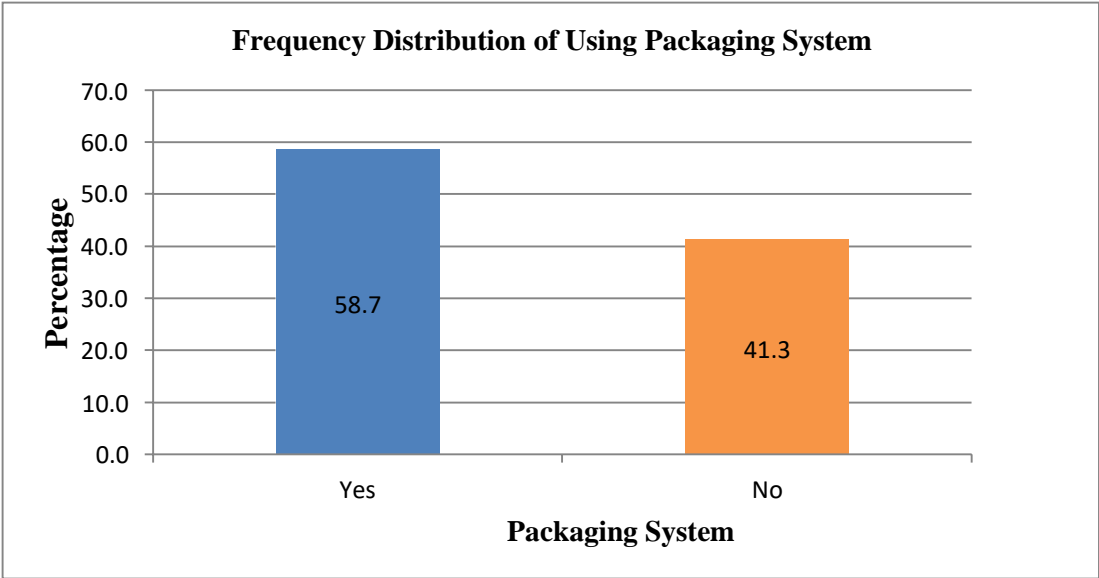


Figure 4.9: Frequency Distribution of Using Packaging System

4.2.10: Frequency Distribution of Usages of Unsold Mushroom

Almost half (49.6 percent) of farmers said that dried up their unsold mushroom. 41.3 percent keep unsold mushroom in cold storage. And rest 9.1 percent farmer consume their unsold mushroom.

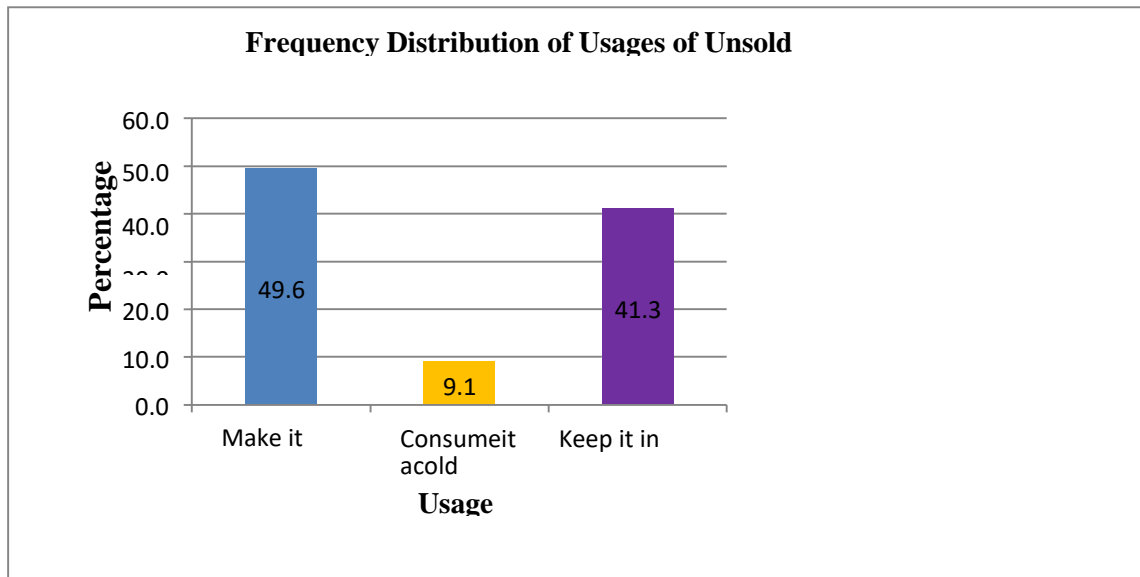


Figure 4.11: Frequency Distribution of Usages of Unsold Mushroom

4.2.11: Frequency Distribution of Ways of Marketing to Get Fairprice

Most of the farmers said that they don't get fair prices of their produce from the existing marketing system. They (40.5 percent) think that can get fair prices if direct marketing can be done bypassing the middle man. 32.2 percent of them think that if advertising or promotional activities can improve the existing situation. And rest 27.3 percent farmer said that if they can sell raw mushroom they will get fairprice.

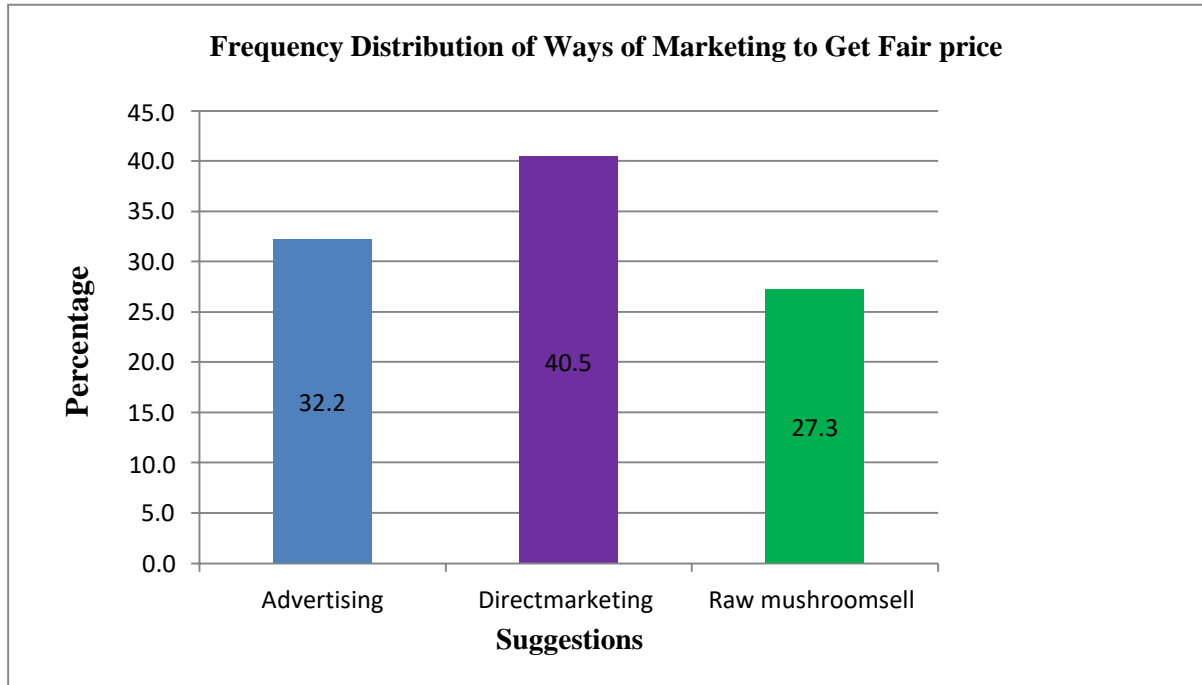


Figure 4.11: Frequency Distribution of Ways of Marketing to Get Fair price

4.2.12: Frequency Distribution of Problem Faced DuringProduction

Mushroom grower farmer faces different problems during production. Researcher finds out some of the major problem farmer faces during the production time. 68.6 percent farmer said that lack of capital is the most prominent limitation they face during the production period. Both poor quality seed and insect attack during production are dominating problems as 63.6 percent farmers said in both the situation. High temperature in summer, choosing right variety, low temperature in winter, inappropriate trimming production and heavy rainfall are the limitations farmer faces during production as said by 58.7percent, 54.5percent, 54.5percent, and 40.5percent and 35.5percent farmersrespectively.

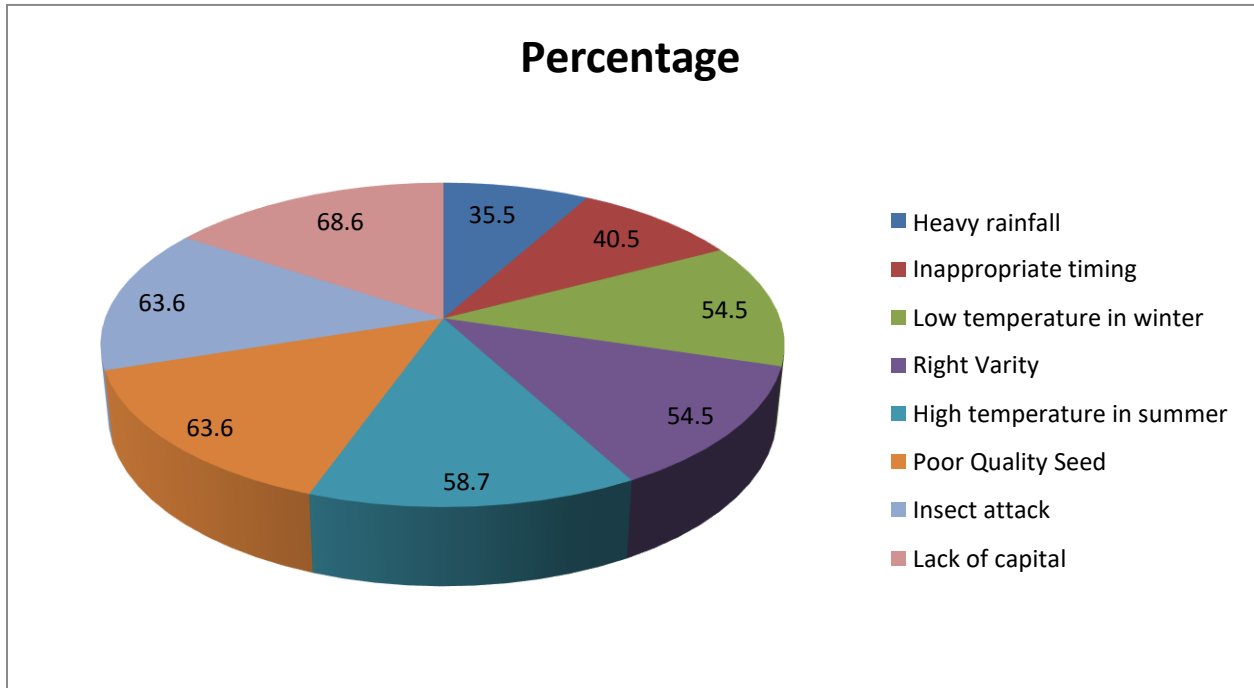


Figure 4.12: Frequency Distribution of Problem Faced During Production

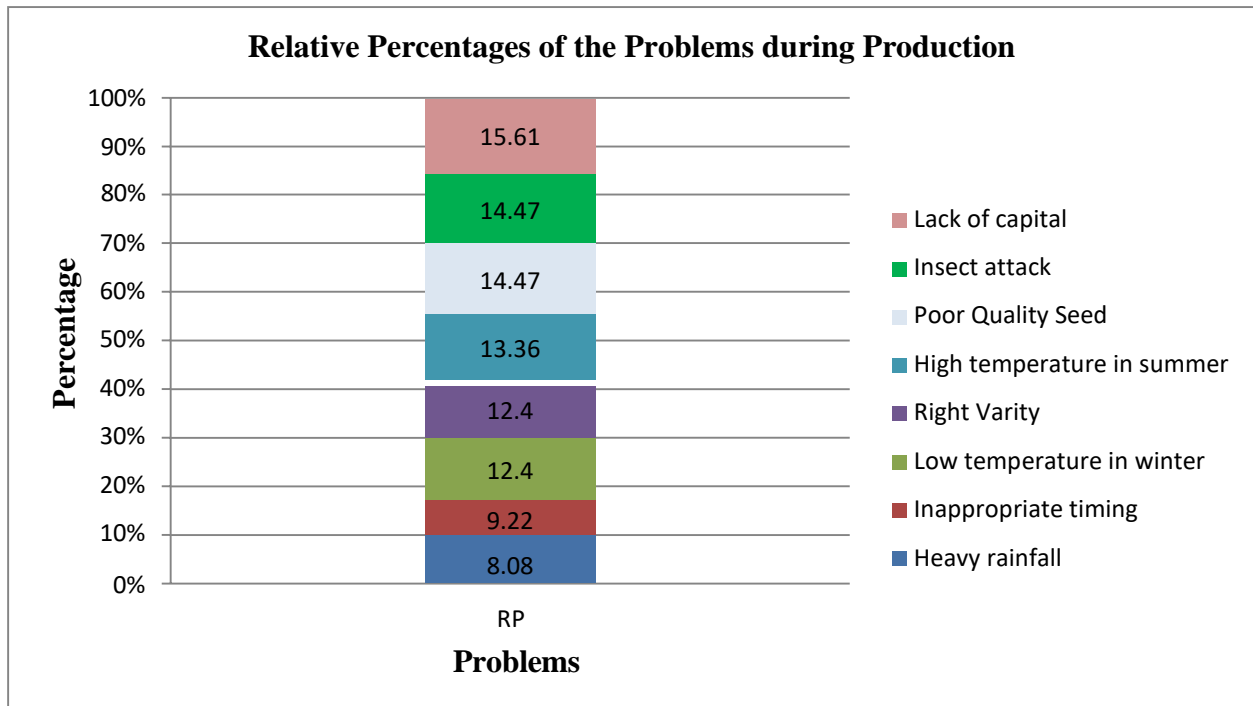


Figure 4.13: Relative Percentages of the Problems during Production

4.2.13: Frequency Distribution of Problem Faced During Marketing of Mushroom

Mushroom grower farmer faces different problems during marketing line production. Researcher finds out some of the major problem farmer faces during the marketing their produce. High transportation cost is the major problem during marketing said by 68.6 percent farmers. 59.5 percent, 58.7 percent and 54.5 percent farmers identified lack of promotion, large number of middlemen and limited wholesale market respectively as problems during mushroom marketing. Absence of proper marketplace and absence of storage facilities are also problems during marketing of mushroom as said by 49.5 percent and 35.5 percent farmers respectively.

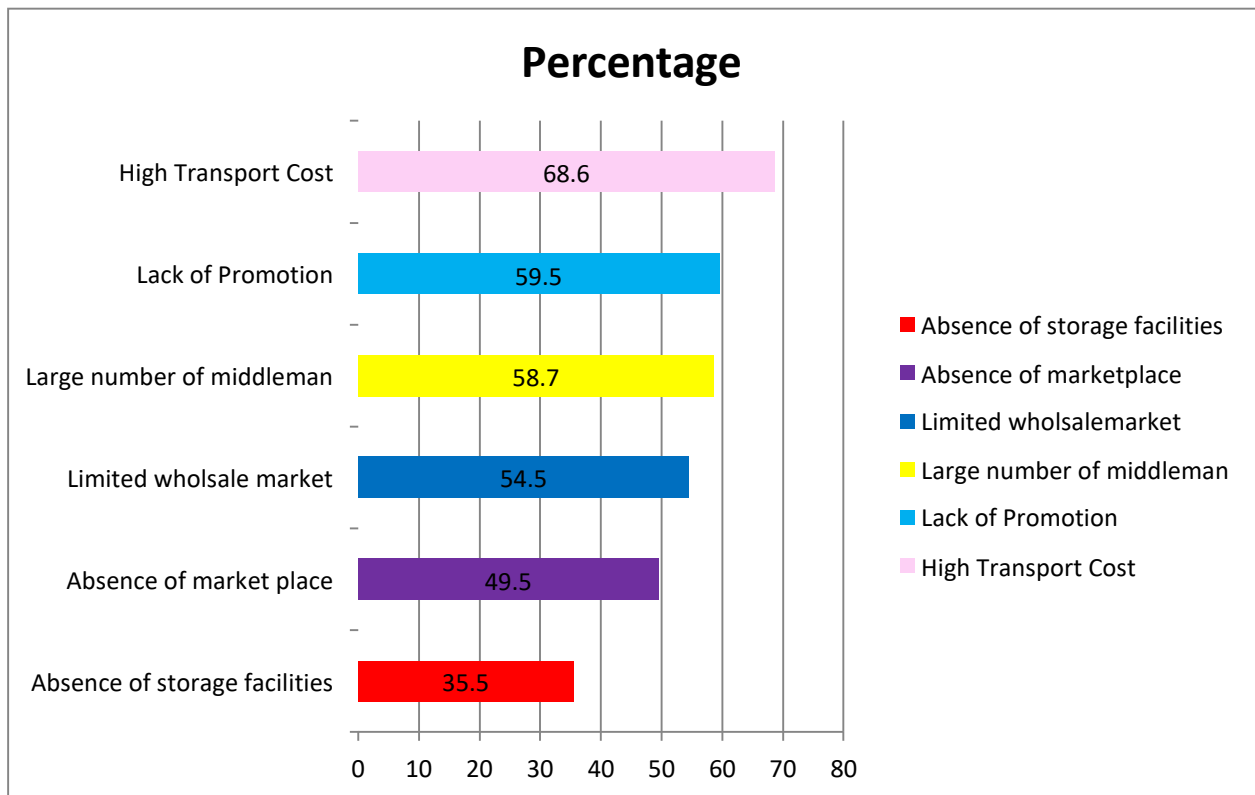


Figure 4.14: Frequency Distribution of Problem Faced During Marketing of Mushroom

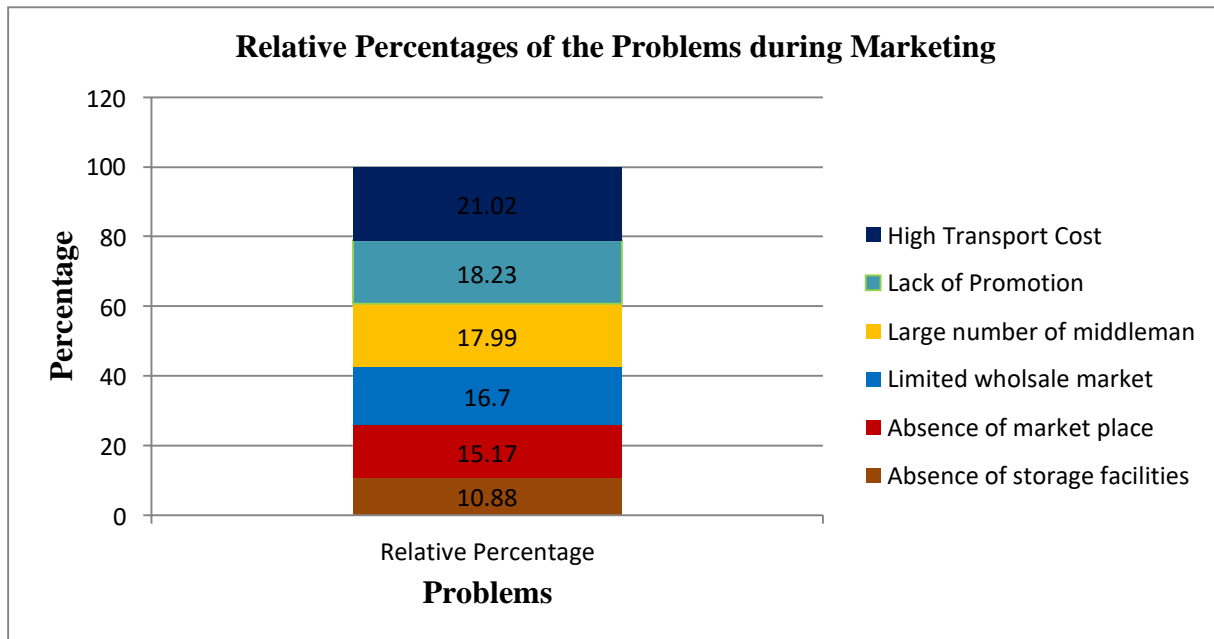


Figure 4.15: Relative Percentages of the Problems during Marketing

4.2.14: Frequency Distribution of Suggestions to Improve Marketing System of Mushroom

As most of the farmer's aren't happy with the existing marketing system of mushroom they have some voluble suggestions to improve this situation. 77.7 percent farmer thinks that an effective policy regarding mushroom cultivation and marketing can improve the situation to a great extent. Government incentives and capital at low interest rate, promotion by government and NGOs, removing middlemen, proper monitoring, training for the growers, expansion of market are the other suggestions given by 67.8 percent, 59.5 percent, 58.7 percent, 58.7 percent, 4.6 percent and 31.4 percent mushroom growers respectively.

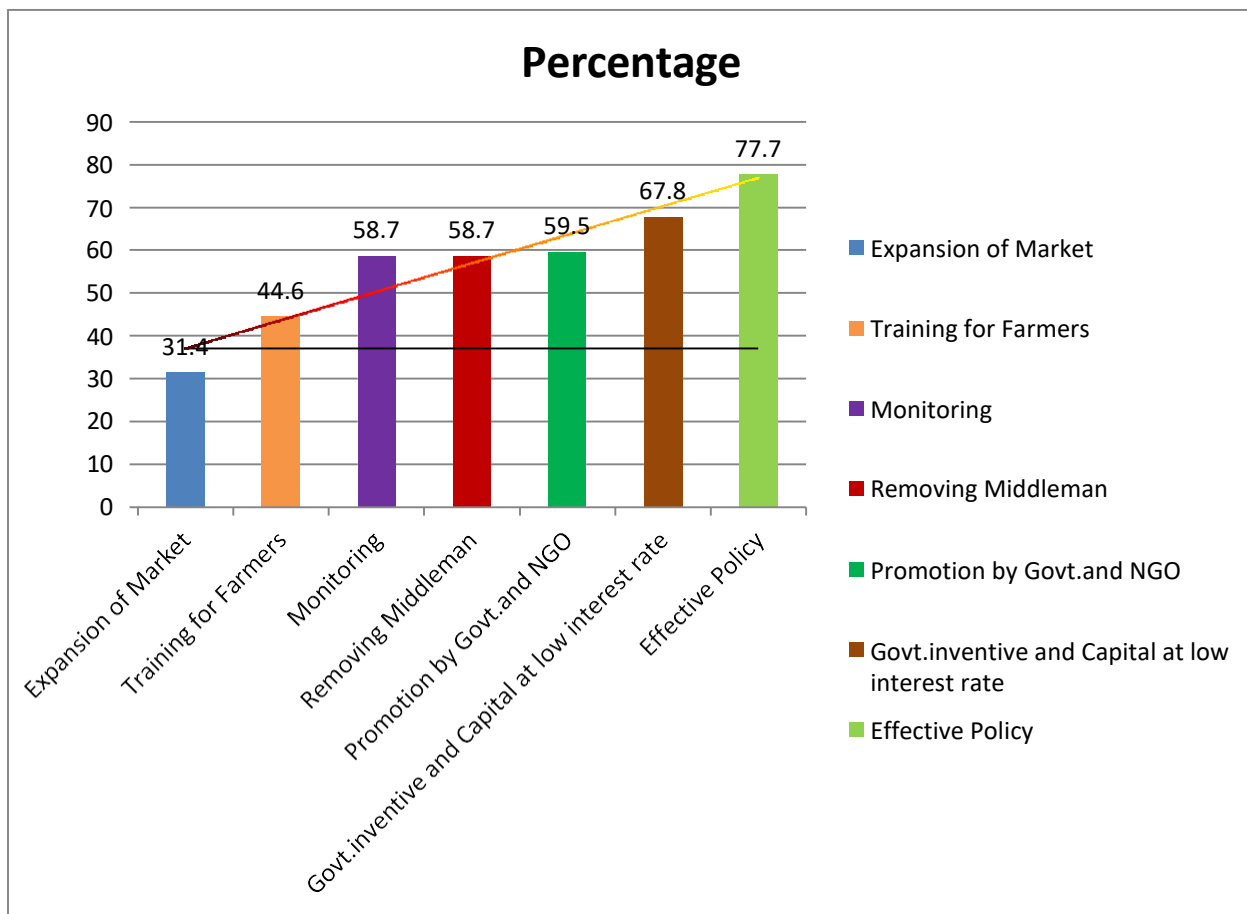


Figure 4.16: Frequency Distribution of Suggestions to Improve Marketing System of Mushroom

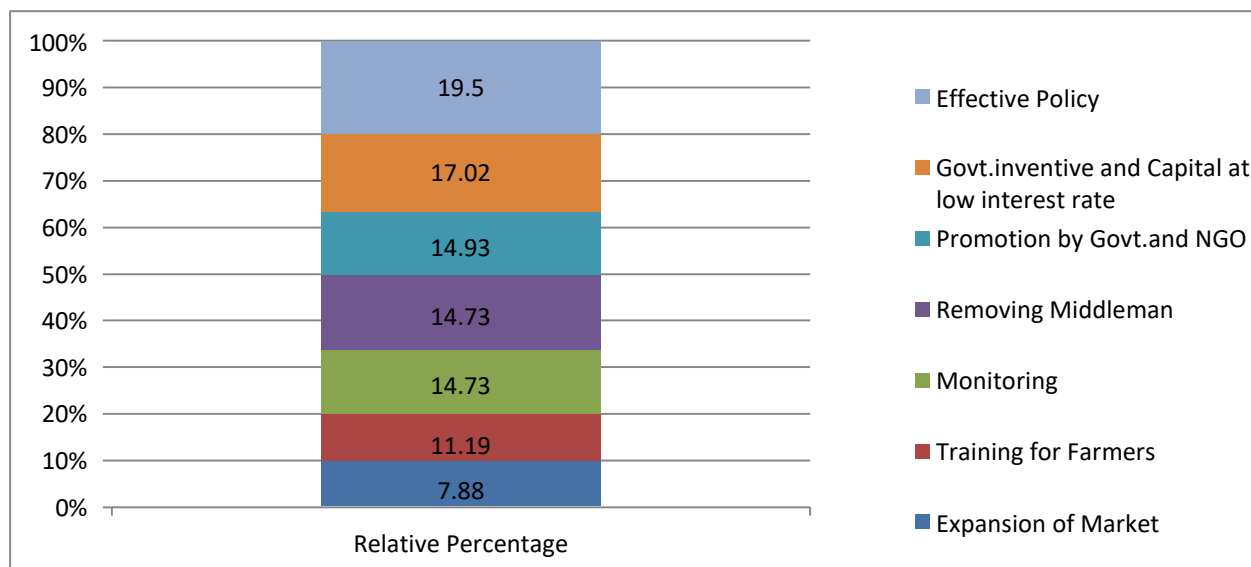


Figure 4.17: Relative Percentages of Suggestions to Improve Marketing System of Mushroom

4.2.15: Statistical analysis

The profile of the respondents described by the use of descriptive statistics (e.g., Frequency distribution). All descriptive statistics presented describe the mushroom cultivators of Bangladesh as a whole population. The relationships between socio-demographic determinants and the outcome were examined by using Two-way contingency tables and the Pearson's chi-squared test. Each independent variable was compared individually against the dependent variable to test for an interaction of the Determinants, those were found to be associated with the outcome in the bivariate analysis with $p < 0.001$ were later included in the multivariate logistic regression to evaluate independent effects.

Finally, a multivariate technique named as logistic regression analysis is used to investigate the associations between each predictor variable and the outcome variable of the respondents. The result was presented as odds ratio (ORs) and 95% confidence interval (CI). SPSS v20.0 software was used for data analysis.

4.2.15.1: Chi-Square Independence Test

A bivariate analysis with two way contingency tables using Pearson's Chi square test showed that when tested independently, all of the socio-demographic factors, technological factors and marketing factors have a significant association with the outcome variable except age group and cultivation intensity as shown in Table 2.

Education level, Occupation, Land size, Source of information, scientific cultivation and selling place have extremely significant impact on mushroom cultivation in years. Medicinal value, Nutritious value, location, source of capital, marketing system and unsold mushroom have very significant impact on cultivation in years.

The gender has significant impact on cultivation in years. It shows that there is difference in the percentage between male and female from the perspective of experience. There exists significant ($p < 0.05$) association between gender and cultivation in years. The result also shows that Education level, Occupation, Land size, Source of information, scientific cultivation, Selling place, Diabetes control and Packaging have extremely significant ($p < 0.001$) association between them and cultivation in years. It indicates these independent variables have most high impact on dependent variable. The variables Medicinal value, Nutritious value, location, source of capital, marketing system and unsold mushroom have significant ($p < 0.01$) association between

them and cultivation in years. On the other hand, Age and Cultivation intensity doesn't have impact on cultivation in years which indicate that there is relationship between them.

Table 4.2: Two-Way Contingency Tables and the Pearson's Chi-Squared Test

Characteristics	Mushroom Cultivation (Years)			Chi-Square	P-value
	1-3(%)	4-6(%)	6+ (%)		
Gender					
Male	23.8	0	76.2	7.302*	0.026
Female	17.0	27.0	56.0		
Age (years)					
≤40	19.3	18.2	62.5	3.185	0.203
>40	15.2	33.3	51.5		
Education					
No education	0	39.3	60.7	30.645***	0.000
Primary	44.7	13.2	42.1		
Secondary and above	9.1	20.0	70.9		
Occupation					
Mushroom cultivation	0	32.5	67.5	63.232***	0.000
Others	57.9	0	42.1		
Land size					
Landless	0	18.0	82.0	161.336***	0.000
Marginal	0	18.5	81.5		
Small holder	100	0	0		
Medium size holder	0	100	0		
Large	100	0	0		
Source of information					
Mushroom development center	8.3	26.7	65.0	48.125***	0.000
Neighboring farmer	0	33.3	66.7		
Newspaper	60.7	0	39.3		
Scientific cultivation					
Yes	6.6	35.5	57.9	31.207***	0.000
No	37.8	0	62.2		
Medicinal value					
Yes	25.0	18.2	56.8	11.110**	0.004
No	0	33.3	66.7		
Diabetes control					
Yes	6.5	6.5	87.0	66.591***	0.000
No	38.6	50	11.4		

Nutritious food					
Yes	25.0	25.0	50	14.191**	0.001
No	0	15.2	84.8		
Cultivation intensity					
Once	0	0	100	9.199	0.056
Few times	20.5	26.5	53		
Occasionally	18.5	18.5	63		
Location					
Home garden	25.0	18.2	56.8	11.110**	0.004
Room	0	33.3	66.7		
Source of capital					
Own	28.6	14.3	57.1	19.291**	0.001
Bank	0	31.3	68.8		
Lending from others	0	39.3	60.7		
Sale					
Local market	0	15.2	84.8	69.090***	0.000
Citymarket	50.0	0	50.0		
Hotels	50.0	0	50.0		
Middleman	0	50.0	50.0		
Marketing system					
Yes	0	40.7	59.3	11.608**	0.003
No	23.4	17	59.6		
Unsold mushroom					
Make it dry	28.3	26.7	45.0	15.967**	0.003
Consume it	0	0	100		
Keep in cold storage	10.0	22.0	68.0		
Packaging					
Yes	31.0	7.0	62.0	33.628***	0.000
No	0	44.0	56.0		
Note: Significance at ***P<0.001, **P<0.01 and *P<0.05					

4.2.15.2: Multiple Logistic Regression Analysis

To assess the net effect of the covariates, all the factors identified have significant association with mushroom cultivation, were included in the multiple logistic regression model. Results based on multiple logistic regression analysis for the mushroom cultivation are presented in Table 3. In order to avoid the problem of multicollinearity, a decision was made to drop some of the viable from the analysis. All independent variables included in the analyses showed to have significant relationship with outcome variables. The results of the regression analysis in Table 3 revealed that, education level, land size, source of information and source of capital appear to significant association with the mushroom cultivation in years. When the cultivators

got minimum education, it helps them to understand and adopt new technology, scientific techniques and implement them in case of harvesting. The level of significance between them is ($P < 0.01$). Capital play a crucial role in business, who get more capital can purchase more land and adopt latest technology. The relationship between the source of capital and cultivation in years is significant at ($P < 0.05$). The result also shows that the source of information have highly significant relationship with dependent variable at ($P < 0.01$) significance level. Naturally the cultivators who got enough training and education on mushroom cultivation will do better performance from them who don't have that.

So according to the result, the researcher reject the null hypothesis and accept the alternative hypothesis which means that the experience of mushroom cultivators have a great impact on mushroom production and domestic supply.

Table 4.3: Effect of Selected Variables on Mushroom Cultivation

Variables	Mushroom Cultivation in Years							
	1-3 Years				6+ years			
	β	Odds Ratio	95% CI	P-Value	β	Odds Ratio	95% CI	P-Value
Intercept	-214				-443.5			
Gender								
Male	4.8	116.0	110-120	0.06	1.21	3.35	2.34-5.79	.988
Female(ref.)	1.0				1.0			
Education								
No education	-1.5	0.22*	0.20-.24	0.020	-2.82	0.059*	0.02-0.081	0.040
Primary	-3.75	0.02**	0.01-.04	0.005	-2.42	0.037**	0.006-0.054	0.005
Secondary+(ref.)	1.0				1.0			
Occupation								
Mushroom cultivation	8.6	543	490-569	0.999	1.61	5.0	4.0-7.0	.978
Others(ref.)	1.0				1.0			
Land size								
Landless	1.06	2.88	1.70-3.1	0.999	2.61	13.59	12.64-14.87	0.930
Marginal	6.3	544	434-629	0.999	1.80	6.01	4.02-8.35	0.987
Small holder	3.6	36.59	29-43.7	0.999	6.87	96.2	87.9-99.23	0
Medium size holder	6.5	665.1	571-837	0.999	-0.61	0.45*	0.39-0.49	0.005
Large(ref.)	1.0				1.0			
Scientific cultivation								
Yes	1.5	4.48	3.23-	0.999	2.82	13.59	12.64-14.87	0.930
No(ref.)	1.0		6.87		1.0			
Source of capital								
Own	2.1	8.1	6.9-9.54	0.999	0.40	1.49*	0.9-1.7	.004
Bank	0.0	0.0			0	0		
Lending from others(ref.)	1.0				1.0			
Source of information								
Mushroom development center	-1.5	0.22*	0.20-.24	0.020	-2.82	0.059*	0.02-0.081	0.040
Neighboring farmer	-3.75	0.02**	0.01-.04	0.005	-2.42	0.037**	0.006-0.054	0.005
Newspaper(ref.)	1.0				1.0			
Packaging								
Yes	0.0	0.0	-	0.999	0.0	0.0	-	0.999
No(ref.)	1.0							
Sale								
Local market	1.06	2.88	1.70-3.1	0.999	2.61	13.59	12.64-14.87	0.930
City market	6.3	544	434-629	0.999	1.80	6.01	4.02-8.35	0.987
Hotels	3.6	36.59	29-43.7	0.999	6.87	96.2	87.9-99.23	0
Middle man(ref.)	1.0				1.0			

Chapter Five: Summary of Findings, Conclusions and Recommendations

Chapter-05: Summary of Findings, Conclusions and Recommendations

5.1: Summary of the Findings

From the above discussion, here author summarized all the findings together. The major findings of the study are given below:

- Among mushroom cultivators in Savar 82.6 percent farmers are female.
- Ages of the farmers, who cultivate mushroom in Savar, 72.7 percentages of them are below 40.
- 23.1 percent of farmers have no formal education, 31.4 percent of them completed primary education and rest 55.5 percent have completed secondary school level or above.
- Mushroom cultivation is the main profession for 68.6 percent of farmers and rest 31.4 percent took it as secondary profession.
- 50.4 percent, 22.3 percent, 14.0 percent, 9.1 percent and 4.1 percent of the mushroom cultivator of Savar are landless, marginal, small holder, medium size holder and large farmer respectively.
- Farmers like to cultivate mushroom species which can be grown throughout the whole year. 41.3 percent and 32.2 percent of the farmers said that they cultivate oyster (*Pleurotus ostreatus*) and Reishi (*Ganoderma lucidum*) respectively. 14.0 percent farmers said that cultivate straw mushroom (*Vovariellavolvacea*). And only 4.1 percent farmers said that they cultivate seasonal species like milky (*Calocybe indica*), bottom mushroom (*Agaricus bisporus*) and shiitake (*Lentinus edodes*).
- Most of the farmers (63.3 percent) operate their function from their limited own sources. On the other hand only 13.2 percent farmers said that they take bank loan from different financial institutes. And 23.1 percent borrow money from their friends and relatives.
- Majority (36.4 percent) of the farmers sell their produce to the middleman. 27.3 percent, 28.1 percent and 8.3 percent of the farmer sell their mushroom to local market, city market and hotels respectively.
- Most of the farmers (58.7 percent) don't have any packaging system for marketing their produce. Rest 41.3 percent use packaging but most of them aren't proper or scientific.

- Almost half (49.6 percent) of farmers said that dried up their unsold mushroom. 41.3 percent keep unsold mushroom in cold storage. And rest 9.1 percent farmer consume their unsold mushroom.
- About (40.5 percent) farmers think that can get fair prices if direct marketing can be done bypassing the middle man. 32.2 percent of them think that advertising or promotional activities can improve the existing situation. And rest 27.3 percent farmer said that if they can sell raw mushroom they will get fair price.
- Most (68.6 percent) of the farmer said that lack of capital is the most prominent limitation they face during the production period. Both poor quality seed and insect attack during production are dominating problems as 63.6 percent farmers said in both the situation. High temperature in summer, choosing right variety, low temperature in winter, inappropriate trimming production and heavy rainfall are the limitations farmer faces during production as said by 58.7 percent, 54.5 percent, 54.5 percent, 40.5 percent and 35.5 percent farmers respectively.
- High transportation cost is the major problem during marketing said by 68.6 percent farmers. 59.5 percent, 58.7 percent and 54.5 percent farmers identified lack of promotion, large number of middlemen and limited wholesale market respectively as problems during mushroom marketing. Absence of proper market place and absence of storage facilities are also problems during marketing of mushroom as said by 49.5 percent and 35.5 percent farmers respectively.
- Most (77.7 percent) of the farmer thinks that an effective policy regarding mushroom cultivation and marketing can improve the situation to a great extent. Government incentives and capital at low interest rate, promotion by government and NGOs, removing middlemen, proper monitoring, training for the growers, expansion of market are the other suggestions given by 67.8 percent, 59.5 percent, 58.7 percent, 58.7 percent, 4.6 percent and 31.4 percent mushroom growers respectively.

5.2:Conclusions

This is the last segment of the study. It is time to wrap up the research findings and check all the research objectives are achieved or not. This study has been initiated to achieve three research objectives. First research objective was to find out problems of mushroom marketing of different stakeholders in Bangladesh. This study provided a detail overview about the problems existing in both production and marketing of mushroom in Bangladesh. Lack of capital, poor quality seed, insect attack, high temperature in summer, choosing right variety, low temperature in winter, inappropriate trimming of production and heavy rainfall are the major problems during production.

High transportation cost, lack of promotion, large number of middlemen, limited wholesale market, proper market place and absence of storage facilities are the major problems during marketing.

Second research objective was to find out the ways of improving mushroom marketing system for domestic markets. This study provided detail findings about the ways to improve the existing marketing system. Effective policy regarding mushroom cultivation and marketing, government incentives and capital at low interest rate, promotion by government and NGOs, removing middlemen, proper monitoring, training for the growers, and expansion of market are the major suggestions to improve the mushroom marketing system for domestic markets.

The third research objective was to learn some important aspects like management aspects- a controlled management, marketing aspects- make profit with consumer satisfaction, financial aspects- arrange the financial support, and - make people aware about good or bad products with reasonable price. About management practice to improve effectiveness and efficiency at both production and marketing level have been discussed at the result and discussion section. To make the marketing system more helpful for both the consumer and growers different techniques have been sort out through the research and discussed in the earlier chapter. As most of the farmers don't get credit facilities they have to run their operation with their own limited capital which decreases their efficiency.

5.3: Recommendations

- ❖ Education is helpful in helping mental development of the people and creating awareness about any improved production technologies. The schools can play a very useful role in dissemination of Mushroom production technology among the rural and urban people. It is, therefore, recommended that arrangement should be made for adult literacy programmer and imparting education in Mushroom cultivation in the academic institutions.
- ❖ Proper monitoring is recommended for effective functioning of the marketing system as it will help the farmers to get fair price.
- ❖ Proper guidance and necessary help should be given to the small and medium farmers so that they can overcome their problems due to the financial inability. The concerned authorities should increase the availability of credit from any commercial bank or NGOs.
- ❖ Higher training exposure in mushroom cultivation seems to minimize their problem confrontation. Therefore, it is highly recommended that the concerned authority should take steps so that farmers can get more opportunity to receive training on mushroom cultivation and increase their efficiency in Mushroom cultivation.
- ❖ Extension contact helps the people to become more conscious and more dynamic. So extension contact is necessary for reducing problem confrontation in Mushroom cultivation. It is, therefore, recommended that extension personnel should take appropriate and suitable steps so that the farmers can come in contact with different media.
- ❖ Large scale promotional activities are recommended at every level to get exposure of the produce at the market.

5.4: Recommendation for Further Study

- ❖ A small piece of study having conducted in some specific locations cannot provide all information for proper understanding about problem in Mushroom cultivation, marketing and related matters. Following future studies should be undertaken covering more dimensions in the related matters.
- ❖ This study was conducted on the population of farmers of Savarupazilain Dhaka district. Findings of this study need to be verified by undertaking similar research in other parts of the country.
- ❖ Most of the Farmers' characteristics were found significantly related with their problem in Mushroom cultivation and marketing in domestic market. Further research should be conducted to verify those findings.
- ❖ In addition to problem in Mushroom cultivation and marketing in domestic market, the farmers also face other problems such as social, economic, housing, sanitation, health and domestic. All these problems affect the performance of the farmers. There is need for undertaking research on the various problems of the farmers which affect their performance in Mushroom cultivation and marketing in domestic market.
- ❖ Research should be undertaken to study the effectiveness of Agricultural Extension Service and other related organizations in helping people solve their problem facing the farmers in Mushroom cultivation and marketing in domestic market.

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Appendix

Problems and Prospects of Quality Mushroom Supply for Domestic Market

Questionnaire

(I solicit your valuable co-operation in filling up this questionnaire. Information collected from you will make a meaningful contribution to the fields of mushroom production and marketing, as well as development of this sector. All information collected from you through this questionnaire will be kept in strict confidence. Please put tick mark to your answer)

SECTION-1: Farm Tomography

Household category: Code 1= Male-headed, 2= Female-headed

Areatype : Code: 1 Project area, 2= Controlarea

District :.....

Upazila :.....

Union :.....

Village :.....

Group Name: Group type: Code: 1= male, 2= Female. 3= mixed

SECTION-2: Socio-Economical Status of Farmers

General information of household members

SL	Name of HH member (start with HH head)	Relation to HH head	Gender (M/F)	Age		Education	Main occupation	Secondary occupation	Remarks
				Year	Month				
1									
2									
3									
4									
5									
6									

N.B: Relation HH head: 01 = HH head self, 02 = Wife/husband, 03 = Son/ daughter, 04 = Father/mother, 05 = others

Occupation: Main occupation will be determined based on income. For student occupation need to be written as student.

Occupation's code: 00= Unemployed, 01 = Own agriculture (crop production), 02= Share cropper, 04= House wife, 05= Livestock husbandry, 06= Homestead gardening/ horticulture, 07= Agricultural day labor, 08= Non-agricultural day labor, 09= Small business/IGA, 10= Business, 11= Fishing, 12= Natural resource collection, 13= Others.

Land owner pattern:

How is land measured locally? Name of local unit:.....

Conversion rate between local unit and decimal? Local 1 =decimal

(Landless: ≤ 50 decimal/.2ha, Marginal farmer: 50-125 decimal, Small-holder: 126- 250 decimal, medium size holder: 251- 5000 decimal, Large –size holder: More than 5001 decimal/ 2 ha)

SECTION-3: Technology Adoption and Productivity

1. How long do you know Mushroom?

A.1-3 yrs., b. 4-6, c.> 6 yrs.

2. How do you know mushroom as cultivated crops?

1. Mushroom development Centre 2. Neighboring farmer 3. Newspaper 4.Others

3. Do you know about scientific cultivation of Mushroom?

A) Yes B) No

4. Do you know about the medicinal value of Mushroom?

A) Yes B) No

5. Do you know that Mushroom is used as vital drug component to control diabetes?

A) Yes B) No

6. Is it known to you that Mushroom is nutritious besides delicious food?

A) Known B) Unknown

7. Do you know that Mushroom is used as component of making various palatable foods?

A) Yes B) No

8. Do you have any special types or species of Mushroom? Which species?

A) Yes B) No

9. Why do you grow this species?

A) Once B) Few times C) Occasionally D) Never

10. Where do you grow Mushroom?

1. Cultivated in home garden 2. In room 3.Others

11. Do you have idea that Mushroom is profitable agro product?

A) A little bit idea B) Good idea C) No idea

12. Where do you get capital for mushroom production?

1. Own sources, 2. Loan from bank, 3. Lending from others, 4.Others

SECTION-4: Marketing of Mushroom

Do you have any idea about products of mushroom?

A) Having idea B) Noidea

Where do you sale your products?

Do you happy with the present marketing system?

A) Yes B)No

What could be other way of marketing for good price?

What are the products that can be made from Mushroom?

1. Soap 2. Oil 3. Fry, 4. Shampoo 5. Make beauty toiletries 6. Others

Do you have any information that mushroom can be exported?

1. Yes 2. No

What do you do with the mushroom if it is not sold?

SECTION-5: What is your suggestion for good price or marketing?

SECTION-6: What are the problems do you have during production?

SECTION-7: What are the limitations during marketing?

SECTION-8: What is your opinion for improving the marketing systems?

Field Visit and Interviewing during Data Collection



Plate 1: Interviewing the farmers regarding mushroom production and marketing



Plate 2: Selling of different mushroom products



Plate 3: Mushroom production techniques at Mushroom Development Centre



Plate 4: Different forms of dried mushroom