SCENARIO ANALYSIS OF MUSHROOM MICROENTERPRISES

By

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(2019-11-180)

DEPARTMENT OF AGRICULTURAL EXTENSION

COLLEGE OF AGRICULTURE

VELLANIKKARA, THRISSUR - 680656

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KERALA, INDIA

2021

DECLARATION

I, hereby declare that the thesis entitled **"Scenario analysis of mushroom microenterprises"** is a bonafide record of research done by me during the course of research and that it has not previously formed the basis for the award to me of any degree, diploma, fellowship or other similar title, of any other University or Society.

Vellanikkara

Date: 06/11/2021

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2019-11-180

CERTIFICATE

Certified that this thesis entitled **"Scenario analysis of mushroom microenterprises"** is a record of research work done independently by **Ms. Swathy Suresh K. S. (2019-11-180)** under my guidance and supervision and that it has not previously formed the basis for the award of any degree, diploma, fellowship or associateship to her.

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SWATHY SURESH K. S.

CONTENTS

LIST OF TABLES

Contd…

…Contd.

Contd…

…Contd.

Contd…

…Contd.

LIST OF FIGURES

Contd…

…Contd.

LIST OF PLATES

LIST OF APPENDICES

LIST OF ABBREVIATIONS

Abbreviations	Expansion
%	Percentage
ADS	Area Development Society
ATMA	Agricultural Technology Management Agency
CDS	Community Development Society
CIFA	Central Institute of Freshwater Agriculture
DIC	District Industries Centre
DMR	Directorate of Mushroom Research
DRDA	District Rural Development Agency
EC	Executive Committee
EI	Efficiency Indicators
FDI	Foreign Direct Investment
GMCP	Good Mushroom Cultivation Practices
HOPCOMS	Horticultural Produce Cooperative Marketing Society Limited
IE	Incremental Expansion
i.e	That is
IIHR	Indian Institute of Horticultural Research
IRDP	Integrated Rural Development Programme
Kg	Kilo gram
KVK	Krishi Vigyan Kendra
NABARD	National Bank for Agriculture and Rural Development

Contd…

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NGO	Non-Government Organizations
NHB	National Horticulture Board
NHG	NeighbourHood Groups
NHM	National Horticulture Mission
NRCM	National Research Centre for Mushroom
PMRY	Pradhan Mantri Rozgar Yojana
RKVY	Rashtriya Krishi Vikas Yojana
RTF	Ready-To-Fruit
SAU	State Agricultural Universities
SCI	Social Capital Indicators
SHG	Self Help Groups
UNDP	United Nations Development Programme
USA	United States of America

Introduction

CHAPTER I
INTRODUCTION

"Nature alone is antique, and the oldest art a mushroom"

- Thomas Carlyle

Mushroom cultivation has become a prevailing activity throughout the world. Mushrooms are fungus's fleshy, macroscopic, achlorophyllus, spore-bearing fruiting body, belonging to the Agaricales order of class Basidiomycetes. They are mainly categorized into three groups, as follows: edible mushrooms, non-edible or poisonous, as well as medicinal mushrooms. Mushrooms are one of the most essential biological components that play a critical role in finding significant answers to the problems of food, health and the environment. They are commonly known as "White vegetables" or "Boneless vegetarian meal" because they contain a copious amount of vitamins, dietary fibres, minerals and proteins. Apart from that they are also fat free, gluten free, cholesterol free and low in carbohydrates and sodium, which is an excellent source for diminishing body weight (Qumio *et al*., 1990). All bioactive components present in mushroom have immunomodulating and antioxidant properties, which helps the human body's immune system to fight against cancer and tumour growth.

Mushrooms have the potential to help rural society to achieve more sustainable economic growth. Furthermore, they are also an excellent food source having the potential to be instrumental in a non-green revolution for combating malnutrition and food insecurity especially in developing countries. Mushrooms can be grown effectively both for local consumption and export markets. Good packing and storage for fresh mushrooms, as well as processing for long-term storage and value addition, are the two major post-harvest steps required for mushroom.

Cultivation of mushroom is becoming a significant agri-business activity, it is more dependable and provides an efficient way for resource constrained entrepreneurs, to produce nutritious food in a short time and to create the opportunity to bring about a highly saleable commodity, there by achieving year-round returns. Mushroom entrepreneurship is a multifaceted one, which can generate a plenty of secondary

enterprises and that necessitates a wide range of skills and logistical support. This includes the spawn producing enterprises, enterprises for processed mushrooms *etc*. Self-employment can be a significant avenue for income generation by small, marginally wealthy agricultural households. In this respect, people can easily go for mushroom enterprises because mushrooms require a minimal amount of land to grow, anybody can simply cultivate them in their own backyard. Expert mushroom professionals, as well as educated and unemployed people all contribute to mushroom cultivation through authorized entrepreneurial skills.

In recent years, global mushroom industry has grown rapidly with production increasing more than 25-fold (from about 1 billion kg in 1978 to 27 billion kg in 2012), despite the fact that the human population has increased 1.7 times in the same time period (from about 4.2 billion in 1978 to 7 billion in 2012) (Royse, 2014). And this rapid growth of global mushroom industry, boost the socio-economic situation of the farming communities or local economies, by providing subsistence food security, medicine and nutrition, creating extra employment for both literate and illiterate people in rural and semi-urban regions and increasing revenue through local, regional and national commerce and also generating potential for processing industries such as drying and pickling.

The global mushroom industry is estimated to reach US$ 69.3 billion by 2024, with significant growth projected as consumers seek healthier eating alternatives and these indicates that the global mushroom market will grow at an annual rate of 8.2 per cent between 2016 and 2024 (Thakur, 2020). Mushroom cultivation is now practised over 100 countries, and the global mushroom production is about 40 million tonnes. China is the leading producer accounting 60% of the total global supply followed by Netherland and USA (Singh *et al.,* 2017). European countries, USA and Hon Kong are the top export destinations for Indian mushrooms. Despite the fact that mushroom production has been practised in other countries of the world over decades, but it is just recently begun in India.

In terms of mushroom production, India has numerous advantages over other mushroom growing countries. Due to diversifying nature of Indian agriculture, wide variety of raw materials, suitable climate and cheap labour are the major factors contributing to mushroom production in India. In India, five mushroom species are mainly under commercial cultivation; white button mushroom (*Agaricus bisporus*), oyster mushroom (*Pleurotus spp.*), milky mushroom (*Calocybe indica*), paddy straw mushroom (*Volvariella volvacea*) and shiitake mushroom (*Lentinula edodes*). Among these mushroom species 73 percent of total mushroom production is contributed by white button mushroom, followed by oyster and milky mushroom (Sharma *et al*., 2017). There are mainly two types of mushroom growers; seasonal and round the year growers. India has a great combination of technical and non-technical manpower to run mushroom growing enterprises. This helps to boost the mushroom production in India and has obtained a tepid response in its growth. In India, mushroom entrepreneurship are promoted under mainly the schemes of UNDP and NHM (Shirur, 2015)

Mushroom entrepreneurship is a profitable, eco-friendly and technologically sound agribusiness, its performance in a nation like India is dependent upon the institutional and technological support. The Government of India promotes mushroom entrepreneurs in establishing high-tech mushroom units as industrial ventures. Mushroom entrepreneurship can be seamlessly integrated into many of the Indian government's rural development policies. In the Integrated Rural Development Programme (IRDP) mushroom cultivation has become a crucially significant cottage industrial activity. Foreign Direct Investment (FDI) policy of India intends to encourage investment in technologies for the development and production of vegetables and mushrooms under controlled environment (NRCM Annual report 2017-2018).

Mushrooms are widely produced in the Indian states of Punjab, Uttarakhand, Haryana, Uttar Pradesh, Himachal Pradesh, Orissa, Tamil Nadu, Kerala, Andhra Pradesh, Maharashtra and the North eastern states. Among this Uttar Pradesh is the leading producer state followed by Tripura and Kerala (Toppo, 2021).

Mushroom cultivation has great scope in Kerala due to suitable agro-climate, cheap and easy availability of raw material, low capital requirement, growing demand, high returns, lower manpower requirement, low gestation period, availability of agro-wastes and a diverse fungal biodiversity. According to the Directorate of Mushroom Research, Kerala had achieved only an annual production of 800 tonnes in 2016 (Sharma *et al*., 2017). In Kerala, oyster mushrooms are most commonly cultivated among mushroom growers. Milky mushrooms and to some extent white button mushrooms are also preferred by the mushroom growers. More people are switching to mushroom production in Kerala, mainly due to its ideal climatic conditions such as temperature and humidity, which enables round-the-year mushroom production.

In addition, the central and state agricultural authorities have been trying to promote mushroom production because of its lucrative potential, through policy support, trainings, subsidies and technology dissemination by the central and state government agricultural departments. Even then, the mushroom entrepreneurs in Kerala are facing difficulties regarding mushroom production and management of mushroom units. With this backdrop, the present study was conducted to know about the current scenario of mushroom cultivation.

Objectives of the study

1. To analyse the type and structure of the mushroom enterprises.
2. To evaluate the performance of representative mushroom units.
3. To document the characteristics of the mushroom entrepreneurs.
4. To identify the constraints experienced by the producers.
5. To suggest measures for improvement of the mushroom enterprise.

Scope of the study

During the past few years, the trend of mushroom cultivation has been picking up. However, extension studies in this area are very few. In this context the present study will help to analyse the different types of mushroom units such as production and marketing and production, processing and marketing, highlight about the performance of various mushroom units, focussing on their social, ecological and economical aspects. Recognising the mushroom units as viable enterprises might play a significant

role in socioeconomic development, both as a livelihood option and as a commercial venture. Thus this study will help to develop an overview of the mushroom production scenario in Kerala.

Limitations of the study

The study is limited to two districts *i.e.,* Trissur and Palakkad of Kerala. This might not provide a foolproof reflection on the entire state's mushroom scenario. This is because the current study is a part of M.Sc. (Ag) work and has the inherent limitations in time, Covid-19 restrictions and resource constraints. Covid-19 pandemic situation, it caused many limitations in travel and conducting work smoothly. However, in spite of these limitations sincere effort and had been taken to complete the study with respect to its objectives and to draw valid conclusions, in a dedicated manner.

Organisation of the study

The current study is organised into five chapters in a systematic order to assist handling and report writing, as shown below:

1) Introduction
2) Review of literature
3) Research methodology
4) Results and discussion
5) Summary and conclusions

The first chapter is introduction, which will gave an outline about the research topic, its objectives, scope and limitations. The second chapter is review of literature, which will briefly describes about the past studies related to the research topic and this is organised on the basis of the objectives of the study. The third chapter deals with the research methodology, this will give an outline about the various research methods and statistical tools used for the study. The fourth chapter is results and discussions, in this chapter it will briefly describes about the outcomes of the research with its discussions. And the last chapter is summary and conclusion, this will present about the overall summary of the research work. Later, it was followed by appendixes, references and abstract.

Review of literature

CHAPTER II

REVIEW OF LITERATURE

Reviewing of literature is a summary of literature on a specific subject or topic. It is deliberated as the most crucial aspect in a research work, which will provide an outline concerning the previous work done in that research area. Reviewing of literature shows an insight of sources that the researcher have looked while researching a specific topic, and to illustrate their readers how their conclusions apt into that broader area of the research. A thorough and comprehensive evaluation of these review of literature support and refute study findings for a variety of reasons. This chapter presents a detailed assessments of previous studies on mushroom microenterprises, relevant to the objectives of present study under the following sub-heads.

2.1 Various activities undertaken by mushroom entrepreneurs

2.2 Performance indicators of mushroom units

2.3 Profile characteristics of mushroom entrepreneurs

2.4 Constraints faced by mushroom entrepreneurs

2.5 Extension interventions in mushroom cultivation

2.1 Various activities undertaken by mushroom entrepreneurs

2.1.1 Production, processing and marketing activities

Gurja (2004) stated that major activities performed by mushroom entrepreneurs include culture preservation, spawn production, substrate preparation, spawn running, casing, sanitation to maintain a high standard of cleanliness to reduce the risk of pests and illnesses, harvesting/packing and supplying mushrooms to the market.

Dash (2015) in his study emphasized that the degree of involvement of women in mushroom cultivation, around 50 per cent of them engaged in straw selection, 30 per cent in straw cutting, 43 per cent in soaking, 40 per cent in mushroom bed preparation, 20 per cent in caring of mushroom unit, 50 per cent in harvesting and 15 per cent in marketing of the production.

Pradhan and Nayak (2009) stated that commercial mushroom entrepreneurs activities includes the use of suitable straw, high-quality spawn, efficient spawning methods and substrate preparation.

Suguna and Sreenarayanan (1995) observed that the sun drying, thin layer drying, fluidized bed drying and solar cabinet drying were all used to study mushroom dehydration. They discovered that the ideal fluidised bed drying temperature was 50 degrees Celsius with a 35 cubic metre per minute air flow rate.

Singh and Sharma (1999) revealed that mushrooms when dried at 60 degrees Celsius very minor changes in mushroom quality were observed. At 60 degrees Celsius the dehydration and rehydration ratios were found to be 15.2:1 and 1:2.65, respectively. At this temperature the drying rate pattern was also examined and the critical moisture content was noticed to be 43.4 per cent.

Shaah and Rakhi (2005) revealed that under their study after reconstitution the mushroom soup mix dried at 60 degrees Celsius was the best. Boiling in 1:10 volumes of water for 4 minutes was shown to be the ideal combination for reconstitution. The crucial relative humidity was discovered to be 52 percent, and the soup mix was found to be extremely stable below this level.

Arumugunathan *et al.* (2005) observed that mushroom chips that have been prepared from freshly harvested button mushrooms. After undergoing certain process such as washing, slicing and blanching in a brine solution of 2 percentage. Mushrooms were immersed overnight in a solution of 0.1 per cent citric acid, 1.5 per cent NaCl and 0.3 g red chilli powder. After sapping the solution the mushrooms were dried for 8 hours in a cabinet dryer at 60 degrees Celsius. After that it was fried in refined oil and high-quality chips were prepared.

Sharma (2018) noticed that beyond mushroom production the mushroom entrepreneurs are also undertaking value addition in mushroom and making certain products like dried mushrooms, mushroom pickles, mushroom cutlets *etc*. and through this they are earning an additional income.

Tyagi and Nath (2005) stated that adding up to 25 per cent oyster mushroom powder to black gram pappad or up to 10 per cent oyster mushroom powder to green gram pappad was really a good product. The addition of mushroom powder lowered fat absorption index and frying expansion.

Singh *et al*. (2010) stated that mushroom marketing activities are still unorganised in India. It's a basic system in which producers sell directly to consumers or even retailers. In contrast to other nations, where marketing receives 10 per cent of total costs for production and processing, marketing in the United States has received insufficient thinking and investment. To increase its consumption serious measures are needed to promote the product, enhance its quality and expand the market.

Khajuria (2005) pointed out that fresh mushrooms are the major product in all mushroom microenterprises. It contributes around 87.68 per cent while comparing with all other products of a mushroom industry.

Sharma and Dhar (2010) stated that some ethnic tribes in Western Assam eat wild edible mushrooms. Additionally they also prepare several products like anti-diabetics mushroom powder, weight gain powder, sex enhancement medicine, mushroom chavawanprash and mushroom pickles.

Marshall and Nair (2009) revealed that ability to manage a continuous supply for chosen outlet markets is one of the most important aspects related to the marketing activities of growing mushrooms for commercial purposes, and even if the mushroom enterprise is one of several livelihood activities producers must become multi-skilled to successfully manage multiple enterprises.

Khara *et al*. (2009) conducted a study among the women mushroom producing entrepreneurs. And the study revealed that majority of the women entrepreneurs had participated in various mushroom production activities such as spawn production, compost preparation, easy production methods and acquisition of mushroom training.

Das (1997) noticed that spawn production can be successfully done by rural women as a coordinated venture and at household level mushroom cultivation can be done as a source of revenue generating activity.

Tripathi (1995) pointed out that packing, cleaning of fruiting bodies, harvesting, caring and sprinkling over compost are the most common activities of mushroom producers in small mushroom enterprises.

Kumar and Rai (2007) stated that mushrooms are becoming increasingly popular and the demand for diversity has led to the development of ready-to-eat or value-added processed mushroom products.

Steinbuch (1986) stated that mushroom processing can help with marketing by extending the shelf life of mushrooms, especially for small-scale producers. So they'll have to sell their product, as well as adding value to the product.

Pathania *et al.* (2017) revealed that methods like drying can be used to extend the shelf life of mushrooms. Because drying minimises the bulk quantity, it is easier to transport, handle and store. Dehydrated mushrooms are used in a variety of cuisine preparations, including pasta salads, quick soups, stuffing, snack seasoning, meat and rice meals.

Meena (2019) revealed that the various activities taken by the mushroom entrepreneurs were spawn production, compost production, production of spawn bags, mushroom processing, packaging of mushroom products and fresh mushrooms, making out new mushrooms by-products and marketing of fresh and processed mushrooms.

Verma *et al*. (2020) in their study on processing of mushroom pointed out that various processing methods for mushroom includes drying, freezing, pickling and making certain value added products like mushroom noodles, mushroom tikka mix and mushroom soup powder.

Beetz and Kustudia (2004) pointed out that mushroom entrepreneurs will be capable of completing various activities related to production and processing on time and marketing involves a high level of social relations skills.

Sharma *et al*. (2007) investigated the status of women in mushroom production in Haryana's Sonepat district. And it was discovered from the study that mushroom cultivation is seen as a technically possible and potentially valuable enterprise. They

also revealed that farm women were involved in a multitude of activities such as mushroom production, farm operations, production of spawn and so on.

Das and Kalita (2006) found that both the sun dried and dehydrated mushrooms have more than six months shelf life. In sun drying process, the mushrooms are spread out on trays and placed out open under the sun. Once the temperature is above 25 degree Celsius, as well as the relative humidity is less than 50 per cent then the sun dried products are ready to pack. The study results also inferred that sun dried products retain around 10 to 12 per cent of their original weight.

Luckasse and Polderduk (2003) observed that during the preservation of postharvest mushroom, less processing utilising a Modified Atmosphere Package (MAP) in connection with cold chain storage will serve as an essential technology to prevent losses and improve quality of mushroom product, while prolonging the benefit of low temperature storage.

Edward (1983) revealed that in European markets mushrooms are mostly available in the form of pickled, canned and frozen type. The study also pointed out that these processed products does not affect the fresh mushrooms marketing value.

In 1980s postharvest technology, distribution, cooperative, advertising and promotional incentive, the universal production code, grading and rising per capita consumption of mushroom were all recognized as important activities of mushroom marketing (Lane, 1982).

Gold *et al*. (2008) pointed out that mushroom enterprises establish various marketing activities like competitive advantage through quality, customer service and continuous supply in order to flourish in the market.

2.2 Performance indicators of mushroom units

Singh *et al*. (2010) observed that mostly large mushroom entrepreneurs who followed better management methods gained in the end and were capable of generating more profit. Study concluded that especially large enterprises benefitted greatly from economies of scale. Benefit Cost Ratio (BCR) also accompanied by this, but that was higher on large enterprises (1.83) than medium enterprises (1.78) or small enterprises

(1.61). Study also concluded that the production cost of mushroom decreased with increase in size of the mushroom enterprise. On small, medium and large enterprises net income per kilogramme were Rs 12.70/-, Rs 14.51/- and Rs 15.23/-, respectively.

Ramsingh and Subhash (2008) pointed out that within increase in the amount of compost usage leads to increase in the economic performance of mushroom enterprise. Net income from cultivation of mushroom, particularly speckled between Rs 33,519/- to Rs 3,33,792/- throughout various types of mushroom enterprises and this indicated that with increase in the enterprise size the net income of mushroom entrepreneurs also get increases. And finally the study also concluded that large scale mushroom entrepreneurs earn more income than medium and small scale entrepreneurs.

Vandna *et al*. (2006) carry out the performance of gross ratio and operation ratio for small sized enterprises with less than 200 sq.m, 200 to 400 sq.m medium sized enterprises and large enterprises with more than 400 sq.m area spawned per season. And the results indicated that 0.56 and 0.65 were the gross ratio and 0.37, 0.48 and 0.32 were the operation ratios of small, medium and large enterprises. Study also concluded that large farms are more efficient than the small and medium sized enterprises.

Chauhan and Sharma (2015) in their research pointed out that the capital turnover ratio for the large mushroom units were performed higher than that of the small mushroom units, the small mushroom units performed capital turnover ratio below Break-even point.

Shirur (2015) in his study mainly taken six dimensions inorder to assess the performance analysis of mushroom enterprises in Karnataka state. Dimensions were scale or size of the enterprise, infrastructure or machinery employed, social capital indicator, efficiency indicator, incremental expansion and good mushroom cultivation practices. The study carried out among 60 mushroom enterprises in Karnataka and the result showed that the dimension, efficiency indicator with highest performance and the dimensions such as infrastructure or machinery employed and scale or size of the enterprise shows poor performance.

2.3 Profile characteristics of mushroom entrepreneurs

2.3.1 Age

Mohanty *et al*. (2009) reported that around 51.25 per cent of mushroom entrepreneurs belongs to the younger age category.

Roguel (1987) observed that majority (65%) of mushroom entrepreneurs were in 44-54 years age category.

Muyal (2018) in his study indicated that 56 per cent of mushroom entrepreneurs belongs to middle age group, 22 per cent of them in younger age group and 22 per cent of them in old age group.

Verma (2007) conducted a study among the mushroom trainees and it showed that majority (60.42%) of mushroom trainees were belongs to the middle age group.

Singh *et al*. (2003) indicated that 69 per cent of the mushroom entrepreneurs belongs to middle age category of 35-50 years.

Sivanarayana (1990) stated that 60.83 per cent of the mushroom entrepreneurs were in middle age category, followed by 29.17 per cent of them in young age category and 10 per cent of them in elderly age category.

Sudakar (1994) in his study found that 78.75 per cent of mushroom entrepreneurs were in young age category, 12.5 per cent in middle age category and remaining 8.75 per cent in old age category.

Ratnasree (1992) conducted a study among the trained and untrained mushroom growers. The study results indicated that, half of the mushroom growers from both the trained and untrained sector belongs to middle age group. Followed, by 40 per cent of the trained mushroom growers and 28.33 per cent untrained mushroom growers were in young age group and remaining 10 per cent of trained mushroom growers and 21.67 per cent of untrained mushroom growers were in old age group.

Rao (1991) noticed that approximately 30 per cent of mushroom entrepreneurs were in young age category and 65 per cent of them were in the middle age category.

Kumar (2016) revealed that out of 110 mushroom entrepreneurs 48.18 per cent of them belongs to young age group, whereas 33.64 per cent belongs to middle age group and remaining 18.18 per cent belongs to old age group.

Nikitha (2019) observed that around 40 per cent mushroom entrepreneurs were belongs to the age group of 31-40 years, followed by 26.66 per cent in 41-50 years age group, 23.33 per cent in 20-30 years age group and remaining 10 per cent in 51-60 years age group.

Ganesh (2004) conducted a study among mushroom entrepreneurs and revealed that majority (76.67%) of the entrepreneurs were in the age category of 26-35 years, 12.50 per cent were below 25 years age category, 7.50 per cent in 36-45 years age category and remaining 3.33 per cent were above 46 years age category.

Singh (2011) observed that out of 50 mushroom entrepreneurs majority (58%) of them were in the age category of 31-40 years, while 20 per cent were below 30 years age category, 14 per cent were in 41-50 years age category and remaining 8 per cent were above 50 years age category.

Khajuria (2005) found that majority (70%) of the mushroom entrepreneurs were in the age category of 28-51 years, 12.58 per cent were below 28 years age category and 14.66 per cent were above 51 years age category.

Singh (2013) observed that nearly 55 per cent of the mushroom entrepreneurs were belongs to the age category varies from 35-45 years. Followed by, 20 per cent above 55 years of age category, 10 per cent were in 45-55 years of age category, 8.75 per cent were in 25-35 years of age category and remaining 6.25 per cent were in age category of up to 25 years.

Thakur (2016) observed that around 58 per cent of mushroom entrepreneurs were belongs to the age category of 20-30 years, 20 per cent were in 30-40 years age category whereas, 12 per cent were in 40-50 years age category and 10 per cent belongs to above 50 years of age category.

Tanni *et al.* (2012) conducted a study among mushroom entrepreneurs and inferred that majority (67%) of the respondents were belongs to the middle age category.

Kangotra and Chauhan (2014) revealed that majority (87%) of mushroom growers were under 60 years of age category and remaining 13% were above 60 years of age category.

Kaur (2016) pointed out that majority (58.80%) of the mushroom trainees were in the age group of 20-30 years and remaining were above 40 years of age group.

Goel and Sodhi (2013) conducted a study among mushroom trainees and concluded that majority (56%) of them were in the age group of 26-45 years.

Nagaraj *et al.* (2017) observed that most of the mushroom entrepreneurs around 68.57 per cent were in middle age group of 31-50 years, 17.14 per cent of them above 50 years were in old age group and remaining 14.28 per cent less than 30 years were in younger age group.

Sonam (2018) found that majority (56.67%) of the mushroom cultivating women entrepreneurs were belongs to young age group of 27-38 years, 31.67 per cent of them were in the middle age group of 39-49 years and remaining 11.66 per cent were in old age group of 50-60 years.

Bhoi (2018) pointed out that around 53 per cent of mushroom entrepreneurs were in the age of up to 35 years, 40 per cent of them were in between age group of 36-50 years and remaining 7 per cent of them were above 50 years of age.

Singh (1998) in his study revealed that majority (46.34%) of mushroom entrepreneurs were in young age group.

Arjun (2013) observed that majority (64%) of the mushroom entrepreneurs were in matured age category, 30 per cent of them were in old age category and remaining 6 per cent of the respondents belongs to young age category.

Gahir (2018) found that majority (54%) of the mushroom spawn producers were in the age group of 35 to 45 years.

Easin *et al*. (2017) revealed that majority (40%) of mushroom entrepreneurs were in the age group of 20-30 years.

Shirur (2015) observed that among the mushroom entrepreneurs majority (48.33%) of them belongs to the young age group.

2.3.2 Education

Mohanty *et al*. (2009) reported that around 50 per cent of the mushroom entrepreneurs were illiterate.

Roguel (1987) revealed that in his study around 66.29 per cent of the mushroom entrepreneurs had completed elementary education.

Deshmukh *et al.* (2001) pointed out that nearly 26 per cent of the mushroom entrepreneurs were illiterate, whereas 74 per cent had some formal education.

Chauhan and Sharma (2015) found that 2.50 per cent of mushroom entrepreneurs were illiterate, whereas 4.50 per cent were had least matriculate level of education and most of the mushroom entrepreneurs are literate and remaining one fourth of them were graduates.

Muyal (2018) in his study indicated that majority (34%) of the mushroom entrepreneurs possess intermediate education, 32 per cent had high school education, 16 per cent were graduates, 10 per cent had primary education and remaining 8 per cent were illiterate and post graduates. And the study also showed that none of the respondents had middle school education.

Verma (2007) pointed out that majority (41.67%) of mushroom trainees were illiterate, 27.08 per cent of mushroom trainees had middle level education, 12.05 per cent were had high school education level and 10.42 per cent were had primary education level.

Singh *et al*. (2003) indicated that in the case of education majority (50%) of the mushroom entrepreneurs were had matric level education or above matric level.

Kumar (2016) observed that majority (37.27%) of the mushroom entrepreneurs had high school level of education followed by, 26.36 per cent were collegiate and 12.73 per cent had middle school level of education.

Nikitha (2019) observed that majority (33.33%) of mushroom entrepreneurs were graduates followed by, 30 per cent of them were post graduates, 20 per cent of them were SSLC, 16 per cent had intermediate level of education and the result also showed that none of the respondents were illiterate.

Ganesh (2004) conducted a study among mushroom entrepreneurs and revealed that majority (85.83%) were graduates followed by, 7.50 per cent were post graduates and remaining 6.67 per cent had higher secondary level of education.

Singh (2011) revealed that out of 50 mushroom entrepreneurs majority (52%) had matric level of education followed by, 42 per cent had higher secondary level of education and remaining 6 per cent were graduates.

Khajuria (2005) found that majority (41.67%) of mushroom entrepreneurs had primary school education followed by, 36.67 per cent of them had middle school education and 21.66 per cent were had illiterate level of education.

Singh (2013) found that majority (57.5%) of mushroom entrepreneurs had an education upto matric level whereas, 16.25 per cent of them had primary level education, 12.50 per cent of them were illiterate, 8.75 per cent were had graduate level education and remaining 5 per cent had senior secondary level of education.

Thakur (2016) observed that a large proportion nearly 48 per cent of mushroom entrepreneurs were graduates followed by, 22 per cent had higher secondary level of education, 18 per cent had matric level of education and remaining 12 per cent of respondents were post graduates.

Tanni *et al.* (2012) indicated that majority (76%) of the mushroom entrepreneurs had secondary and above secondary level of education.

Kangotra and Chauhan (2014) observed that majority (70%) of the mushroom entrepreneurs had matric level education and remaining 30 per cent had above matric level education.

Goel and Sodhi (2013) in their study concluded that majority (76%) of the mushroom trainees were had illiterate education level.

Kaur (2016) pointed out that majority (35.3%) of the mushroom trainees were had education level up to senior secondary.

Nagaraj *et al.* (2017) observed that among the mushroom entrepreneurs around 34.28 per cent were had graduate level of education.

Sonam (2018) found that majority (26.67%) mushroom entrepreneurs had got upper primary education level followed by, 23.33 per cent of them had an intermediate level of education and 21.66 per cent had high school level of education.

Bhoi (2018) pointed out that majority (49%) of the mushroom entrepreneurs had high school level of education while, 24 per cent had college level of education, 12 per cent of them had middle school education, 7 per cent had an educational level above graduation, 6 per cent of them can read and write and remaining 2 per cent were illiterate.

Singh (1998) in his study revealed that almost 29.27 per cent of the mushroom entrepreneurs had illiterate level of education.

Arjun (2013) in his study observed that majority (32%) of the mushroom entrepreneurs had primary level of education.

Sudhakar (1994) observed that majority (42.5%) of mushroom entrepreneurs were had graduate level of education.

Gahir (2018) found that nearly 43 per cent of mushroom spawn producers were had graduate level of education.

Easin *et al*. (2017) revealed that around 60 per cent of the mushroom entrepreneurs were had secondary level of education.

Shirur (2015) observed that majority (36.67%) of the mushroom entrepreneurs were had graduate level of education.

2.3.3 Family occupation

Roguel (1987) revealed that nearly 54.32 per cent of the mushroom entrepreneurs were engaged in both mushroom and agriculture as their primary family occupation.

Bruhn *et al.* (2000) pointed out that approximately 60 per cent of mushroom entrepreneurs had perceived mushroom cultivation to be the part of their secondary family occupation.

Muyal (2018) observed that only 30 per cent of mushroom entrepreneurs had mushroom cultivation as their primary family occupation. Hence, the result also highlighted that majority (70%) of the mushroom entrepreneurs were engaged in occupations other than mushroom cultivation.

Verma (2007) pointed out that about 68.75 per cent of mushroom trainees had other family occupation than mushroom cultivation.

Kumar (2016) pointed out that almost 77.28 per cent of mushroom entrepreneurs had mushroom cultivation as their primary family occupation, followed by other secondary occupations.

Ganesh (2004) conducted a study among the mushroom entrepreneurs and revealed that majority (80%) of them had mushroom cultivation as their primary family occupation.

Singh (2013) revealed under his study that around 43.20 per cent of mushroom entrepreneurs were had mushroom cultivation as their primary family occupation. Followed by, 47.48 per cent were engaged in farming along with mushroom cultivation and remaining 9.32 per cent were engaged in other non-farming activities along with mushroom production.

In the study conducted by Thakur (2016) indicated that majority (42%) of mushroom entrepreneurs had agriculture along with mushroom cultivation as their main family occupation followed by business and other sectorial jobs.

Sonam (2018) observed that in the occupation status of mushroom entrepreneurs majority (45%) of them had business along with mushroom cultivation as their main source of family occupation followed by agriculture along with mushroom cultivation.

Singh (1998) noticed that majority (92.68%) of the mushroom entrepreneurs had mushroom cultivation as their secondary family occupation.

Arjun (2013) observed that nearly 40 per cent of the mushroom entrepreneurs had agriculture along with mushroom cultivation as their primary family occupation.

2.3.4 Income

Mohanty *et al*. (2009) reported that 53.75 per cent of mushroom growers earned around an income of Rs 24,000/- per year from mushroom cultivation.

Mamtha *et al.* (1998) noticed that mushroom entrepreneurs had generated a net income of Rs 94,845/- per year from mushroom cultivation.

Khatkar *et al.,* (2005) pointed out that by selling one kilogramme of mushroom for Rs 36/-, the entrepreneur can make a net profit of Rs 13.70/-. By growing mushrooms on 40 square metres and the entrepreneur can earn a net return of Rs 21,654/-. According to their marketing cost and price study, the producer's share of the consumer rupee was about 60 per cent. It was also determined that mushroom cultivation is a financially viable enterprise that provides farmers with gainful employment.

Singh (1998) found that fresh mushrooms account for about 90 per cent of the overall income generated by entrepreneurs through mushroom cultivation.

Celik and Peker (2009) stated that the average cost of one kilogramme of mushroom was USD 1.36, while the average selling price was USD 1.54.

Singh and Suresh (2007) in their study revealed that in a 16 square feet mushroom shed, a mushroom producer can earn a net profit of rupees ranging between Rs 4,000/- to Rs 11,000/- per year from mushroom cultivation.

Sran *et al*. (2008) in his study stated that the small entrepreneurs for cultivating mushroom round the year follows two rotations mainly. And the result showed that they had earned a net profit of Rs 12,167/- in the first season and in the later season they had earned around Rs 10,921/-.

Sharma (1999) observed that on small, medium and large mushroom farms cost benefit ratio of mushroom production yielded net income of Rs 5.72/-, Rs11.53/- and Rs 13.83/-, correspondingly. As a result, large farms seem to be the most cost-effective and efficient size of mushroom production unit and should be adopted on a wide scale to get better outcomes.

Tripati (1995) found that the cost-benefit analysis of mushroom cultivation revealed a net income of Rs 4.63/-, Rs 6.95/- and Rs 9.22/- per kg for small, medium and large producers.

Khare *et al*. (2009) indicated that mushroom entrepreneurs market the mushroom at a rate of Rs 35/- to Rs 45/- per kilogram. The results also revealed that around Rs 4,000/- can earn for a mushroom entrepreneur in a growing season.

Prasad *et al.* (2010) indicated that mushroom entrepreneurs were earned a price range lying between Rs 40/- to Rs 52/- per kg.

Nanda (2011) found that large scale mushroom entrepreneurs are earning an income of approximately Rs 4,38,000/- annually from mushroom enterprise. This mainly achieves through various mushroom related activities such as spawn selling, mushroom processing and fresh mushroom selling.

In his study Kumar (2016) pointed out that majority (57.27%) of the mushroom entrepreneurs had medium level of income from mushroom enterprise, followed by 23.64% persons belongs to high income category.

Ganesh (2004) conducted a study among mushroom growers and revealed that most of the mushroom entrepreneurs 88.33 per cent availed an income of Rs 84,198/- from the mushroom enterprise.

Sharma *et al.* (2007) stated that majority of mushroom entrepreneurs had earned an income with in a range between Rs 6,675.30/- to Rs 41,478. 82/- anually. The study findings also showed that the supply of fresh mushrooms contributed roughly 87.68 percent of the mushroom enterprise's revenue.

Aswathi *et al.* (2015) in their study indicated that the total income from 100 kg mushroom substrate lies between Rs 6,000/- to Rs 8,000/-.

Meena *et al*., (2019) revealed that in their study nearly 7000 mushroom entrepreneurs were involved in mushroom production and earns around a Rs 35,000/- to Rs 50,000/- per month through fresh mushroom production alone. Whereas, mushroom entrepreneurs who were engaged in both production and processing of mushroom were earned around a Rs 1,50,000/- to Rs 2,50,000/- per month.

Sharma (2018) pointed out that monthly income earned by most of the mushroom entrepreneurs were in the range between Rs 25,000/- to Rs 30,000/-.

Singh *et al*. (2018) pointed out that total revenue from 100 kg wheat straw varied between Rs 6,400/- to Rs 12,000/- with a net income of Rs 4,650/- to Rs 12,000/- in six months, indicating the financial viability of mushroom cultivation.

Nagaraj *et al.,* (2017) pointed out that nearly 68.57 per cent of the mushroom entrepreneurs had low income level from the mushroom enterprise.

2.3.5 Size of production unit

Shirur (2015) observed that majority (71.67%) of the mushroom entrepreneurs had less than 1500 square feet as their production unit size.

Celik and Peker (2009) stated that the average production area in Kenya was observed to be 1135.1 square metres.

Singh and Kalra (1995) in their study a sample of 70 mushroom entrepreneurs were taken from Kakroi and 30 from Bhadana village of Sonipat district of Haryana. And the results revealed that, in the economic analysis of mushroom production large entrepreneurs with a production unit size above 2000 square feet had earned a higher income than the medium and small entrepreneurs.

2.3.6 Type of mushroom shed

Kumar (2016) revealed that majority (58.18%) of mushroom entrepreneurs had semi pucca type shed for mushroom cultivation, 28.18 per cent had pucca shed and remaining 13.64 per cent had kutcha shed for mushroom cultivation.

2.3.7 Yield

Das (2000) stated that the total number of mushroom beds often used by mushroom entrepreneurs ranged from 22 to 92 beds, with an average yield per bed of 1.08 to 1.20 kg.

Celik and Peker (2009) stated that majority of the mushroom entrepreneurs had an average yield of 45.4 kg per square metre.

Chauhan and Sood (1992) in their study a sample of 50 mushroom farms from 12 villages in the Solan district of Himachal Pradesh were taken. On average, each farm produced 360 kg of mushroom, with more than 85 percent of it being sold.

Acosta and Chavez (2010) revealed that a mushroom unit cottage could hold 600 spawned bags, each containing 1.5 kg of new substrate. Each production unit collected an average of 2.5kg of *Pleurotus sp* (fresh mushroom), resulting in a massive mushroom production of approximately above 150 kg each cycle (1.66 kg per day) and a biological efficiency of 25 per cent.

Khare *et al*. (2009) stated that majority of the mushroom entrepreneurs produce oyster mushroom with a production of 100 kg per year.

Kumar (2016) observed that majority (62.73%) of mushroom entrepreneurs had obtained an average yield of 500 to 700 grams per mushroom bed. Followed by, 37.27 per cent of mushroom growers had obtained a yield of 700 gram to 1 kg per mushroom bed.

Aswathi *et al.* (2015) stated that majority of the mushroom entrepreneurs had obtained yield between 60-80 kg/100 kg substrate.

Easin *et al.* (2017) revealed that majority (70%) of the mushroom entrepreneurs had a mushroom production of 1-3 kg/day.

Sharma (2018) noticed that importance of mushroom cultivation is increasing nowadays and majority of the mushroom entrepreneurs are producing 50-70 kg of mushroom per day.

Singh *et al*. (2018) pointed out that mushroom yield varies between 80 to 120 kg/100 kg wheat straw.

Prasad *et al.* (2010) indicated that moderate yield of mushroom from one spawn packet varies between 0.90 kg to 1.10 kg

2.3.8 Experience

Oseni (2007) pointed out that most of the mushroom producers around 68 per cent had less than two years experience, 24 per cent of them had three to five years experience, 8 per cent had six to eight years experience, 4 per cent had nine to eleven years experience and remaining 2 per cent had eleven years experience in mushroom cultivation.

Sawant (1999) observed that majority (78%) of the mushroom entrepreneurs had an experience varies from three to fifteen years in mushroom cultivation.

Shirur (2015) observed that nearly 55 per cent of the mushroom entrepreneurs had an experience between 2 to 5 years.

Ganesh (2004) pointed out that majority (66.67%) of mushroom entrepreneurs had an experience of 7 to 12 months, 21.66 per cent had an experience up to 6 months, whereas 6.67 per cent had an experience up to 13 to 18 months and the remaining 5 per cent had an experience above 19 months.

In the study conducted by Thakur (2016) revealed that a large proportion nearly 80 per cent of the mushroom entrepreneurs had more than 10 years experience in mushroom cultivation. Whereas, 10 per cent of them had an experience in between15 to 20 years and remaining 6 per cent had an experience of above 20 years.

Kangotra and Chauhan (2014) in his study depicted that almost 51.43 per cent of mushroom entrepreneurs had five years experience, whereas 48.57 per cent of respondents had an experience between 5 to 7 years.

Singh (1998) in his study found that majority (75.61%) of the mushroom entrepreneurs were cultivating mushroom for the past seven years.

Tanni *et al*. (2012) in his study observed that nearly 73 per cent of the mushroom entrepreneurs had almost above two years of experience in mushroom cultivation.

2.3.9 Source of labour

Kumar (2016) observed that around 42.74 per cent of mushroom entrepreneurs had family labour with 3 to 4 members. Whereas, 30.90 per cent of them had family labour with 1 to 2 members and remaining 26.36 per cent with 5 to 6 members.

Ganesh (2004) in his study observed that majority (46.67%) of mushroom entrepreneurs had family labourers.

Singh (2011) revealed that majority (86%) of mushroom entrepreneurs had hired labour, whereas 14 per cent of them had family labour.

Prasad *et al.* (2010) conducted a study on mushroom cultivation and revealed that in recent years women's group labours especially living in the rural area are mostly engaged in mushroom production through the Self-Help Groups (SHGs).

2.3.10 Marketing avenue

Gold *et al*. (2008) observed that majority of the mushroom entrepreneurs sell their shiitake mushrooms locally. The major markets for shiitake mushrooms were recognized to be gourmet restaurants, farmers markets and on-farm stores.

In the study conducted by Thakare and Gupta (2004) a total of 64 mushroom entrepreneurs were selected from four blocks of three districts in Chhattisgarh. The study revealed that among all the small mushroom entrepreneurs the producer-consumer channel was most popular. Whereas, the medium and large entrepreneurs prefer the producer-retailer-consumer channel.

Patra (1995) revealed that cultivation of mushroom by rural and urban mushroom entrepreneurs were marketing in many places which includes snack shops, fruits and vegetable shops and certain other local markets.

Ferdousi *et al*. (2019) pointed out that the mushroom enterprises present marketing networks, and it demonstrate the participation of three mediators such as retailers, wholesalers and mushroom training centres. Oyster mushroom is the most common mushroom and it caters especially among tiny niche market that includes city dwellers, institutional consumers such as restaurants, large mushroom farms, NGOs, schools, colleges, universities and cantonment canteens. Whereas, button mushroom were marketing mainly to Chinese restaurants and pharmaceutical companies.

Parida (2002) noted that majority of the mushroom entrepreneurs (85%) of them market their fresh mushroom and products in the city markets, while 25 per cent of them sell in local markets.

Beetz and Kustudia (2004) pointed out that majority of mushroom entrepreneurs were marketing directly to end customers, restaurants and supermarkets because this will provide a higher pricing than selling to wholesalers.

Martinez *et al.* (2019) investigated about the distribution networks for wild and cultivated mushrooms in Central Mexico. For this study a big metropolis in Mexico, two medium cities, and a rural village were chosen as representative locations. Middlemen, wholesalers, merchants, public marketplaces, retail food shops and food services were all recognised and defined as marketing channels.

Mamtha *et al*. (1999) observed that most of the mushroom entrepreneurs in Karnataka state opted Horticultural Produce Cooperative Marketing Society Limited (HOPCOMS) and retailers as their main market mediators. Small farmers supplied 54 per cent of their produce to HOPCOMS, 33 per cent to retailers, 11 per cent to customers directly and only 2 per cent to hotels.

Hazledine and Huang (1990) defined that mushrooms were produced by the British Columbia Mushroom Marketing Board, which possessed monopoly marketing rights in British Columbia. Entrepreneurs may sale into the fresh market or to mushroom processors, thus preventing consumer arbitrage from equating the prices in the two marketing sectors.

Sivaprakashan and Sethraman (1995) observed that mushrooms cultivated by urban and rural producers were sold locally as well as in other cities beyond the production plants, which is similar to marketing of vegetables and fruits.

Kumar (2016) found that majority (53.64%) of mushroom entrepreneurs were marketed mushrooms to local market, 40.90 per cent marketed to city market and remaining 5.46 per cent were marketed to trader market.

Bhoi (2018) noticed that a high proportion around 76 per cent of the mushroom entrepreneurs market their mushroom products directly to traders.

Singh (2011) revealed that approximately 54 per cent of mushroom entrepreneurs were selling their mushrooms within the city, while 36 per cent of them were selling in their whole district and remaining 10 per cent in their village or town.

2.3.11 Mode of transport for sale of goods

Singh (2011) pointed out that majority (76%) of the mushroom entrepreneurs use their own vehicles as a mode of transport for marketing fresh mushroom and its products whereas, 24 per cent of entrepreneurs use public vehicles for transportation.

Bhoi (2018) observed that majority of the respondents use their own vehicle for transportation of fresh mushroom and its products.

2.3.12 Economic motivation

Shirur (2015) observed that majority (36.67%) of the mushroom entrepreneurs were had medium level of economic motivation.

2.3.13 Risk orientation

Sivanarayana (1990) stated that majority (61.67%) of mushroom entrepreneurs had medium risk orientation, followed by 29.17 per cent had high risk orientation and 9 per cent had low risk orientation.

Sudakar (1994) in his study found that about 83.75 per cent of the respondents had medium risk orientation, whereas, 8.75 per cent had high risk orientation and remaining 7.50 per cent had very low risk orientation.

Ratnasree (1992) conducted a study among trained and untrained mushroom growers. The study revealed that 70 per cent of the trained and 50 per cent of the untrained mushroom growers had medium level of risk orientation whereas, 30 per cent trained and 20 per cent untrained mushroom growers had high level of risk orientation.

Ganesh (2004) pointed out that 72.50 per cent of mushroom entrepreneurs had medium level of risk orientation followed by 17 per cent had low level of risk orientation and remaining 10 per cent had high level of risk orientation.

Shirur (2015) pointed out that around 43.33 per cent of mushroom entrepreneurs had medium level of risk orientation.

2.3.14 Extension contact

Parida (2002) found that around 52 per cent of mushroom entrepreneurs had extension contact with their peers and friends, 17 per cent with agriculture officers and remaining 11 per cent had contact with local change agent.

Satapathy (2007) noticed that almost 30 per cent of mushroom entrepreneurs were having contact with block extension officers, 25 per cent of respondents with agricultural scientists and the remaining 15 per cent with their friends and neighbours.

Kumar (2016) stated that almost 66.66 per cent of mushroom entrepreneurs had contact with mushroom training centres such as DRDA, CIFA and ATMA followed by, KVK, NGO, agricultural office *etc*.

Thakur (2016) observed that majority (70%) of the mushroom entrepreneurs had extension contact with the horticulture development officers followed by, agricultural officers and scientists of DMR at Solan.

Tanni *et al*. (2012) observed that majority (60.4%) of mushroom entrepreneurs had medium level of extension contact.

Shirur (2015) observed that majority (56.67%) of mushroom entrepreneurs had medium level of extension contact.

2.3.15 Institutional support

Singh and Narian (1974) stated that mushroom training programme were given to mushroom entrepreneurs who plays an important role in supplementing the government's efforts.

Vijaykhudar (1994) pointed out that mushroom entrepreneurs had much more positive opinion on mushroom production after receiving proper training and demonstrations.

Deshmukh *et al*. (2001) observed that majority (41%) of the mushroom entrepreneurs were willing to engage in mushroom production training, whereas 59 per cent of them were uninterested in mushroom production training.

Barman *et al.* (1999) noticed that majority of the off-campus mushroom training participants have chosen mushroom cultivation for household consumption.

Kamal *et al*. (2009) in their study mushroom production in Bangladesh. It was noted that 92 per cent of mushroom entrepreneurs were taken training of mushroom cultivation whereas, remaining 8 per cent of them were untrained mushroom entrepreneurs.

Patra (1995) stated that schemes worth Rs 10,000 and Rs 1,00,000 for mushroom cultivation and Rs 1,00,000 for spawn production, which had been authorised by NABARD and were being supported by Gramya banks sponsored by DRDA and DIC under the IRDP and PMRY, correspondingly.

Singh *et al.* (2008) noticed that the major institutional support for mushroom enterprises were given by State Horticulture Mission (SHM) and Krishi Vigyan Kendra (KVK).

Biswas (2014) revealed that majority of the mushroom entrepreneurs had an increase in both the total mushroom production of nearly 88 per cent and in productivity about 89 per cent, which was noted after receiving proper institutional support like training and subsidy.

Shirur *et al.* (2016) observed that the various institutional support provided to the mushroom entrepreneurs in the form of trainings and researches, mainly provided by the institutions such as SAUs, KVKs, SHM and Research Organisations.

2.4 Constraints faced by mushroom entrepreneurs

The study conducted by NRC for Mushroom (2004-2005) stated that marketing, non-availability of spawn in rural regions, financial facilities, receiving poor trainings in mushrooms and mobility are the major constraints faced by entrepreneurs in mushroom production.

Chandrasekhar *et al.* (2001) stated that mushroom growers are mainly dealing with the implications of an oversaturated market and distressed sales. The storage of fresh mushrooms at the level of the producer, distributor, retailer and consumer degrades their quality and causes financial losses in mushroom cultivation.

Jahan and Moonmoon (2010) in their study indicated that the major constraints faced by mushroom entrepreneurs in mushroom production were unavailability of spawn, pest and disease attack and poor quality of spawn for mushroom production.

Thakare and Gupta (2004) stated that the major constraint of mushroom growers were less availability of mushrooms in the market, thus the market functionaries were less involved. This remained as the primary problem that mushroom entrepreneurs were mainly faced with respect to the marketing sector.

Singh and Suresh (2007) stated that the primary issues in mushroom production were found to be a lack of funding from government organisations, shortage of quality spawn, high price for spawn, pest and disease concerns and lack of subsidies and schemes from government organisations.

Chauhan and Sharma (2015) revealed that the most common challenge faced by mushroom growers were lack of hatched mushroom bags in sufficient quantities, followed by pest and disease outbreaks for which the services of technocrats are frequently necessary to maintain adequate benefits. Growers were unable to meet their demand for spawn and compost because nearby public units preparing it were unable to meet it. The quality of spawn for mushroom cultivation provided by public units was

determined to be poor. All types of mushroom units such as both production and processing were affected by the problem.

Kangotra and Chauhan (2014) reported that the major problems faced by the mushroom entrepreneurs were inadequate supply of spawned compost bags, lack of remunerative prices for fresh and processed mushrooms in the market, poor quality spawn, non-availability of casing material and incidence of pest and diseases.

Singh *et al*. (2011) stated that the major constraints faced by mushroom entrepreneurs were marketing issues which mainly arises from December to February, especially during the winter months. If more than 75 per cent of the annual production of mushroom is available for sale for a short time and market area. Entrepreneurs are obliged to sell their mushroom products at highly uncompetitive rates as a result of an oversupplied market. Rather than seeking assistance, private processors are enticed to take advantage of the situation for their benefit.

Marshall and Nair (2009) stated that the first obstacle which every mushroom entrepreneurs must want to be overcome include determining the best mushroom to cultivate, identifying a spawn provider, combining available resources to build a growing system and analysing requirements for supplying various marketing outlets.

Vashist and Sashi (2007) pointed out that lack of space, lack of time, lack of coordination, lack of marketing outlets and lack of storage facilities were the major constraints faced by the mushroom entrepreneurs.

Singh and Singh (2006) conducted a study in mushroom marketing pattern of two districts of Haryana, among 100 mushroom entrepreneurs, 12 wholesalers and 10 retailers. And the study indicated that marketing is the major problem enlightened by the small, medium and large mushroom entrepreneurs. This includes the type of mushroom farm, lack of a proper agency to purchase the mushrooms, longer distance to sell the mushrooms and certain purchasing agency corrupt practices.

Kunwar (2002) stated that the major constraints highlighted by the rural mushroom entrepreneurs were the difficulty in marketing of both the fresh mushrooms and the mushroom value added products.

Paul *et al.* (2001) indicated that the major constraints faced by mushroom entrepreneurs were lack of skill and knowledge in mushroom cultivation, lack of storage facilities, lack of education about mushroom nutritional and medicinal benefits, heavy losses due to perishability of mushroom and difficulty in availing loans for mushroom cultivation.

Deshmukh *et al*. (2001) indicated that majority (78.95%) of the mushroom entrepreneurs were facing marketing challenges. While 94.00 per cent of the mushroom entrepreneurs encountered a major challenge throughout the summer season due to excessive temperatures and humidity. Other major constraints faced by mushroom entrepreneurs includes, about 85 per cent of them were had problem with lack of cold storage facilities, 77 per cent of them with lack of funds, 61 per cent of them with lack of availability of quality spawn and remaining 57 per cent of them with lack of skilled labour.

Shilaja *et al.* (1997) observed that non-availability of financial assistance and lack of spawn availability were the major constraints faced by women mushroom entrepreneurs in Kerala.

Khurana and Sharma (1995) concluded that various constraints faced by mushroom entrepreneurs were inability to get compost in a timely manner and in required quantity, erratic production, complicated spawn production techniques, availing of late payments from government institutions and a lack of technical oriented training in mushroom production at the commercial level.

Kohli (1991) observed that the major limitations for deactivating mushroom practises by mushroom entrepreneurs after 2-3 years were due to its high cost of production, lack of proper guidelines for consistent profitable harvest and lack of credible literature on major components. He asserts that mushroom entrepreneurs have also been affected by the government excise and electricity authorities due to the lack of any concession facilities on air conditioners, cold storage facilities, spawn producing laboratories *etc*.

Joseph *et al*. (1991) noted that the key constraints of mushroom production were shortage of organizational support to deliver infrastructural facilities and high-quality spawn to prospective growers on a timely manner, as well as the lack of adequate post-harvest preservation methods.

Gurja (2004) revealed that the major constraints faced by the mushroom entrepreneurs were lack of availability of spawn suppliers enterprises, poor quality substrates and variations in environmental conditions such as temperature, light and humidity affecting the growth of the fruiting body.

Mohanty *et al*. (2009) concluded that lack of space, lack of time, unavailability of straw and spawn were the most befalling constraints faced by the mushroom entrepreneurs.

Saikia *et al*. (2013) in their study constraints faced by mushroom entrepreneurs were classified into four types such as production, marketing, financial and social constraints with varying degrees. The major production constraints include non-availability of drying facilities, lack of spawn supplying enterprises, shortage of labour and insect infestations. Marketing constraints faced by mushroom entrepreneurs were lack of regular market supply and less consumer demand for the fresh mushrooms. Financial constraints were lack of support from government institutions and lack of funds. Social constraints include lack of awareness about mushroom cultivation and fearness about the toxicity and allergic problem of mushroom.

Patnayak and Mishra (2008) revealed that the major constraints faced by the women mushroom growers were lack of marketing outlets, infection from pest and diseases, spawn infection, low risk taking ability, lack of skill and knowledge about cultivation aspects of mushroom, lack of knowledge about mushroom value addition, non-availability of spawn and paddy straw during the cultivation time, lack of transportation facilities and lack of subsidies availing from government institutions for mushroom cultivation.

Singh *et al*. (2008) found that the major constraints faced by the mushroom entrepreneurs were lack of marketing facilities, fluctuation in mushroom market price, lack of information about mushroom marketing, lack of institutional support, lack of

knowledge about mushroom production and processing technology, lack of processing and cold storage facilities, lack of infrastructural facilities, lack of funds and non-availability of quality spawn in time.

Nikitha (2019) revealed that major constraints faced by mushroom growers were high labour costs, non-availability of equipment's, lack of awareness, poor quality spawn and compost bags, lack of extension facilities, infestation of pest and diseases, lack of marketing outlets, lack of remunerative price for mushroom, delayed payments from government institutions, lack of transportation facilities, high cost for transportation and limited knowledge about the market information.

Sagar (2001) inferred that the major obstacles faced by mushroom growers includes lack of storage facilities, shortage in obtaining training facilities, lack of spawn, non-availability of funds from government organisations and lack of knowledge in preparation of farm design.

Shirur (2015) revealed that the major obstacles faced by the mushroom entrepreneurs were high electricity costs, insufficient electricity supply, lack of knowledge in production and processing techniques, exploitation by consumers, long gestation period, lack of skilled labour, poor quality spawn and pest and disease infestations.

Job and Geetha (2010) observed that the major problems faced by the mushroom entrepreneurs in Kerala were low yield due to pest and disease infestation, lack of input facilities, lack of awareness about the benefits of nutritional and medicinal qualities of mushroom and its value added products among the people.

Tamilselvi and Kumar (2009) found that major problems faced by the mushroom entrepreneurs were lack of knowledge on mushroom production and processing, non-availability of marketing outlets, non-availability of storage facilities, difficulties in the preparation of spawn production, perishability losses and lack of awareness about mushroom benefits among the people.

Kumar and Ban (1994) pointed out that the major constraints faced by mushroom entrepreneurs were lack of availability of spawn, lack of technical knowledge, lack of quality in training programmes, financial and marketing problems,

lack of awareness about mushroom benefits especially in the domestic markets of rural areas, infection from various biotic and abiotic agents and losses due to postharvest.

Kumar (2016) stated that the major constraints faced by the mushroom entrepreneurs includes lack of family support, less exposure to outside, lack of technical skills, lack of credit facility, lack of marketing channels, high labour cost, contamination of mushroom spawn, pest and disease infestation and delay of subsidies from government institutions.

Sonam (2018) in his study observed that the major obstacles faced by the mushroom entrepreneurs were lack of joint decision in implementation of work, lapse in moisture level and controlled temperature, lack of proper marketing outlets and poor quality mushroom spawn.

Kumari *et al.* (2018) pointed out that majority of the mushroom entrepreneurs were confronted with the obstacles such as lack of marketing channels, distantly located market avenues, lack of support from government organisations, non-availability of quality spawn and risk involved with the highly perishable nature of mushrooms.

Roy *et al.* (2020) conducted a study in West Bengal and revealed that the major constraints faced by mushroom entrepreneurs were unavailability of quality spawn, high cost for mushroom production and poor supply of quality spawn at the right time, lack of knowledge about nutritive value of mushroom and lack of local market availability.

Singh *et al.* (2017) observed that majority (98%) of the mushroom entrepreneurs were facing problem with non-availability of quality spawn in time, 93 per cent of them had lack of knowledge about mushroom cultivation, 75 per cent of them were facing the problem regarding moisture content during compost preparation and remaining were facing the obstacle with respect to price fluctuations of fresh mushrooms in the market.

2.5 Extension interventions

Shirur *et al.* (2016) pointed out that the institutions such as Indian Institute of Horticultural Research, Bangalore and Bio Center, Hulimavu adopted the extension interventions in mushroom production. Both of the above institutions had begun

supplying ready-to-fruit (RTF) spawned compost bags to small mushroom entrepreneurs for small-scale household consumption and marketing from 2014 onwards. This extension intervention was well received by the public because, it aimed to increase mushroom consumption and disseminate farming technologies of mushroom especially among the starters and enthusiastic mushroom entrepreneurs.

Gold *et al*. (2008) pointed out that the subsidies for local mushroom producers for mushroom production and direct marketing, were listed as policies that aided in the foundation of a shiitake mushroom company in the United States. As a result, this extension intervention ready-to-fruit (RTF), its sale and distribution among small mushroom producers in India were also started.

Research methodology

CHAPTER III
RESEARCH METHODOLOGY

Research methodology deals with the fundamental congruence of the study for doing the research work within the context of the objectives. Methodology encompasses the construction of various measuring devices used for collection of data, statistical methods, tools, techniques and approaches. This chapter explains the precise methodology that was established for the current study to explore numerous factors in line with the stated objectives. This chapter is organised under the following subheadings:

3.1 Research design

3.2 Location of the study

3.3 Sample and Sampling procedure

3.4 Selection of variables and their measurements

3.5 Operationalization of independent variables

3.6 Operationalization of dependent variable

3.7 Data collection method

3.8 Statistical tools

3.1 Research design

Research design is the structure for the methods and approaches selected by a researcher. It authorize researchers to focus on research methodologies that are appropriate for the selected topic and establish their research for accomplishment. According to Kerlinger (1978), research design is a plan, structure and strategy of investigation conceived so as to obtain answers to research questions and to control variance. In the present study the research design used was exploratory in nature. Exploratory research design is used when there are little or no previous studies conducted to which information can be referred. This design will diagnose the problem of the research area and scrutinize all kind of research questions. The main intention of

exploratory research design, is to focus on game insights and knowledge mostly with the subject area in order to conduct a more thorough analysis later.

3.2 Location of the study

The current study was conducted in Thrissur and Palakkad districts of Kerala. Criterion based random sampling was used for selection of both the districts, having the highest number of mushroom units under SHG's, RKVY including the home-scale based micro producing units.

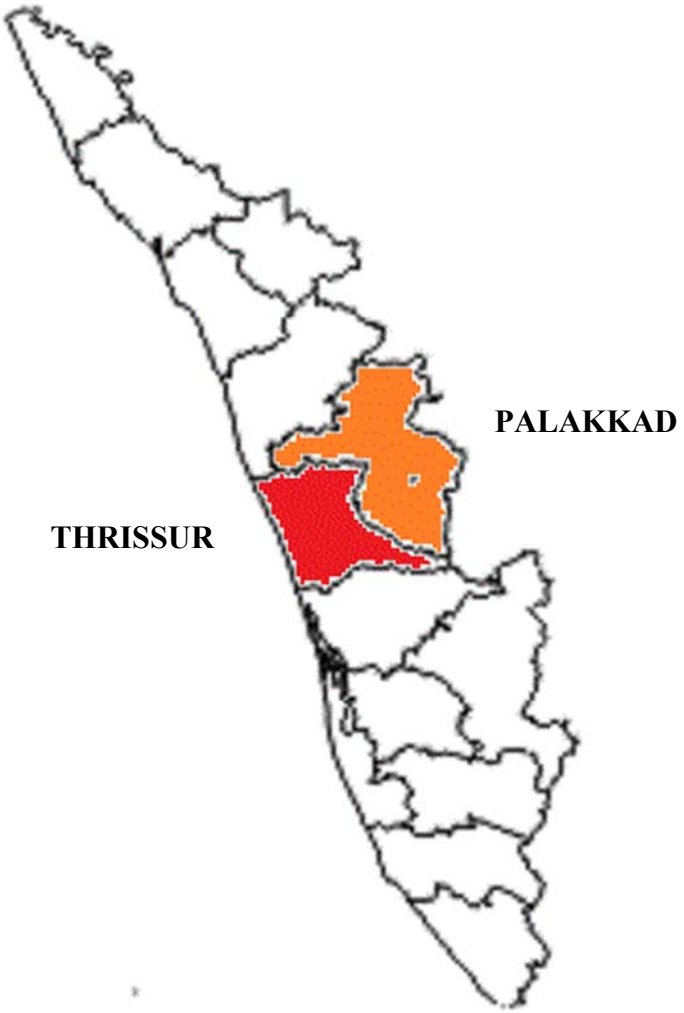


Figure 1: Map showing the study locations in Kerala

Thrissur district

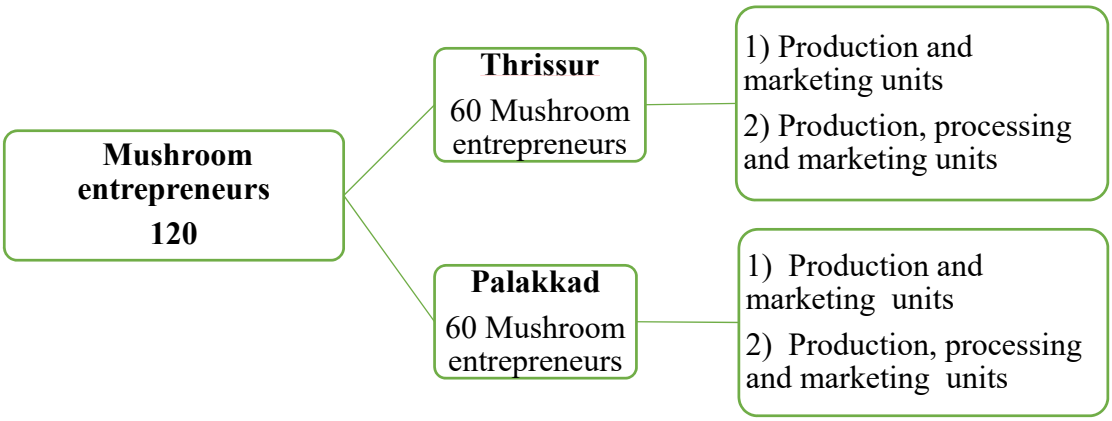
Figure 2: Map of the study location : Thrissur district

Palakkad district

Figure 3 : Map of the study location : Palakkad district

3.3 Sample and sampling procedure

Mushroom units promoted under SHGs, RKVY including the home-scale based micro producing units were considered for sample selection. Data collection was carried out among 120 mushroom entrepreneurs. Sixty mushroom entrepreneurs each from Thrissur and Palakkad districts, mainly engaged in production (spawn / mushroom) and marketing; production, processing and marketing were randomly selected for the study.



3.4 Selection of variables and their measurements

For the present study, considering the objectives seventeen independent variables were selected based on judges rating with the thirty expert extension professionals. The independent variables which had obtained highest mean relevancy score on judges rating were taken for the study. The independent variables selected were age, educational qualification, family occupation, size of production unit, income per season, type of mushroom shed, yield per season, experience, source of labour, marketing avenue, mode of transport for sale of goods, mobility, economic motivation, risk orientation, extension contact, institutional support and equipment's. The dependent variable of the study was performance of mushroom unit. The performance of mushroom units includes several dimensions such as Social Capital Indicators (SCI), Good Mushroom Cultivation Practices (GMCP), Efficiency Indicators (EI) and Incremental Efficiency (IE).

Table 1: List of variables and their measurements

SI.NO	Variables	Measurements
Independent variables		
1	Age	Singh (2011) with Modification
2	Educational qualification	Bhoi (2018) with Modification
3	Family occupation	Developed for the study
4	Size of production unit	Developed for the study
5	Income per season	Developed for the study
6	Type of mushroom shed	Developed for the study
7	Yield per season	Developed for the study
8	Experience	Developed for the study
9	Source of labour	Developed for the study
10	Marketing avenue	Developed for the study
11	Mode of transport for sale of goods	Developed for the study
12	Mobility	Developed for the study
13	Economic motivation	Scale developed by Singh (1991) with Modification
14	Risk orientation	Scale developed by Supe (1969) with Modification
15	Extension contact	Shirur (2015) with Modification
16	Institutional support	Developed for the study
17	Equipments	Developed for the study
Dependent variable		
1	Performance of mushroom units	Shirur *et al*., (2018)

3.5 Operationalization of independent variables

3.5.1 Age

Age is operationally defined as the chronological years completed by the mushroom entrepreneurs during the time of data collection. Age of the mushroom entrepreneurs was grouped into four, based on the data obtained. And it was measured using the scoring procedure developed by Singh (2011) with suitable modifications.

Table 2: Procedure for scoring age

Sl. No	Age category	Score
1	Less than or equal to 30 years	1
2	31 – 40 years	2
3	41 – 50 years	3
4	Above 50 years	4

3.5.2 Educational qualification

Educational qualification can be operationally defined as the highest level of formal education accomplished by the mushroom entrepreneurs at the time of data collection. Educational qualification was categorised into seven groups and it was measured using the scoring procedure developed by Bhoi (2018) with suitable modification.

Table 3: Procedure for scoring educational qualification

Sl. No	Educational qualification category	Score
1	Illiterate	0
2	Primary education	1
3	Secondary education	2
4	High school	3
5	Higher secondary	4
6	Graduate	5
7	Post graduate	6

3.5.3 Family occupation

Family occupation is operationally defined as the means for major occupation or livelihood of the mushroom entrepreneurs family through which they earns income, and enables the family to sustain. The family occupation was categorised into various categories on the basis of data obtained during the present study. The classification followed is depicted on the table below.

Table 4: Procedure for scoring family occupation

Sl. No	Family occupation category	Score
1	Mushroom	1
2	Mushroom + Agriculture	2
3	Mushroom + Retired employment + Agriculture	3
4	Mushroom + Business	4
5	Mushroom + others	5

3.5.4 Size of production unit

Production unit size is operationally defined as the floor area of the mushroom unit in square feet, utilized by the mushroom entrepreneurs for mushroom cultivation. The production unit size was classified into three groups based on the data obtained during investigation viz. less than 250 sq. feet, 250 – 500 sq. feet and above 500 sq. feet.

Table 5: Procedure for scoring size of production unit

Sl. No	Size of production unit (Sq. feet) category	Score
1	Less than 250	1
2	250 – 500	2
3	Above 500	3

3.5.5 Income per season

Income per season is operationally defined as the money earned by the mushroom entrepreneurs during one season of mushroom cultivation. It includes all the earnings received from both production and processing of mushroom. Based on the data obtained during the investigation the income per season is classified into various categories, as shown below.

Table 6: Procedure for scoring income per season

Sl. No	Income per season category	Score
1	Less than Rs 25,000/-	1
2	Rs 25,000/- – Rs 50,000/-	2
3	Above Rs 50,000/-	3

3.5.6 Type of mushroom shed

Mushroom shed type is operationally defined as the shed structure which is used for mushroom cultivation by the mushroom entrepreneurs. The mushroom shed type was grouped into various categories on the basis of data obtained during the investigation, as shown below.

Table 7: Procedure for scoring type of mushroom shed

Sl. No	Type of mushroom shed category	Score
1	Kutcha	1
2	Pucca	2
3	Kutcha and pucca	3
4	High-tech	4
5	Kutcha and High-tech	5

3.5.7 Yield per season

Yield per season can be operationally defined as the total productivity (kg) of mushroom obtained during one season of mushroom cultivation. The yield per harvest from single mushroom bed multiplied with the total number of harvest possible in that single mushroom bed was calculated. Then the total yield obtained from the single mushroom bed was multiplied with the total number of mushroom beds cultivated in that particular season and this value is taken as the yield per season. The yield will varies among different mushroom entrepreneurs based on the number of mushroom beds they cultivated during one season.

Table 8: Procedure for scoring yield per season

Sl. No	Yield per season category	Score
1	Less than 100 kg	1
2	100 kg – 150 kg	2
3	Above 150 kg	3

3.5.8 Experience

Experience is operationally defined as the number of years of involvement of mushroom entrepreneurs in mushroom cultivation. Based on the data obtained during the study the experience of mushroom entrepreneurs was categorised into four categories, as shown below.

Table 9: Procedure for scoring experience

Sl. No	Experience category	Score
1	Less than one and half years	1
2	One and half to three years	2
3	Three and half to five years	3
4	More than 5 years	4

3.5.9 Source of labour

Source of labour is operationally defined as the utilization of various type of manpower resources available for mushroom cultivation. In the present study based on the data obtained from mushroom entrepreneurs the source of labour was categorised into three categories, as shown below.

Table 10: Procedure for scoring source of labour

Sl. No	Source of labour category	Score
1	Permanent labour	1
2	Temporary labour	2
3	Family / group labour	3

3.5.10 Marketing avenue

Marketing avenue is operationally defined as the place where the mushroom entrepreneurs market their produce. It includes both fresh mushrooms and processed products from mushroom. Based on the data obtained during the time of investigation, the nature of marketing of mushroom entrepreneurs was broadly categorised into various categories, as shown below.

Table 11: Procedure for scoring marketing avenue

Sl. No	Marketing avenue category	Score
1	Directly to consumers	1
2	Directly to consumers and local markets	2
3	Directly to consumers and town markets / super markets	3
4	Directly to consumers and sold to wholesalers	4
5	Directly to consumers, local markets and sold to wholesalers	5
6	Directly to consumers, town markets / super markets and sold to wholesalers	6

3.5.11 Mode of transport for sale of goods

Mode of transportation for sale of goods is operationally defined as the transportation mode opted by the mushroom entrepreneurs to market their produce at respective marketing locations.

Table 12: Procedure for scoring mode of transport for sale of goods

Sl. No	Mode of transport for sale of goods category	Score
1	Own vehicle	1
2	Own vehicle and through public conveyance	2
3	Group owned vehicle	3
4	Group owned vehicle and through public conveyance	4

3.5.12 Mobility

Mobility is operationally defined as the extent to which mushroom entrepreneurs travel often to different locations for various purposes. The purposes includes mainly mushroom enterprises, general purposes, agriculture related purposes, entertainment purposes and also for marketing purposes. The mobility was measured based on the frequency of visit to four locations viz. local areas, nearby panchayath, nearby town and distant town. In the present study, mobility was measured on the basis of the responses attained during investigation, and the percentange of mushroom entrepreneurs under each locations for various purposes were found.

Table 13: Procedure for measuring mobility

Sl. No	Categories	Frequency of visit (Yearly)			
		Local areas	Nearby panchayath	Nearby town	Distant town
1	Mushroom enterprise				
2	Agriculture related				
3	Entertainment purpose				
4	General purpose				
5	Marketing purpose				

3.5.13 Economic motivation

Economic motivation can be operationally defined as the tendency of mushroom entrepreneurs to benefit all the chances in order to increase the financial status of the mushroom unit. Economic motivation was measured using the scale developed by Singh (1991) with modifications. Scale consist of 6 statements with 5 point continuum such as strongly agree, agree, undecided, disagree and strongly disagree. For the positive statements the scores given were 5,4,3,2 and 1 and in the reverse order of this the scores were given for negative statements. Out of six statements first four statements were positive and the last two statements were negative ones. On the basis of mean and standard deviation, the mushroom entrepreneurs were classified into three groups *i.e.*, low, medium and high.

Table 14: Procedure for scoring economic motivation

Statement	Strongly Agree (SA)	Agree (A)	Undecided (UD)	Disagree (D)	Strongly Disagree (SD)
Positive	5	4	3	2	1
Negative	1	2	3	4	5

Table 15: Categorization of economic motivation based on mean and standard deviation

Sl. No.	Economic motivation category	Score
1.	Low	<(Mean - SD)
2.	Medium	Mean – SD to Mean + SD
3.	High	>(Mean - SD)

3.5.14 Risk orientation

Risk orientation can be operationally defined as the degree to which the mushroom entrepreneurs have the ability to take risk and to make apt decisions with respect to their mushroom unit. It was measured using the scale developed by Supe (1969) with modifications. Scale consist of 6 statements with 5 point continuum such as strongly agree, agree, undecided, disagree and strongly disagree. For the positive statements the scores given were 5,4,3,2 and 1 and in the reverse order of this the scores were given for negative statements. Out of six statements first four statements were positive and the last two statements were negative ones. On the basis of mean and standard deviation the mushroom entrepreneurs were classified into three groups *i.e*., low, medium and high.

Table 16: Procedure for scoring risk orientation

Statement	Strongly Agree (SA)	Agree (A)	Undecided (UD)	Disagree (D)	Strongly Disagree (SD)
Positive	5	4	3	2	1
Negative	1	2	3	4	5

Table 17: Categorization of risk orientation based on mean and standard deviation

Sl. No.	Risk orientation category	Score
1.	Low	<(Mean - SD)
2.	Medium	Mean – SD to Mean + SD
3.	High	>(Mean - SD)

3.5.15 Extension contact

Extension contact can be operationally defined as the degree to which mushroom entrepreneurs were efficient to interact with various extension bodies as well as experts in order to acquire guidance or support on different activities related to mushroom enterprise. It was measured using the scale developed by Shirur (2015) with modifications. The measurement was mainly taken on the basis of three point continuum; Regularly, Occasionally and Never with a score range of 2, 1, 0 respectively. The sum of mushroom entrepreneurs overall score was used to determine the degree of their extension contact. On the basis of mean and standard deviation the mushroom entrepreneurs were classified into three groups *i.e*., low, medium and high.

Table 18: Procedure for scoring extension contact

Sl. No	Particulars	Frequency of contact		
		Regularly (2)	Occasionally (1)	Never (0)
1	Agriculture department officers			
2	Scientists of research organisation			
3	Private consultants			
4	Officials of NGO			
5	Kudumbashree block coordinator			
6	SHM field assistant			

Table 19: Categorization of extension contact based on mean and standard deviation

Sl. No.	Extension contact categories	Score
1.	Low	<(Mean - SD)
2.	Medium	Mean – SD to Mean + SD
3.	High	>(Mean + SD)

3.5.16 Institutional support

Institutional support can be operationally defined as the extent of providing assistance or support to mushroom entrepreneurs by various governmental institutions through training, schemes and subsidies. In the present study mushroom entrepreneurs availing the various support from government institutions are shown below.

Table 20: Procedure for scoring institutional support

Sl. No	Institutional support categories	Score
1	SHM subsidy	1
2	Training and SHM subsidy	2
3	Training and Kudumbasree subsidy	3
4	Training, Kudumbasree subsidy and marketing support	4
5	Training, SHM subsidy, Kudumbasree subsidy and marketing support	5

3.5.17 Equipments

Equipment can be operationally defined as the various items which are essential for the working of a mushroom enterprise. It was measured as the total number of equipments owned by an individual. Based on the equipments number, it was classified into three groups *i.e.,* less than 2 in number, 2 to 4 in number and above 4 in number.

Table 21: Procedure for scoring equipment

Sl. No	Equipments	Frequency of equipments		
		< 2 numbers	2 to 4 numbers	>4 numbers
1	Spray pump			
2	Weighing machine			
3	Sealing machine			
4	Thermohygrometer			
5	Irrigation equipments			

3.6 Operationalization of dependent variable

3.6.1 Performance of mushroom units

Mushroom entrepreneurs performance can be operationally defined as the coalition of various dimensions of the mushroom unit such as Social Capital Indicator (SCI), Good Mushroom Cultivation Practices (GMCP), Efficiency Indicator (EI) and Incremental Expansion (IE) with respect to the passage of time.

The dependent variable for the present study was performance of mushroom units, and which was measured using the tool performance index. Performance index consists of four dimensions and a total of 23 statements under the dimensions were analysed to measure the performance index of mushroom units. All the statements under each dimensions were given in detail in (Appendix 1). The responses were obtained using the three-point continuum scale by allocating score as 3, 2, and 1 respectively.

Performance index was calculated individually for all mushroom entrepreneurs. Each mushroom growing unit obtained its mean score (raw score / maximum possible score) under various dimensions was multiplied with the scale value of each dimension. The composite index, which measures the performance of mushroom growers, was calculated by adding the values obtained for all dimensions. The four dimensions of performance index and its respective scale values are indicated in the Table 22. The performance index and its dimensions used for the present study was adopted from the study of (Shirur *et al*., 2018).

$$PI = \sum_{i=1}^{4} \frac{\textbf{\textit{Actual score of Di x Scale value of Di}} \ \textbf{x 100}}{\textbf{\textit{Max. Score of Di}}} \Bigg/ \textbf{\textit{} } \sum \textbf{\textit{Scale value of Di}}$$

Table 22: Scale values for various dimensions

Sl. No	Dimensions	Scale values
1	Social Capital Indicator (SCI)	4.696
2	Good Mushroom Cultivation Practices (GMCP)	5.246
3	Efficiency Indicators (EI)	6.346
4	Incremental Expansion (IE)	3.597

Using the mean and standard deviation the mushroom units were categorised mainly into three groups viz. low, medium and high on the basis of the dimensions and overall performance score.

Table 23: Categorization of mushroom units based on mean and standard deviation

Sl. No.	Categories	Score
1.	Low	<(Mean - SD)
2.	Medium	Mean – SD to Mean + SD
3.	High	>(Mean + SD)

3.7 Data collection method

An interview schedule was prepared with respect to the objectives underlying the study in consultation with the major advisor and experts. The variable selection in the interview schedule was done on the basis of judges rating with expert extension professionals. Basic details about the mushroom entrepreneurs were collected from Kudumbasree office and State Horticulture Mission (SHM) office of Thrissur and Palakkad districts. Both the primary and secondary data regarding the study were collected using appropriate tools. Primary data were obtained mainly through interviewing mushroom entrepreneurs using interview schedule and face to face interaction with mushroom entrepreneurs through field visits. Secondary data related to

study were obtained through various articles, research organisations, research papers, journals, internet *etc.*

3.8 Statistical tools used

The data obtained through interview schedule was examined and scored using the software tool Statistical Package for Social Sciences (SPSS version 20). The various statistical tools used for the study were:-

3.8.1 Descriptive statistics

3.8.1.1 Arithmetic mean

3.8.1.2 Standard deviation

3.8.1.3 Frequency tables

3.8.1.4 Percentages

3.8.2 Two way contingency table

3.8.3 Chi-Square test

3.8.4 Binary Logistic Regression

3.8.5 Discriminant Analysis

3.8.6 Spearman's rank correlation coefficient

3.8.7 Garret ranking method

3.8.1 Descriptive statistics

Descriptive statistics are the statistical methods that will briefly outline a given set of data, the data can illustrate the population either entirely or as a sample. The various descriptive statistics used for the study includes frequency table, percentages, mean and standard deviation based on the data obtained during the data collection.

3.8.1.1 Arithmetic mean

Arithmetic Mean (AM) is described as the sum of all values of a given observation divided by the total number of observation.

3.8.1.2 Standard deviation

Standard deviation is used to estimate that how much a set of values differs or how scattered are these values.

3.8.1.3 Frequency

Frequency are represented mainly in the form of frequency tables to know about the scattering pattern of respondents in the study with respect to their dependent and independent variables.

3.8.1.4 Percentage

Percentage were used in the study inorder to determine the proportion of respondents, who might fall into each group under different variables.

3.8.2 Two way contingency tables

Two way contingency table also called as cross tabulation table or crosstab, which have been used to examine categorical variables. Such tables laid the groundwork for statistical inference, which involves using statistical tests to examine the association between variables based on the data available. Here in this study the association among producer characteristics were analysed using cross Tables.

3.8.3 Chi-Square test

Chi-square test is performed to know about the existence of correlation between two categorical variable. The null hypothesis in the Chi-Square test indicates that the categorical variables in the sample have no association; they are independent. Chi-Square is calculated using the equation:-

$$\chi^2 = \sum (O_i - E_i)^2 / E_i$$

Where, Oi = Observed value

Ei = Expected value

3.8.4 Binary Logistic Regression

In the present study the relationship between the dimensions of the performance index and type of unit was analysed. Here the dimensions such as social capital indicator, good mushroom cultivation practices, efficiency indicators and incremental expansion were taken as the independent variable and the type of unit such as production and marketing unit and production, processing and marketing unit were taken as the dependent variable. And analysis is done using the binary logistic regression. It is calculated using the equation:-

$$P = \frac{\exp^{a+bx}}{1 + \exp^{a+bx}}$$

Where, P = Probability of a group in a particular category

exp = exponential function

a = equation constant

b = predictor variables coefficient

3.8.5 Discriminant Analysis

Discriminant analysis is used in the study to find out the dimension or indicator of performance index that characterise or shows more relationship with the type of unit *i.e.,* both production and marketing unit and production, processing and marketing unit. Here the dimensions is taken as the independent variable and type of unit is taken as the dependent variable to perform the discriminant analysis. Discriminant Analysis is performed using the equation:-

$$Z_{jk} = a + W_i X_{ik} + W_2 X_{2k} + W_3 X_{3k} + \ldots\ldots\ldots + W_n X_{nk}$$

Where, a = intercept

Z_{jk} = Z score of discriminant function j for object k

W_i = discriminant weight for independent variable i

X_{ik} = independent variable i for object k

3.8.6 Spearman's rank correlation coefficient

Spearman's rank correlation coefficient method is a nonparametric method. This is mainly used to evaluate the relationship among the independent variables with the dependent variable. Here in the present study the independents variables such as age, educational qualification, family occupation, size of the production unit, income per season, type of mushroom shed, yield per season, experience, source of labour, marketing avenue, mode of transport for sale of goods, economic motivation, risk orientation, extension contact and institutional support are evaluated with the dependent variable performance index. The spearman's rank correlation coefficient is obtained using the equation:-

$$r_s = 1 - \frac{6 \sum d_i^2}{n (n^2 - 1)}$$

Where, n = number of pairs of observation

d = difference of rank between the paired elements in the two sequence

3.8.7 Constraints

Constraints experienced by mushroom entrepreneurs were examined using Garret ranking method. Various difficulties or problems faced by the mushroom entrepreneurs were observed during the time of data collection through key informant interview schedule. The various constraints experienced by the mushroom entrepreneurs were listed out and asked them to rank each constraints according to their preferences. Then the rank given by the mushroom entrepreneur to each constraint was converted into the per cent position using the following equation of Garret ranking:-

$$\text{Per cent position} = \frac{100 (R_{ij} - 0.5)}{N_j}$$

Where, R_{ij} is the rank for i^{th} constraint experienced by the j^{th} individual

N_j is the number of constraints ranked by the j^{th} individual

Here the obtained rank was on an interval scale and its midpoint indicates the interval, thus 0.5 was subtracted from every rank obtained. Finally with the use of Garret table the per cent position obtained was reformed into score (Garrett and Woodworth, 1969). Then the mean score was calculated and ranked by using the obtained score for each constraint.

3.8.8 Scenario analysis

Scenarios are conversation based collaborative technique that allows a wide range of ideas to interact. Scenario analysis is performed to enable better grapple with the changes and behaviours that shape what the future might hold and to explore the possibilities in ways that are designed to aid decision-making (Bentham, 2008). Trends and drivers were identified to build up the scenario analysis for mushroom microenterprises. The observed trends are then ranked according to their uncertainty and importance. Two trends have been chosen that are not very dependent on one another and could go in antipode directions in the future. Then these two significant trends is represented using a graph with labels on the horizontal and vertical axis. The axis polar ends are marked to highlight the potential excess of future predictions. Finally, the results of each section are summed up. It is possible to determine the best future for mushroom entrepreneurs inclusion (Vermeulen *et al.,* 2008).

Results and discussion

CHAPTER IV

RESULTS AND DISCUSSIONS

This chapter results and discussions specifies about the overall results obtained from the study, under various objectives. Result were obtained by using the appropriate research methodology, various data collection tools and statistical tools developed. The results of the present study was presented under the following sub-heads.

4.1 Information about the type of mushroom unit

4.2 Baseline information about mushroom entrepreneurs and mushroom unit

4.2.1. Personal and socio-economic characteristics of mushroom entrepreneurs

4.2.2 Structure of mushroom unit

4.2.3 Details about institutional support

4.2.4 Other salient findings from the study

4.3 Analyses of mushroom enterprise characteristics

4.4 Performance index of representative mushroom units with their dimensions

4.5 Comparison of performance index dimensions with the type of units

4.6 Relationship of independent variables with the performance index

4.7 Constraints faced by producers

4.8 Futuristic scenario analysis

4.1 Information about the type of mushroom unit

In the present study, a total of 120 mushroom units were taken for data collection. The units were classified into two types such as:-

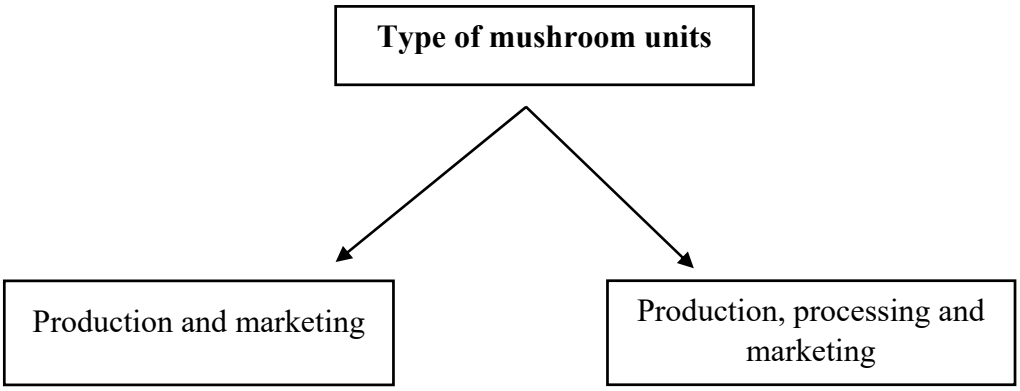


Table 24: Distribution based on type of mushroom units

Sl.No	Type of mushroom units	Frequency	Percentage
1	Production and marketing	68	56.66
2	Production, processing and marketing	52	43.33

Out of 120 mushroom units, 68 units were engaged in production and marketing type. Whereas, 52 units were engaged in both production, processing and marketing type.

Table 25: District wise distribution on the basis of type of mushroom units

Type of mushroom units	Thrissur		Palakkad	
	Frequency	Percentage	Frequency	Percentage
Production and marketing	31	51.66	**37**	**61.66**
Production, processing and marketing	**29**	**48.33**	23	38.33

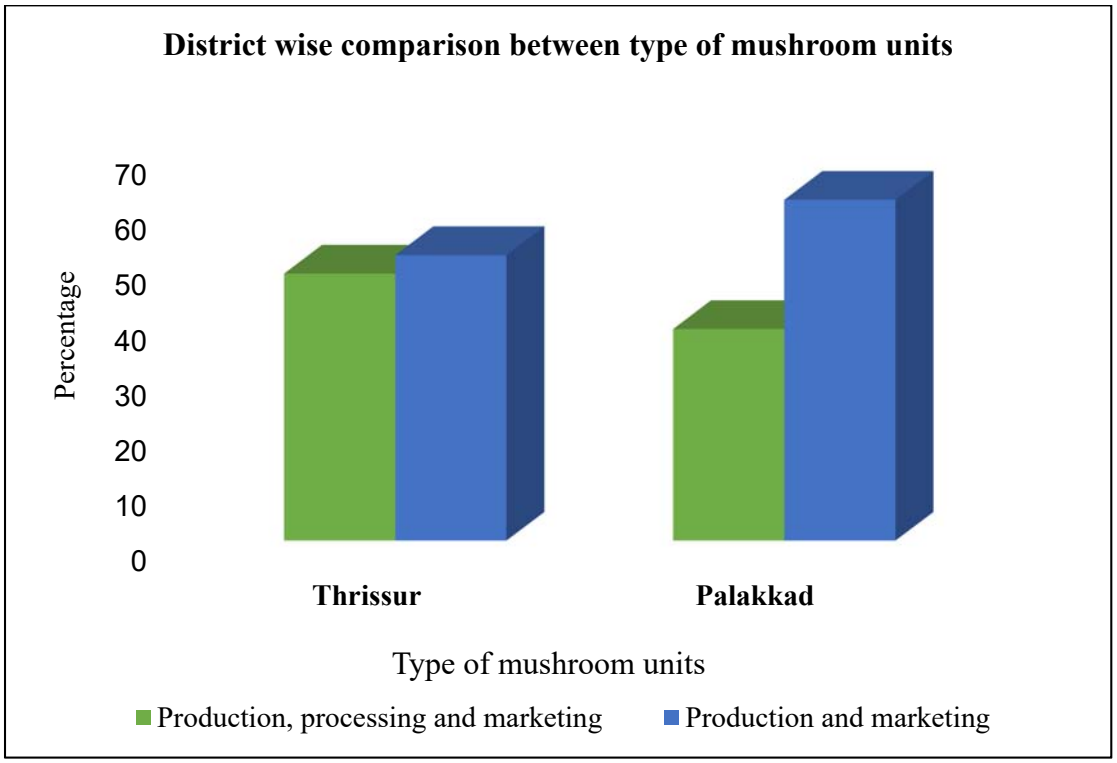


Figure 4: District wise distribution on the basis of type of mushroom units

From the above Table 25 and Figure 4 it is understood that, 61.66 per cent production and marketing type units were in Palakkad district, whereas 51.66 per cent of production and marketing units were in Thrissur district. Thus, the results indicates that the production and marketing type units were more in Palakkad district than Thrissur. This is because, the sole enterprises are mostly engaged in production and marketing and from the study it was observed on the basis of data collection that majority of the sole enterprises were in Palakkad district. In the case of production, processing and marketing type of units, 48.33 per cent of mushroom units were in Thrissur and 38.33 per cent mushroom units were in Palakkad. Hence, it shows that the production processing and marketing type units were more in Thrissur district than Palakkad, because joint enterprises were more engaged in production, processing and marketing especially the SHGs group. It was observed that on the basis of obtained data in the present study more number of joint groups *i.e.*, SHGs were in Thrissur district.

4.1.1 Activities of type of mushroom unit

4.1.1.1 Production and marketing unit activities

Majority (56.66%) of mushroom units were production and marketing type units. Mushroom entrepreneurs performs various activities under production and marketing units includes production of fresh mushrooms and production of mushroom beds for sale.

4.1.1.2 Production, processing and marketing unit activities

Among 120 mushroom units, 43.33 per cent of mushroom units were production, processing and marketing type of units. Various activities possessed by mushroom entrepreneurs under production, processing and marketing type of unit were production of fresh mushrooms, production of mushroom beds for sale and preparation of several value added mushroom products.

Table 26: List of value added mushroom products

Sl. No	Value added mushroom products
1	Mushroom pickle
2	Mushroom powder
3	Dry mushrooms
4	Mushroom cutlet
5	Mushroom roll
6	Mushroom burger
7	Mushroom pakovada
8	Mushroom biscuits
9	Chilly mushrooms
10	Mushroom shavarma

The above Table 26 shows the list of several value added products prepared from mushrooms by the mushroom entrepreneurs who were especially engaged in production, processing and marketing type.

4.2 Basic information about mushroom entrepreneurs and mushroom unit

Here, the basic details about the personal and socioeconomic characteristics of mushroom entrepreneurs, regarding the structure of mushroom unit, institutional support and other salient findings about mushroom entrepreneurs and unit will be depicting under the following subheads.

4.2.1 Personal and socio-economic characteristics of mushroom entrepreneurs

Here, the basic details collected about mushroom entrepreneurs which include their personal and socio-economic characteristics will be indicating. The various socio-economic characters encompass viz. age, education, family occupation, income per season, yield per season, experience, marketing avenue, mode of transport for sale of goods, mobility, economic motivation, risk orientation and extension contact.

4.2.1.1 Age

Table 27: Distribution of mushroom entrepreneurs on the basis of age

Sl. No	Age categories	Frequency	Percentage
1	Less than or equal to 30 years	13	10.83
2	31 - 40 years	52	43.33
3	41 – 50 years	39	32.5
4	Above 50 years	16	13.33
	Total	**120**	**100**

From the above Table 27 it is seen that, out of 120 mushroom entrepreneurs, 43.33 per cent belongs to age category 31 - 40 years whereas, 32.5 per cent of mushroom entrepreneurs were in age category of 41 - 50 years. And 13.33 per cent of them were above 50 age category and the remaining 10.83 per cent of mushroom entrepreneurs were in the age category less than or equal to 30 years. Similar study findings were found in the studies of Singh (2011) and Nikitha (2019).

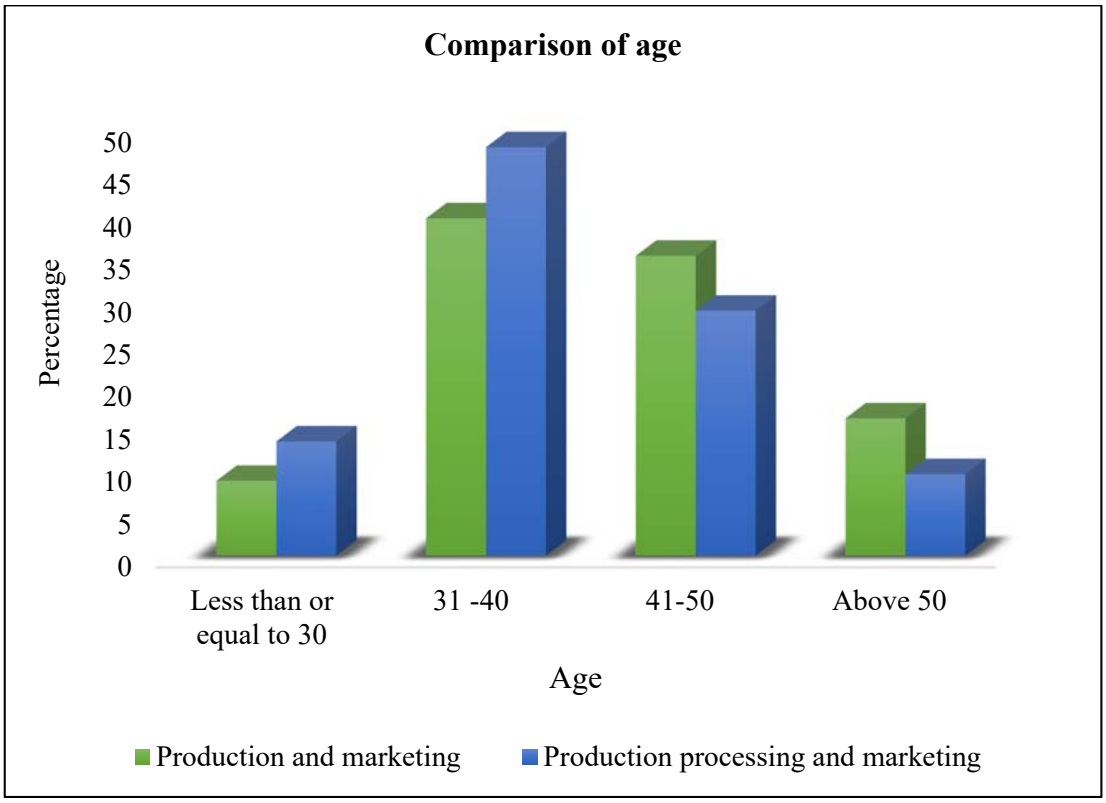


Figure 5: Unit wise distribution of mushroom entrepreneurs on the basis of age

From the Figure 5 it is understood that, 48.07 per cent of mushroom entrepreneurs from production, processing and marketing units and 39.7 per cent from production and marketing units belongs to the age category 31 - 40 years. Followed by, 35.29 per cent of mushroom entrepreneurs from production and marketing units and 28.84 per cent from production, processing and marketing units were in the age category 41 - 50 years. And about 16.17 per cent of mushroom entrepreneurs from production and marketing units and 9.61 per cent from production, processing and marketing units belongs to the age category above 50 years. Finally the remaining 8.82 per cent of mushroom entrepreneurs of production and marketing units and 13.46 per cent from production, processing and marketing units. Thus the results shows that more number of mushroom entrepreneurs belongs to the age category 31 - 40 years. The respondents from the production, processing and marketing units were more in this age group than from production and marketing units.

4.2.1.2 Education level

Table 28: Distribution of mushroom entrepreneurs on the basis of education level

Sl. No	Education level categories	Frequency	Percentage
1	Illiterate	0	0
2	Primary education	0	0
3	Secondary education	3	2.5
4	High school	28	23.33
5	Higher secondary	27	22.5
6	Graduate	49	40.83
7	Post graduate	13	10.83
	Total	**120**	**100**

From the above Table 28 it is understood that, 40.83 per cent of the mushroom entrepreneurs had graduate level of education. Whereas, 23.33 per cent had higher secondary level of education, 22.5 per cent had an education level up to higher secondary, 10.83 per cent had post graduate level of education and the remaining 2.5 per cent were post graduates. None of the mushroom entrepreneurs were illiterate or in primary level of educational qualification. Similar study findings were found in the studies of Sudhakar (1994), Ganesh (2004), Thakur (2016), Shirur (2015), Nagaraj *et al.,* (2017), Gahir (2018) and Nikitha (2019).

From the Figure 6 it is seen that, 44.23 per cent of mushroom entrepreneurs from production, processing and marketing units and 38.23 per cent from production and marketing units had graduate level of education. 26.92 per cent of mushroom entrepreneurs from production, processing and marketing units and 20.58 per cent from production and marketing units had high school level of education. 23.52 per cent of mushroom entrepreneurs from production and marketing unit and 21.15 per cent from production, processing and marketing units had secondary educational level. 13.23 per cent of mushroom entrepreneurs from production and marketing units and 7.69 from production, processing and marketing units were post graduates. And the remaining 4.41 percent of mushroom entrepreneurs had upto secondary level of education from

production and marketing units and none of the respondents with secondary education from production, processing and marketing units. Majority of the respondents had graduate level of education, and this is because the literacy rate of Kerala is high. More number of graduates were from production, processing and marketing units than from production and marketing units.

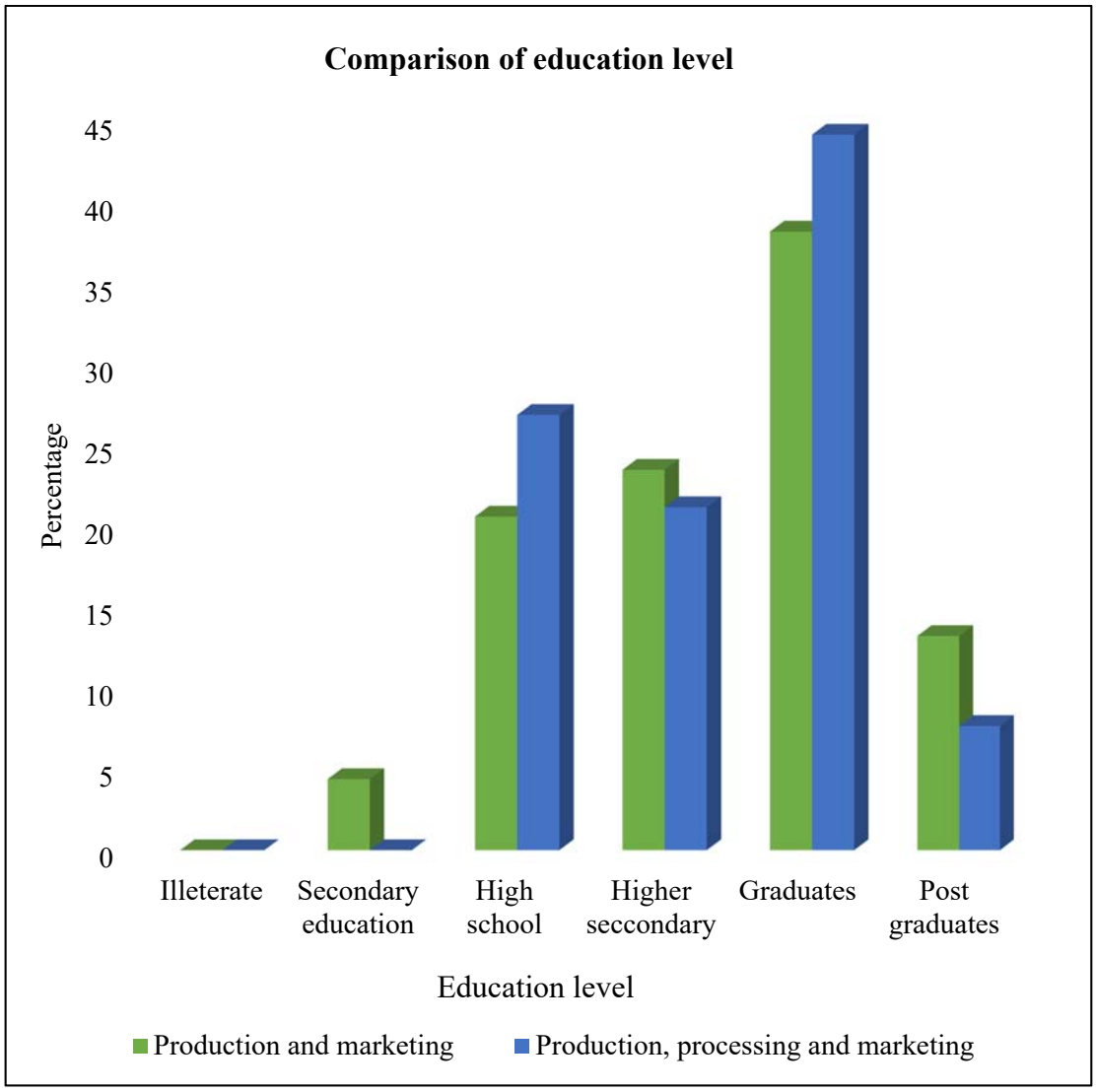


Figure 6: Unit wise distribution of mushroom entrepreneurs on the basis of educational level

4.2.1.3 Family occupation

Table 29: Distribution of mushroom entrepreneurs on the basis of family occupation

Sl. No	Family occupation categories	Frequency	Percentage
1	Mushroom	15	12.5
2	Mushroom + Agriculture	45	37.5
3	Mushroom + Retired employment+ Agriculture	3	2.5
4	Mushroom + Business	16	13.33
5	Mushroom + Others	41	34.16
	Total	**120**	**100**

From the above Table 29 it is seen that, majority (37.5%) had mushroom and agriculture as their main family occupation. Whereas, 34.16 per cent of the respondents had mushroom and other jobs as their main family occupation, and 13.33 per cent had mushroom and business as their main family occupation source. The table clearly depicts that around 12.5 per cent of the respondents only had mushroom alone as their family occupation and remaining 2.5 per cent had mushroom, retired employment and agriculture as their family occupation. Similar findings were found in the studies of Roguel (1987), Arjun (2013) and Thakur (2016).

Figure 7 show that, 50 per cent of mushroom entrepreneurs from production and marketing unit and 21.15 per cent from production, processing and marketing units had mushroom and agriculture as their main family occupation. 40.38 per cent of mushroom entrepreneurs from production, processing and marketing units and 29.41 per cent from production and marketing units had mushroom and other jobs as their main source of family occupation. 14.7 per cent of mushroom entrepreneurs from production and marketing units and 11.53 per cent from production, processing and marketing units had mushroom along with business as their family occupation. 26.92 per cent mushroom entrepreneurs from production, processing and marketing units and 1.47 per cent from production and marketing units had mushroom alone as their source of family

occupation. And the remaining 4.41 per cent from production and marketing units had mushroom, retired and agriculture as their family occupation. None of the respondents from production, processing and marketing units had mushroom, retired income and agriculture as the source of family occupation. Thus the results indicate that majority of the respondents had mushroom along with agriculture as their main source of family occupation. These mushroom entrepreneurs who were already engaged in agriculture were more aware about various agriculture allied sectors schemes and subsidies obtaining from government institutions. So this might be the reason that they were promoting mushroom along with agriculture, inorder to maintain a stable family income. Here the respondents from production and marketing units were more engaged in both mushroom and agriculture than from production, processing and marketing units.

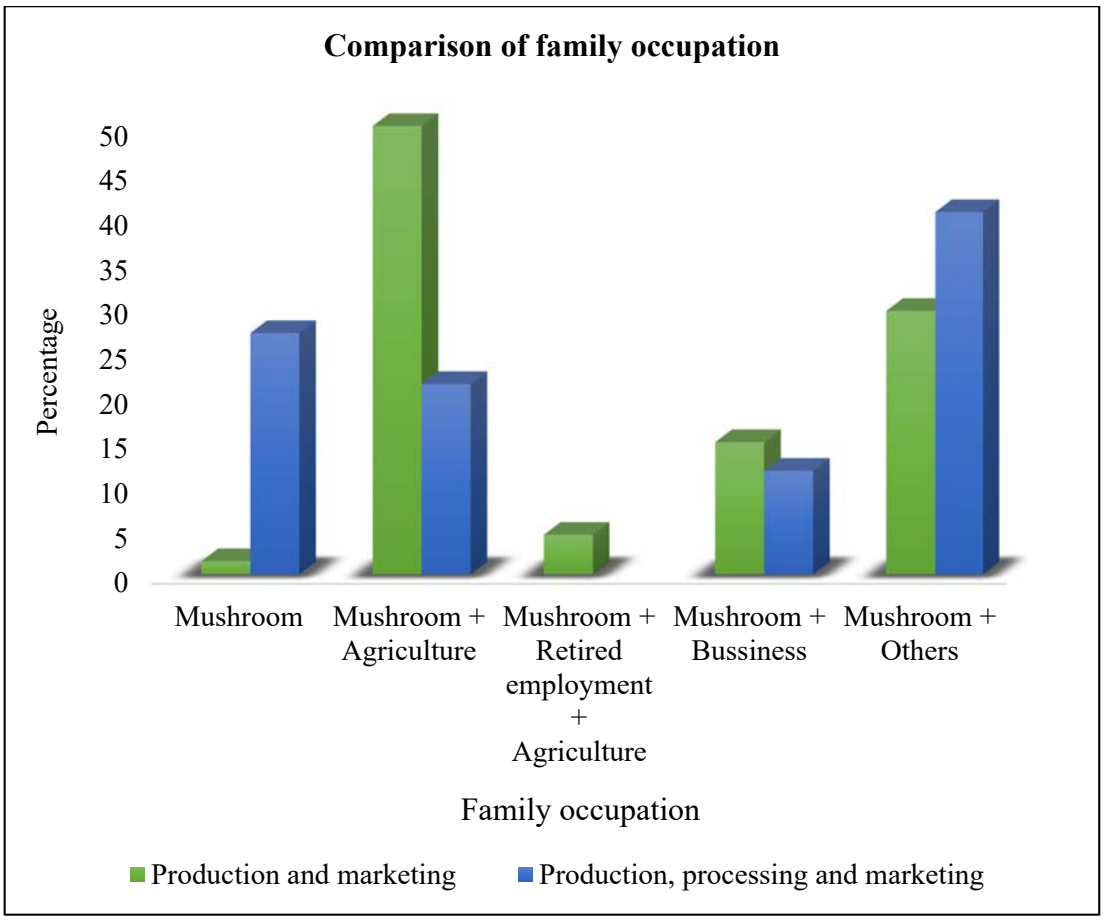


Figure 7: Unit wise distribution of mushroom entrepreneurs on the basis of family occupation

4.2.1.4 Income per season

Table 30: Distribution of mushroom entrepreneurs on the basis of income per season

Sl.No	Income per season categories	Frequency	Percentage
1	Less than Rs 25,000/-	23	19.16
2	Rs 25,000/- - Rs 50,000/-	50	41.66
3	Above Rs 50,000/-	47	39.16
	Total	**120**	**100**

From, the above Table 30 it is seen that, majority (41.66%) of mushroom entrepreneurs had income in the range of Rs 25,000/- to Rs 50,000/- followed by 39.16 per cent of mushroom entrepreneurs had income above Rs 50,000/- and 19.16 per cent of mushroom entrepreneurs had income level below Rs 25,000/-. Similar study findings were pointed out by Kumar (2016).

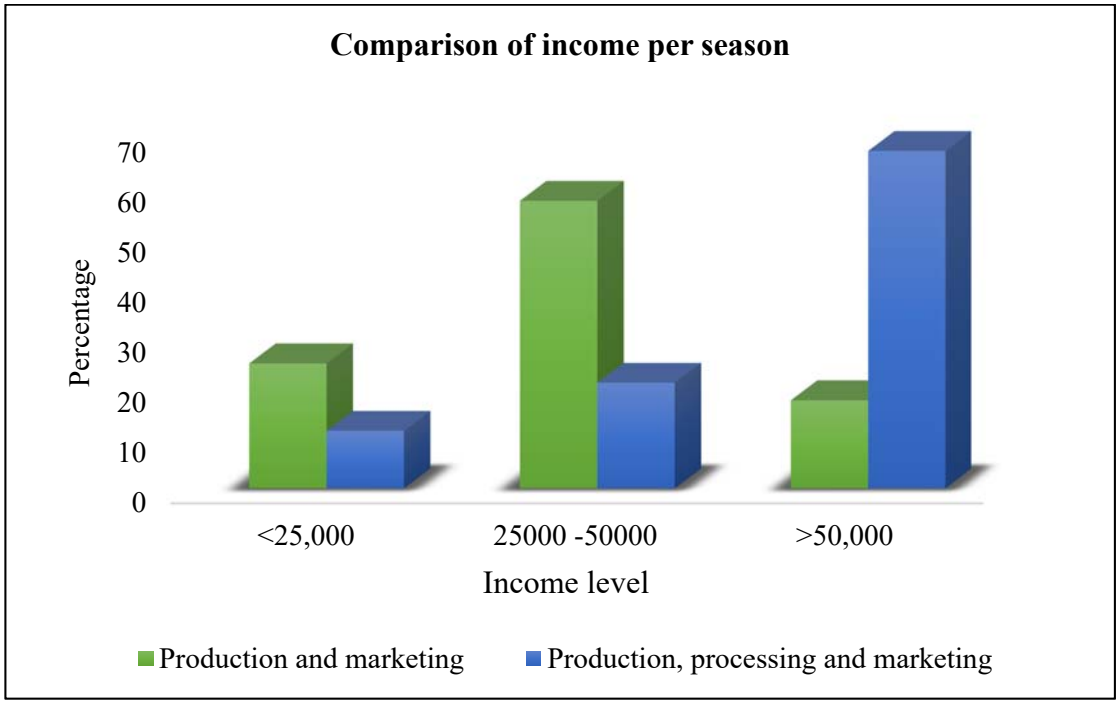


Figure 8: Unit wise distribution of mushroom entrepreneurs on the basis of income per season

From the above Figure 8 it is seen that, 57.35 per cent of mushroom entrepreneurs from production and marketing units and 21.15 per cent from production, processing and marketing units had income in the range of Rs 25,000/- to Rs 50,000/-. 67.3 per cent of mushroom entrepreneurs from production, processing and marketing units and 17.64 per cent from production and marketing units had income above Rs 50,000/-. 25 per cent from production and marketing units and 11.53 per cent from production, processing and marketing units had income below Rs 25,000/-. Thus the results indicate that majority of the mushroom entrepreneurs had income in the range of Rs 25,000/- to Rs 50,000/-, among that more respondents from production and marketing units had income in the range of Rs 25,000/- to Rs 50,000/- than respondents from production, processing and marketing units.

4.2.1.5 Yield per season

Table 31: Distribution of mushroom entrepreneurs on the basis of yield per season

Sl. No	Yield per season categories	Frequency	Percentage
1	< 100 kg	23	19.16
2	100 – 150 kg	35	29.16
3	Above 150 kg	62	51.66
	Total	**120**	**100**

From the above Table 31 it is seen that, majority (51.66%) of mushroom entrepreneurs had yield above 150 Kg, followed by 29.16 per cent of them had yield in the range of 100 -150 Kg and remaining 19.16 per cent of the respondents had yield less than 100 Kg. Similar study findings were pointed out in the study of Acasta and Chavez (2010).

From the Figure 9 it is seen that, 75 per cent of mushroom entrepreneurs from production, processing and marketing units and 33.82 per cent mushroom entrepreneurs from production and marketing units were had yield above 150 Kg. 41.17 per cent mushroom entrepreneurs from production and marketing units and 13.46 per cent from production, processing and marketing units had yield in the range of 100 – 150 Kg. And remaining, 25 per cent from production and marketing units and 11.53 per cent from

production, processing and marketing units had yield less than 100 Kg. Hence, the results indicates that majority of the respondents had yield above 150 Kg. More mushroom entrepreneurs from production, processing and marketing units are having yield above 150 Kg than respondents from production and marketing units.

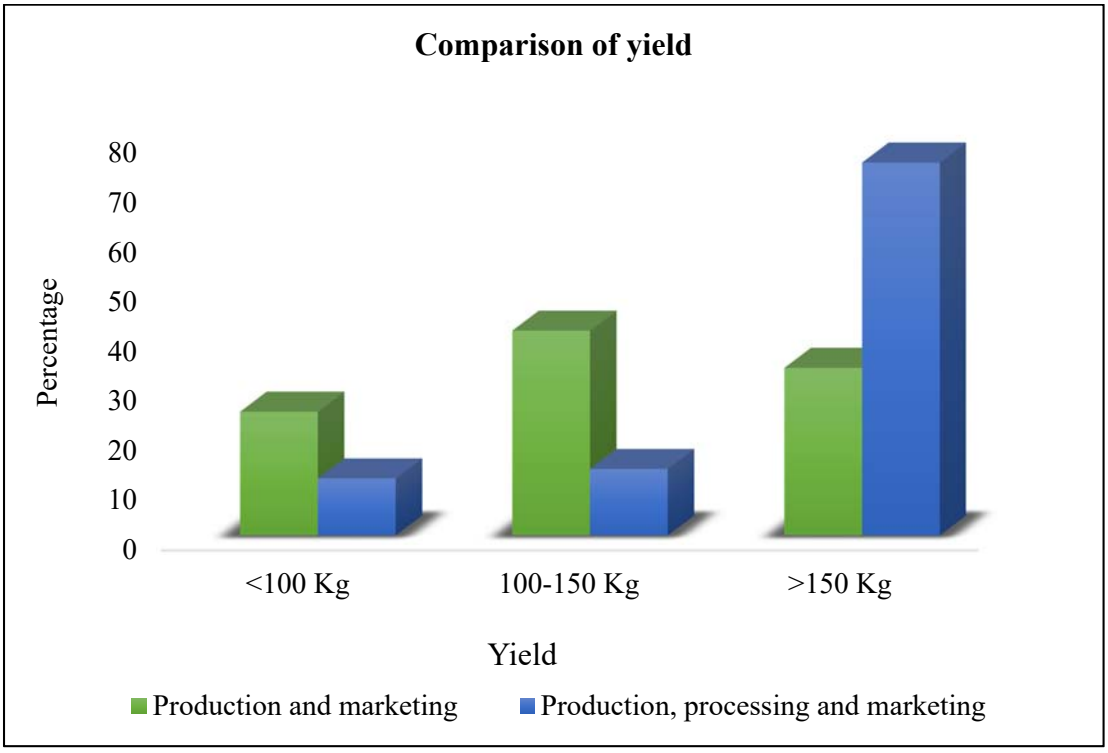


Figure 9: Unit wise distribution of mushroom entrepreneurs on the basis of yield per season

4.2.1.6 Experience

Table 32: Distribution of mushroom entrepreneurs on the basis of experience in mushroom farming

Sl.No	Experience categories	Frequency	Percentage
1	Less than one and half years	26	21.66
2	One and half to three years	29	24.16
3	Three and half to five years	34	28.33
4	More than five years	31	25.83
	Total	**120**	**100**

From the above Table 32 it is understood that, 28.33 per cent of mushroom entrepreneurs had an experience of about three and half two five years followed by, 25.83 per cent of mushroom entrepreneurs had an experience of more than five years, 24.16 per cent of mushroom entrepreneurs had an experience of one and half to three years and remaining 21.66 per cent had and experience of about less than one and half years.

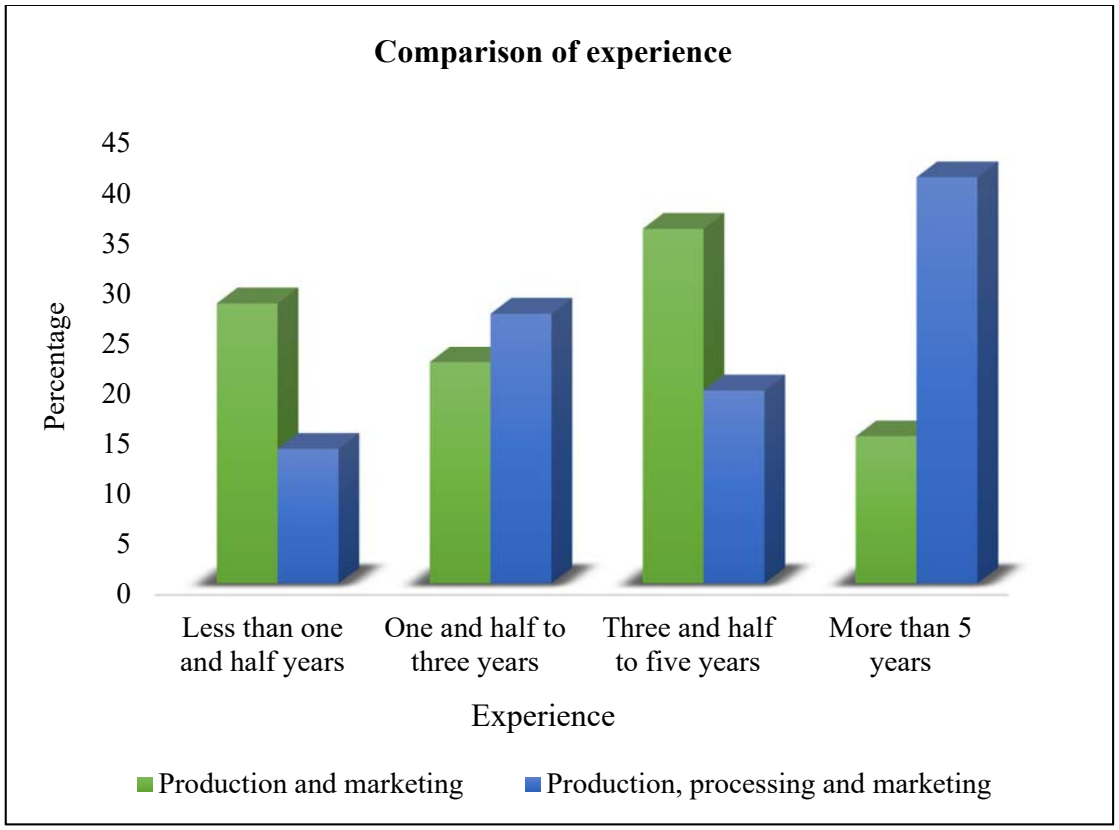


Figure 10: Unit wise distribution of mushroom entrepreneurs on the basis of their experience in mushroom farming

From the Figure 10 it is seen that, 35.29 per cent of mushroom entrepreneurs from production and marketing units and 19.23 per cent from production, processing and marketing units had three and half to five years experience. Whereas, 40.38 per cent of mushroom entrepreneurs from production, processing and marketing units and 14.7 per cent from production and marketing units had an experience of about more than five years. 26.92 per cent of mushroom entrepreneurs from production, processing and marketing units and 22.05 per cent from production and marketing units had one and half to three years experience. Finally the remaining 27.94 per cent of mushroom

entrepreneurs from production and marketing units and 13.46 from production, processing and marketing units had less than one and half years experience. Here, the results indicate that majority of mushroom entrepreneurs had an experience of three and half to five years and the respondents from production and marketing units are more in this experience category than from production, processing and marketing units.

4.2.1.7 Marketing avenue

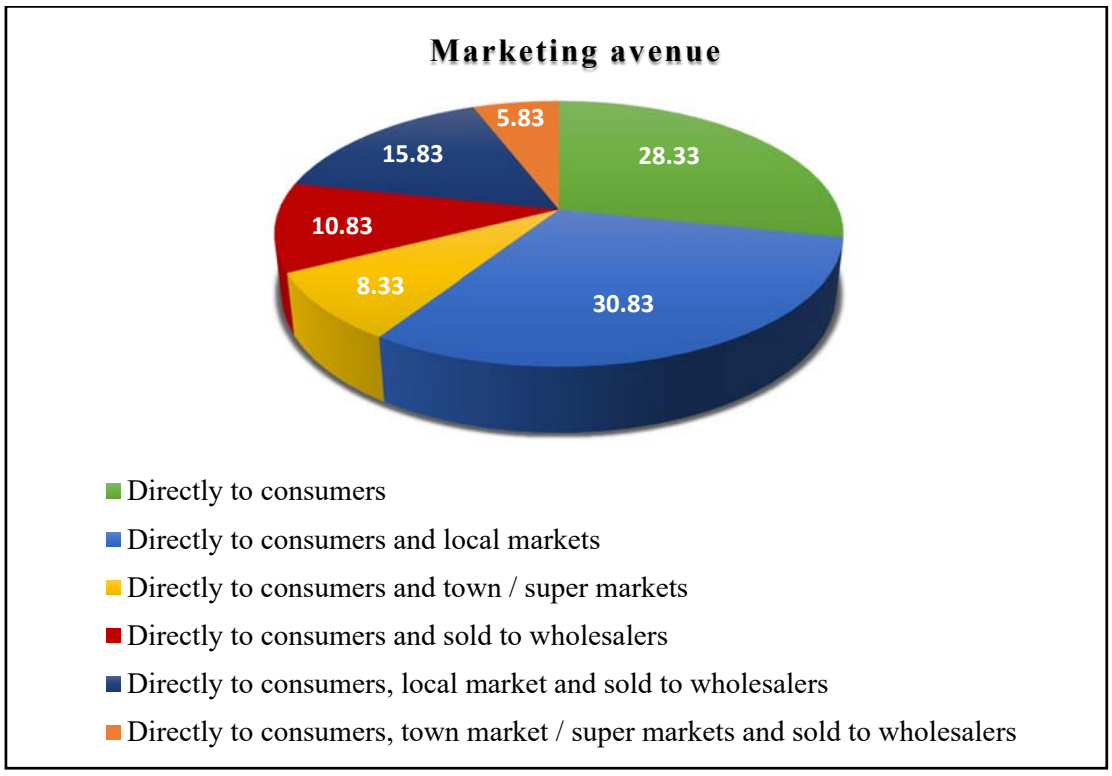


Figure 11: Distribution of mushroom entrepreneurs on the basis of marketing avenue

The above Figure 11 show that, majority (30.83%) of mushroom entrepreneurs were marketing directly to consumers and to local market. Followed by, 28.33 per cent of respondents were marketing directly to consumers, 15.83 per cent respondents were marketing directly to consumers, local market and to wholesalers, 10.83 per cent of the respondents were marketing directly to consumers and to wholesalers, 8.33 per cent were marketing directly to consumers and in town or supermarkets and remaining 5.83 per cent people were marketing directly to consumers, town / super markets and to

wholesalers. Similar study findings were pointed out by Thakare and Gupta (2004), Gold *et al*., (2008) and Kumar (2016).

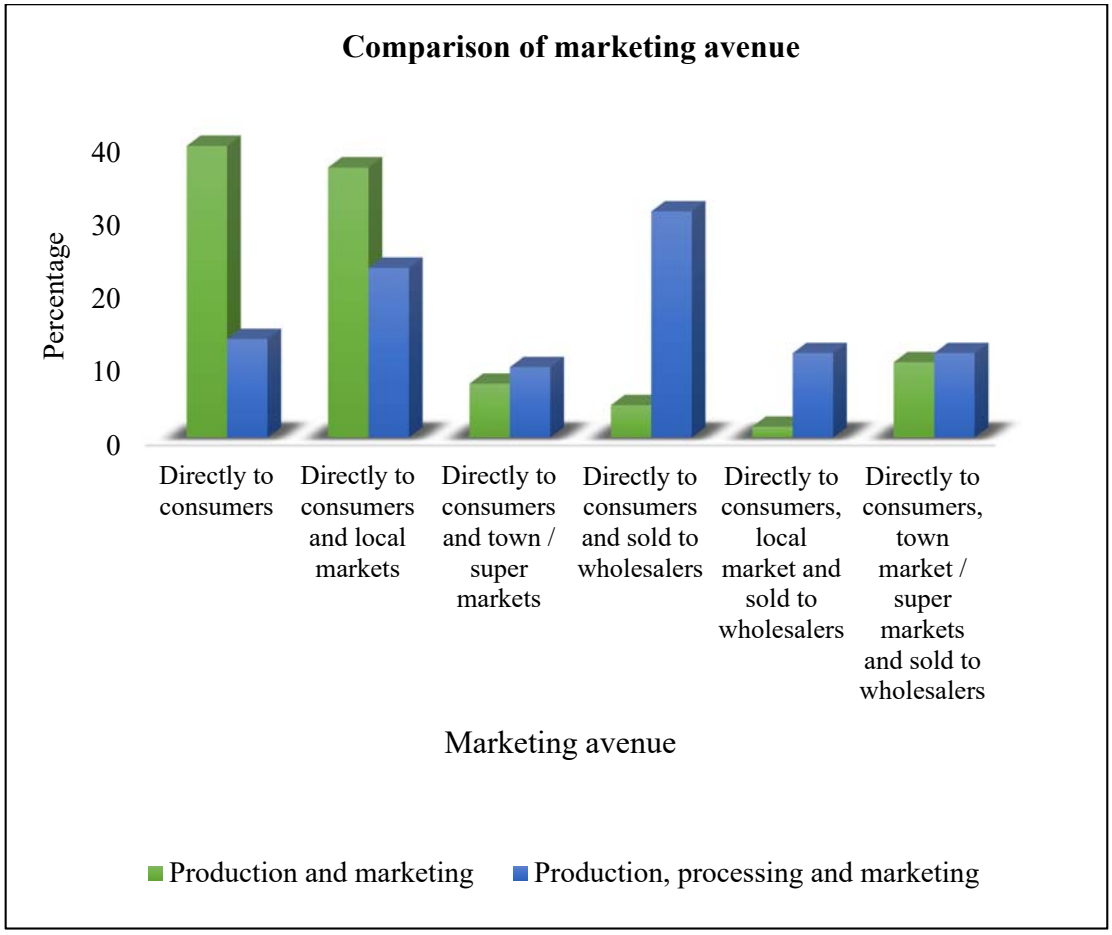


Figure 12: Unit wise distribution of mushroom entrepreneurs on the basis of their marketing avenue

From the above Figure 12 it is seen that, 36.76 per cent mushroom entrepreneurs from production and marketing units and 23.07 per cent of them from production, processing and marketing units were mainly marketing to directly to consumers and local markets. 39.7 per cent of mushroom entrepreneurs from production and marketing units and 13.46 per cent from production, processing and marketing units were mainly marketing directly to consumers. 11.53 per cent of mushroom entrepreneurs from production, processing and marketing units and 1.47 percent of them from production and marketing units were marketing directly to consumers, local market and to wholesalers. 30.76 per cent of mushroom entrepreneurs from production, processing and marketing units and 4.41 per cent of them from production and marketing units

were marketing directly to consumers and to wholesalers. 9.61 per cent of mushroom entrepreneurs from production, processing and marketing units and 7.35 per cent of them from production and marketing units were marketing directly to consumers and to town / super markets. 11.53 per cent of mushroom entrepreneurs from production, processing and marketing units and 10.29 per cent of them from production and marketing units were marketing directly to consumers, town / super markets and to wholesalers. Hence, from the above data it is clear that marketing avenue for majority of the mushroom entrepreneurs is directly to consumers and to local market. Here, the respondents from production and marketing units shows larger proportion to this marketing avenue for marketing than respondents from production, processing and marketing units.

4.2.1.8 Mode of transport for sale of goods

Table 33: Distribution of mushroom entrepreneurs on the basis of mode of transport for sale of goods

Sl. No	Mode of transport for sale of goods categories	Frequency	Percentage
1	Own vehicle	82	68.33
2	Own vehicle and through public conveyance	24	20
3	Group owned vehicle	5	4.16
4	Group owned vehicle and through public conveyance	9	7.5

The above Table 33 show that, 68.33 per cent of mushroom entrepreneurs were using own vehicle for sale of goods, 20 per cent of the respondents were using both own vehicle and public transportation, 7.5 per cent of the mushroom entrepreneurs were using group owned vehicle and remaining 4.16 per cent of them were using both group owned vehicle and public transport. Similar study findings were found in the studies of Singh (2011) and Bhoi (2018).

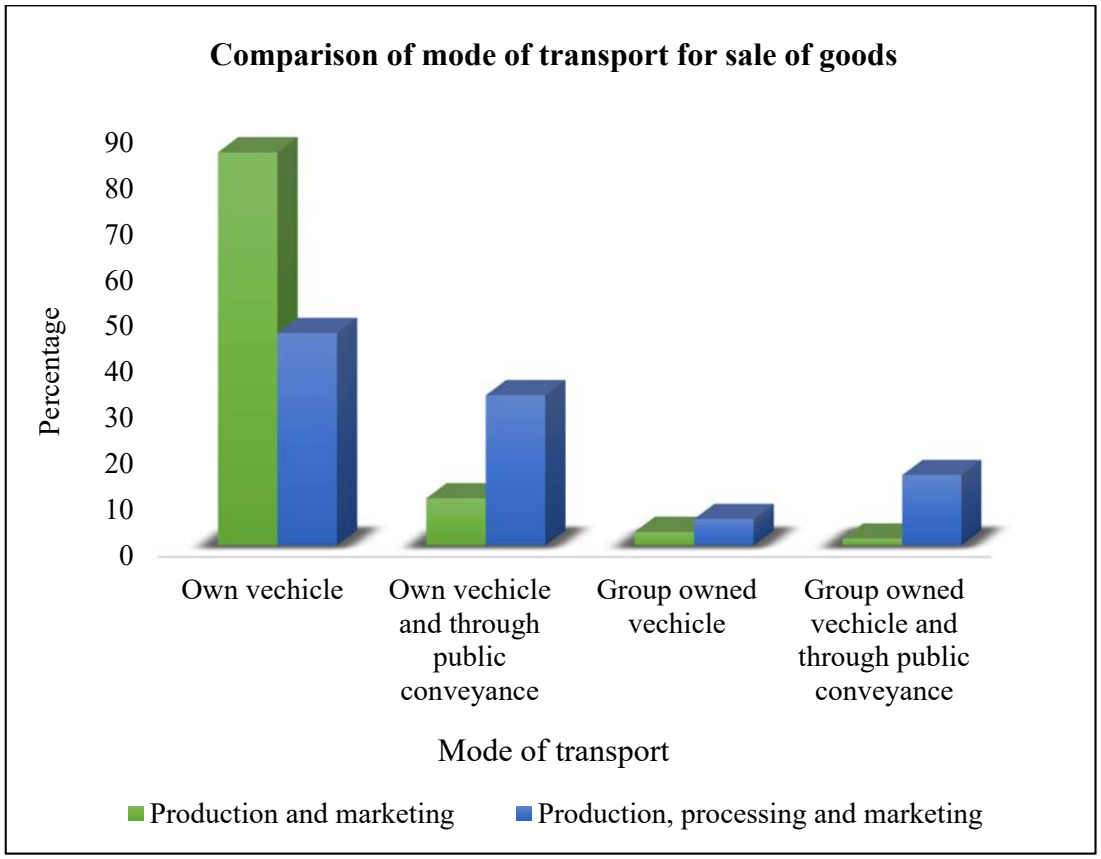


Figure 13: Unit wise distribution of mushroom entrepreneurs on the basis of their mode of transport for sale of goods

From the above Figure 13 it is seen that, 85.29 per cent of mushroom entrepreneurs from production and marketing units and 46.15 per cent of them from production, processing and marketing units were using own vehicle for transportation of goods. Followed by, 32.69 per cent of the mushroom entrepreneurs from production, processing and marketing units and 10.29 per cent from production and marketing units were using both own vehicle and public transport for sale of goods. 15.38 per cent of mushroom entrepreneurs from production, processing and marketing units and 1.47 per cent from production and marketing units were using group owned vehicle and public transport. And remaining, 5.76 from production, processing and marketing units and 2.94 from production and marketing units are using group owned vehicle for transportation of sale of goods. Thus the results indicates that majority of mushroom entrepreneurs were using own vehicle as mode of transport for sale of goods, among

which respondents from production and marketing units are more using own vehicle than respondents from production, processing and marketing units.

4.2.1.9 Mobility

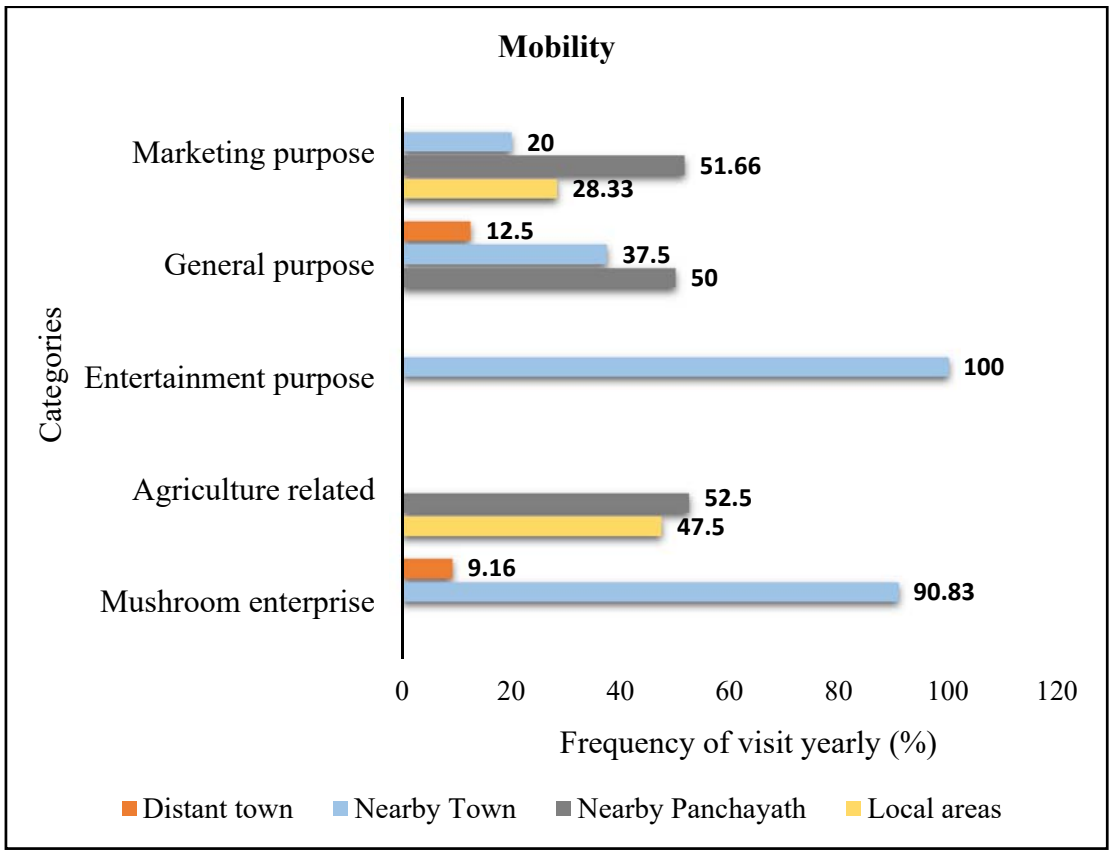


Figure 14: Distribution of mushroom entrepreneurs on the basis of mobility

The above Figure 14 show that, for the purpose related to mushroom enterprise 90.83 per cent mushroom entrepreneurs most frequently travel to nearby town and 9.16 per cent of them travel to distant town in a year. None of the mushroom entrepreneurs travel to local area and nearby panchayath for the purpose related to mushroom enterprise. For agriculture related purpose, majority 52.5% of the mushroom entrepreneurs most frequently travel to nearby panchayath and around 47.5 percent of them travel to local area in a year. None of the respondents travel to nearby town and distant town for agriculture related purpose. Whereas, 100 per cent of mushroom entrepreneurs most frequently travel to nearby town for their entertainment purpose in a year. And it shows that none of the respondents travel to local area, nearby panchayath and distant town for their entertainment purposes. For the general purpose, it denotes

that 50 per cent of the mushroom entrepreneurs most frequently travel to their nearby panchayath, followed by 37.5 per cent travel to nearby town and remaining 12.5 per cent travel to distant town for their general purposes in a year and none of the respondents travel to local area. For the marketing purposes 51.66 per cent of mushroom entrepreneurs most frequently travel to nearby panchayath, around 28.33 per cent travel to local area and 20 per cent travel to nearby town in a year and it shows that none of the respondents travel to distant town for their marketing purpose.

4.2.1.10 Economic motivation

Table 34: Distribution of mushroom entrepreneurs on the basis of economic motivation

Sl. No	Economic motivation categories	Frequency	Percentage
1	Low	11	9.16
2	Medium	96	80
3	High	13	10.83
	Total	**120**	**100**

From the above Table 34 it is seen that, majority (80%) of the mushroom entrepreneurs are having medium level of economic motivation, followed by 10.83 per cent of the mushroom entrepreneurs had high level of economic motivation and remaining 9.16 per cent of them had low level of economic motivation. Similar study findings were found in the study of Shirur (2015).

4.2.1.11 Risk orientation

Table 35: Distribution of mushroom entrepreneurs on the basis of risk orientation

Sl. No	Risk orientation categories	Frequency	Percentage
1	Low	34	28.33
2	Medium	65	54.16
3	High	21	17.5
	Total	**120**	**100**

From the above Table 35 it is seen that, majority (54.16%) of mushroom entrepreneurs had medium level of risk orientation, followed by 28.33 per cent had low level of risk orientation and 17.5 per cent had high level of risk orientation. Similar study findings were pointed out by Sivanarayana (1990), Ratnasree (1992), Sudakar (1994), Ganesh (2004) and Shirur (2015).

4.2.1.12 Extension contact

Table 36: Distribution of mushroom entrepreneurs on the basis of extension contact

Sl. No	Extension contact categories	Frequency	Percentage
1	Low	12	10
2	Medium	86	71.66
3	High	22	18.33
	Total	**120**	**100**

From the above Table 36 it is seen that, majority (71.66 %) of mushroom entrepreneurs had medium level of extension contact, 18.33 per cent had high level of extension contact and 10 per cent had low level of extension contact. Similar study findings were pointed out by Tanni *et al*., (2012) and Shirur (2015).

4.2.2 Information about the structure of mushroom units

4.2.2.1 Size of production unit

Table 37: Distribution of mushroom entrepreneurs on the basis of size of production unit

Sl. No	Categories	Frequency	Percentage
1	Less than 250 sq. feet	25	20.83
2	250 - 500 sq. feet	46	38.33
3	Above 500 sq. feet	49	40.83
	Total	**120**	**100**

From the above Table 37 it is understood that, 40.83 per cent of mushroom entrepreneurs had production unit with size above 500 sq. feet, followed by 38.33 per cent of mushroom entrepreneurs who had production unit size between 250 - 500 sq. feet and remaining 20.83 per cent had production unit size below 250 sq. feet. Similar study findings were pointed out by Shirur *et al.*, (2017)

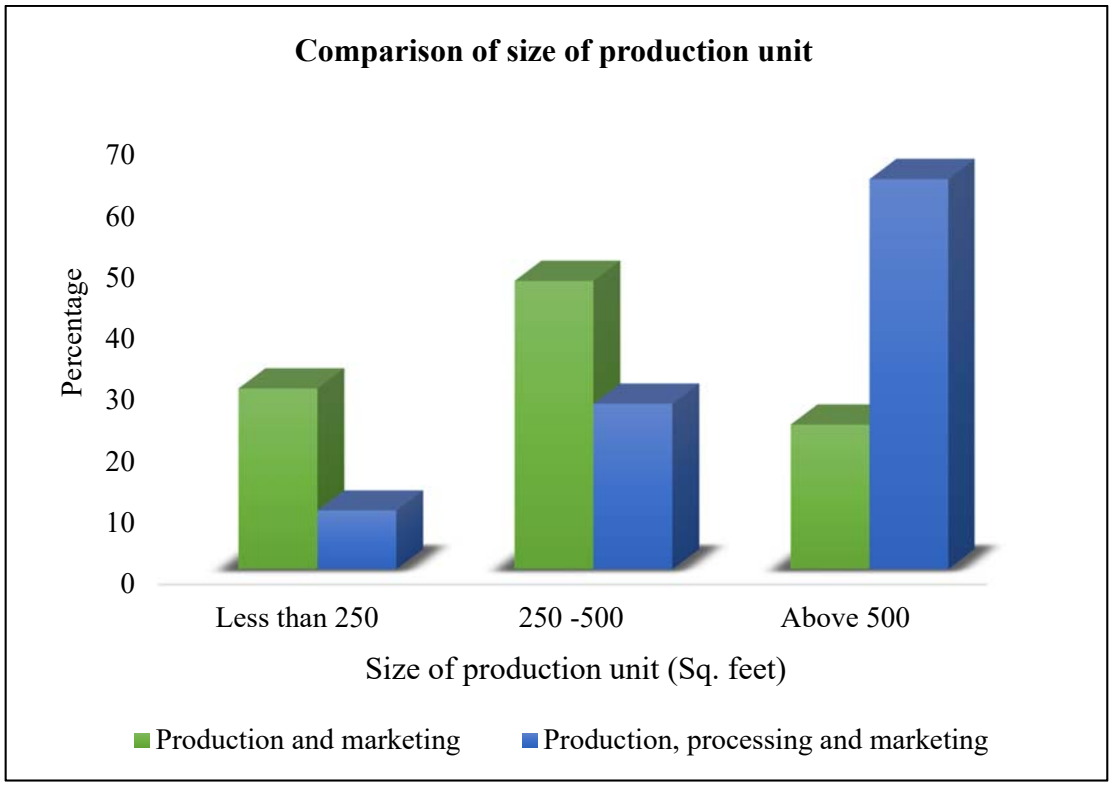


Figure 15: Unit wise distribution of mushroom entrepreneurs on the basis of size of production unit

From the above Figure 15 it show that, 63.46 per cent of mushroom entrepreneurs from production, processing and marketing units and 23.52 per cent from production and marketing units had production unit with size above 500 sq. feet. 47.05 per cent of respondents from production and marketing units and 26.92 per cent from production, processing and marketing units had production unit with size varies between 250 - 500 sq. feet. 29.41 per cent of respondents from production and marketing units and 9.61 per cent from production, processing and marketing units had production unit size with less than 250 sq. feet. Thus the results show that majority of mushroom entrepreneurs had production units size above 500 sq. feet. Among that more

mushroom entrepreneurs from production, processing and marketing units, had unit size more than 500 sq. feet, than the mushroom entrepreneurs from production and marketing units.

4.2.2.2 Source of labour

Table 38: Distribution of mushroom entrepreneurs on the basis of source of labour

Sl. No	Categories	Frequency	Percentage
1	Permanent labour	12	10
2	Temporary labour	17	14.16
3	Family / group labour	91	75.83
	Total	**120**	**100**

From the above Table 38 it show that, 75.83 per cent of mushroom entrepreneurs had family or group labour, followed by 14.16 per cent of respondents had temporary labour and 10 per cent of the respondents had permanent labour. Similar study findings were pointed out in the studies conducted by Ganesh (2004) and Prasad *et al.,* (2010).

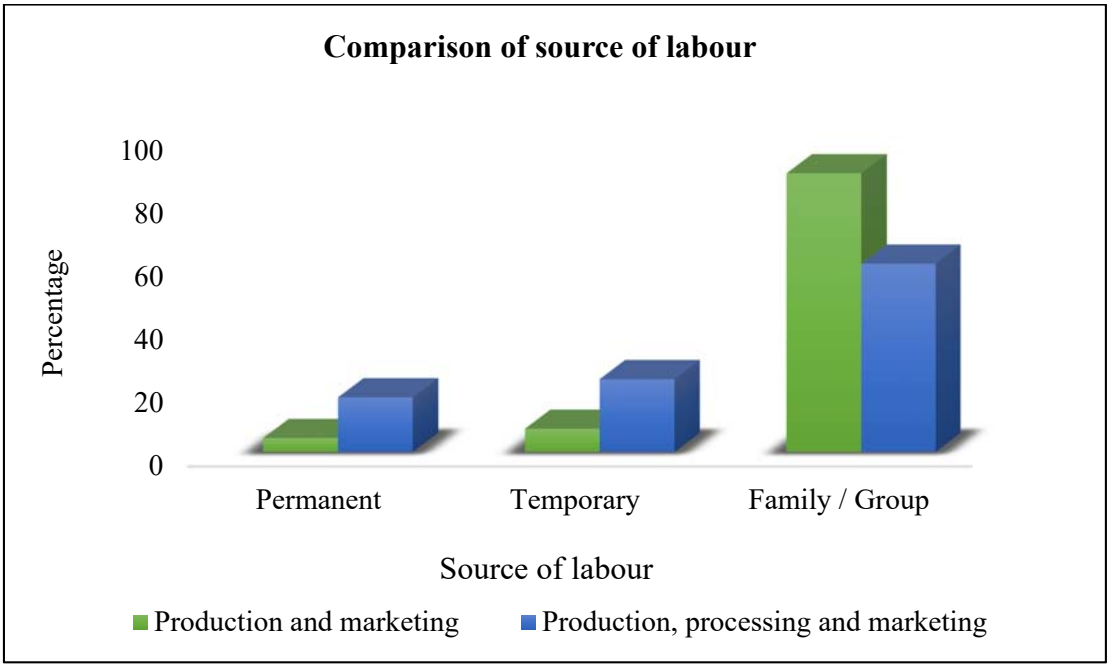


Figure 16: Unit wise distribution of mushroom entrepreneurs on the basis of source of labour

From the above Figure 16 it is seen that, 88.23 per cent of mushroom entrepreneurs from production and marketing units and 59.61 per cent from production, processing and marketing units had family / group labour as their labour source. 23.07 per cent of mushroom entrepreneurs from production, processing and marketing units and 7.35 per cent from production and marketing unit had temporary labour. Whereas, 17.3 per cent of mushroom entrepreneurs from production, processing and marketing units and 4.41 per cent from production and marketing units had permanent labour. Hence, the results show that majority of mushroom entrepreneurs used family / group labour. Among that, mushroom entrepreneurs from production and marketing units were more in having family / group labour than from production, processing and marketing units.

4.2.2.3 Type of mushroom shed

Table 39: Distribution of mushroom entrepreneurs on the basis of type of mushroom shed

Sl. No	Categories	Frequency	Percentage
1	Kutcha	65	54.16
2	Pucca	24	20
3	Kutcha and pucca	24	20
4	High-tech	3	2.5
5	Kutcha and high-tech	4	3.33
	Total	**120**	**100**

From the above Table 39 it is seen that, 54.16 per cent of mushroom entrepreneurs had kutcha type shed for mushroom cultivation, whereas, 20 per cent of them had pucca type shed, 20 per cent had both kutcha and pucca type shed, 3.33 per cent had both kutcha and high-tech type of shed and remaining 2.5 per cent had high-tech shed.

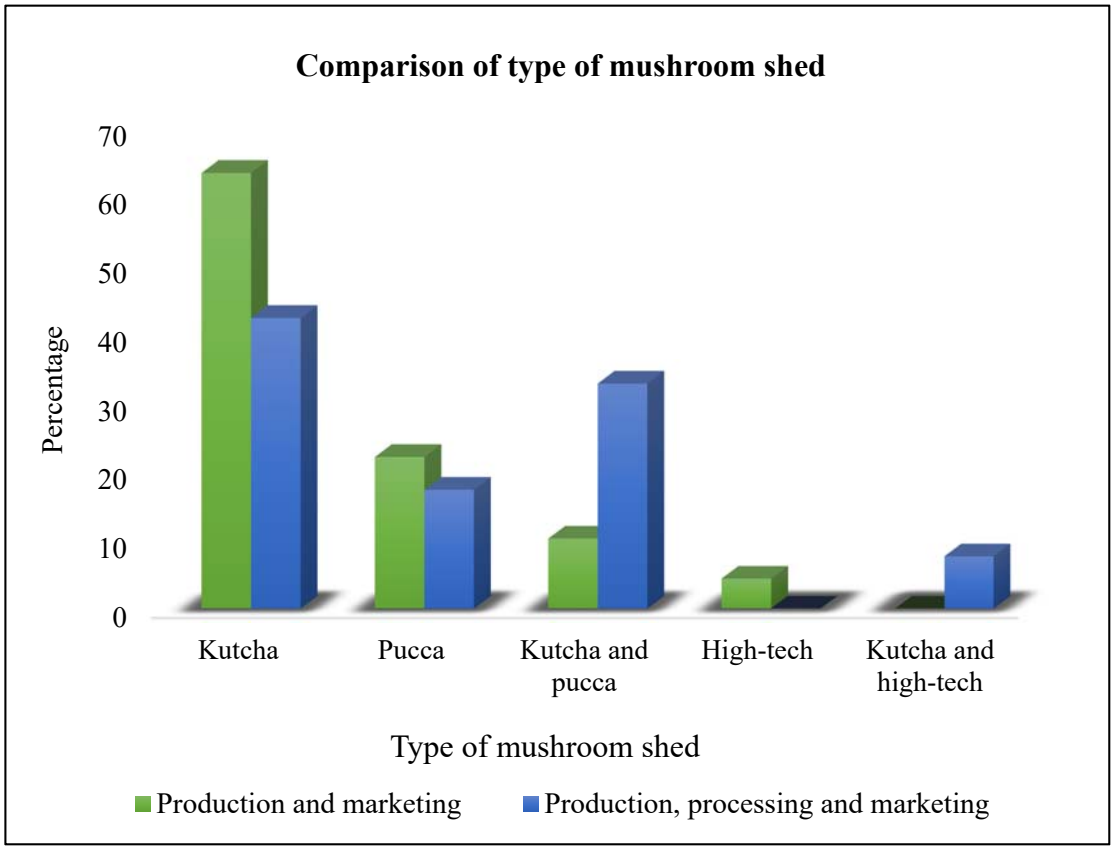


Figure 17: Unit wise distribution of mushroom entrepreneurs on the basis of type of mushroom shed

From the above Figure 17 it show that, 63.23 per cent of mushroom entrepreneurs from production and marketing units and 42.3 per cent from production, processing and marketing units had kutcha type of mushroom shed. 32.69 per cent of mushroom entrepreneurs from production, processing and marketing units and 10.29 per cent from production and marketing units had both kutcha and pucca type of mushroom shed. 22.05 per cent of mushroom entrepreneurs from production and marketing units and 17.3 per cent from production, processing and marketing units had pucca type of mushroom shed for cultivation. 7.69 per cent of mushroom entrepreneurs had both kutcha and high-tech type of shed. And remaining 4.41 per cent of mushroom entrepreneurs had high-tech type of mushroom shed. Hence the result shows that majority of the mushroom entrepreneurs had kutcha type shed. And mushroom entrepreneurs from production and marketing units were more in having kutcha type shed than respondents from production, processing and marketing units.

4.2.2.4 Equipments

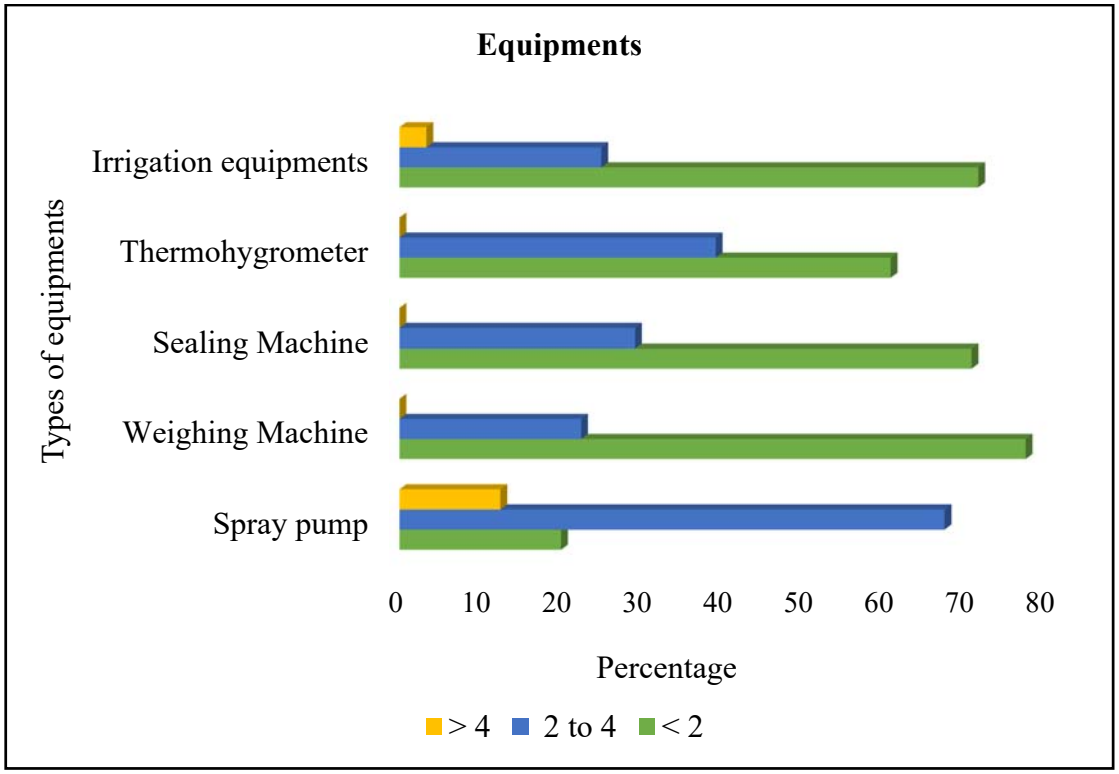
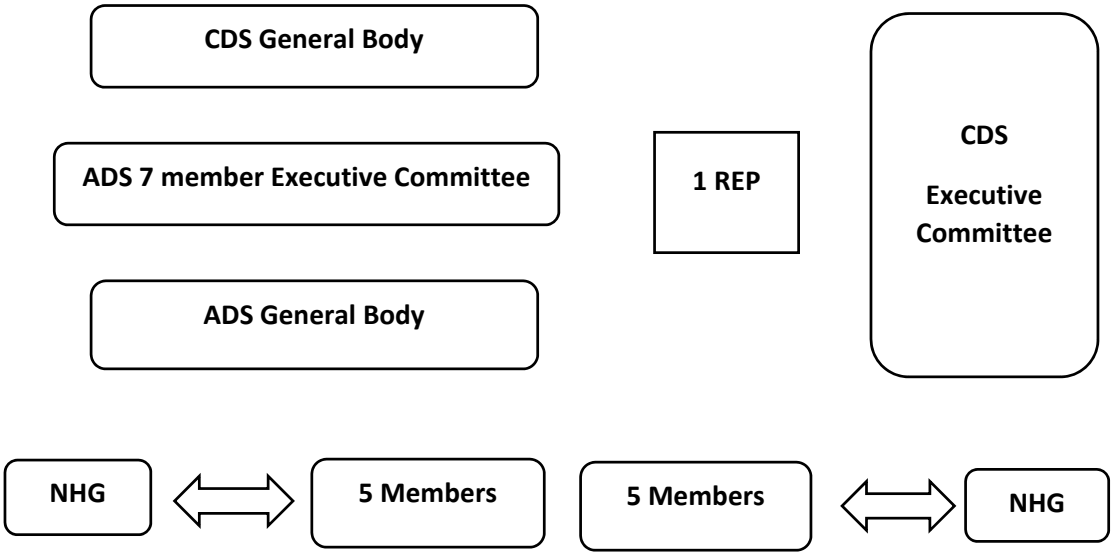


Figure 18: Distribution of mushroom entrepreneurs on the basis of number of equipments

The above Figure 18 show that, 67.5 per cent of mushroom entrepreneurs had spray pump in the range of 2 to 4, 20 per cent had spray pump less than 2 and 12.5 per cent had spray pump more than 4. Whereas, 77.5 per cent of mushroom entrepreneurs had weighing machines less than 22.5 per cent had weighing machines in the range of 2 to 4 and none of the respondents have more than 4 weighing machines. 70.83 per cent of mushroom entrepreneurs had sealing machines less than 2, 29.16 per cent had sealing machines in the range of 2 to 4 and none of the respondents had more than 4 sealing machines. 60.83 per cent of mushroom entrepreneurs had thermohygrometer less than 2, 39.16 per cent of them had thermohygrometer in the range of 2 to 4 and none of the respondents had thermohygrometer above 4 numbers.71.66 per cent of mushroom entrepreneurs had irrigation equipments less than 2 number, 25 per cent had irrigation equipments in the range of 2 to 4 and 3.33 per cent had more than 4 irrigation equipments.

4.2.5 Organisational structure

4.2.5.1 Formal organisational structure : Community Development Society (CDS)



(Source:- Kudumbashree site)

Figure 19: Formal organisational structure : Community Development Society

The community based organisation structure is the apex body of Kudumbashree three-tier organisation. In the basic level Neighbour-Hood Groups, at the second most level Area Development Society (ADS) and at the third level there exists a Community Development Society (CDS). The Community Development Society (CDS) can be defined as the representative structure of vast network of Neighbour-Hood Groups (NHGs), which exists at the panchayath or municipal level. General body of CDS includes all the members of Area Development Society (ADS) and governing body members of ADS. CDS governing body consists of chair person, vice-chair person and a member secretary. The general body and governing body of CDS also includes five women members, as elected representatives and two representatives from experienced ex-CDS as ex officio members. Whereas, in the ADS seven member executive committee it includes ADS chairperson, ADS vice-chairperson, ADS secretary and 4 other ex-officio members. The ADS general body includes presidents, secretaries and three sectoral volunteers of NHGs. Neighbour-Hood Groups (NHGs) consist of 10 to 20 women members and among them five members are selected as office bearers for

doing various functional activities. And these elected women representatives will fix various activities and decisions in the ADS. CDS executive committee is composed of one person from each ADS in the area. The executive committee has the same number of members as the number of ADSs. Special meetings of the executive committees of all ADSs are held to elect their representative to the CDS executive committee. The CDS's executive committee appoints two office bearers; the chairperson and vice chairperson. A person can only serve in each of these posts for a total of two three-year terms in a row.

4.2.5.2 Semi-formal structure

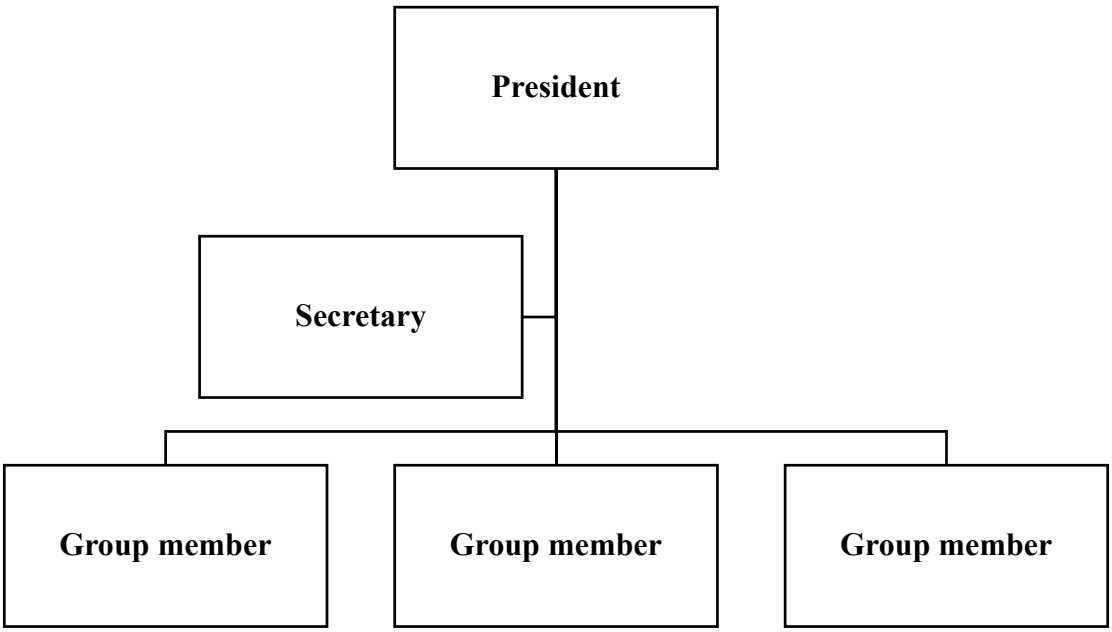


Figure 20: Semi-formal structure of Kudumbasree based mushroom unit

The semi-formal organisational structure consist of maximum five members; president at the top most level, secretary at the second level and then at the lower level three group members. President will act at the topmost level in a unit, she will be having the major responsibility to maintain the mushroom unit. Duties of president are arranging and attending various trainings, attending meetings at the CDS level, regular inspection of the mushroom unit, maintaining proper records of the unit, conduct meetings periodically among the group members, brining coordination among the group members, providing required trainings and developing skills among other group

members of the unit. After president secretary is at the next most level, the major duties of secretary is to attend trainings, record day to day activities, maintain the financial returns of the unit, also attend the trainings in the absence of president, preparation of minutes with respect to the meetings conducted in the group, provide support to other group members in various activities of mushroom cultivation and maintain proper record book regarding the production, processing and marketing / saleing related to mushroom unit. Other group members of the unit will mainly engage in the various activities of mushroom production and processing such as; preparation of bed, packing, harvesting , value addition *etc.* they will receive proper guidance from the president and secretary of the respective unit. On rotational basis all the members attend the mushroom related trainings.

4.2.3 Details about institutional support

Table 40: Distribution of mushroom entrepreneurs on the basis of institutional support

Sl. No	Categories	Frequency	Percentage
1	SHM subsidy	32	26.66
2	Training and SHM subsidy	58	48.33
3	Training and kudumbasree subsidy	12	10
4	Training, kudumbasree subsidy and marketing support	15	12.5
5	Training, SHM subsidy, kudumbasree subsidy and marketing support	3	2.5
	Total	**120**	**100**

From the above Table 40 it is seen that, majority (48.33%) of mushroom entrepreneurs were receiving training and SHM subsidy, 26.66 per cent of them were receiving SHM subsidy, 12.5 per cent of them were receiving training, Kudumbasree subsidy and marketing support, 10 per cent of them were receiving training and Kudumbasree subsidy and remaining 2.5 per cent of the mushroom entrepreneurs were receiving training, SHM subsidy, Kudumbasree subsidy and marketing support. Hence

the result shows that, majority of the mushroom entrepreneurs were receiving training and SHM subsidy. Similar study findings were pointed out by Deshmukh *et al*., (1988), Singh *et al.,* (2008), Kamal *et al*., (2009) and Shirur *et al.,* (2016).

Table 41: Institutions and their support in mushroom cultivation

Sl. No	Institutions	Support
1	Kerala Agricultural University, Extension centres and Research Organisations	These governmental institutions are providing support to mushroom entrepreneurs in the form of trainings on various aspects related to mushroom production and processing. Training on mushroom cultivation aspects include both production of mushroom and spawn, and providing training in value addition of mushroom i.e., how to make certain value added products from mushroom such as mushroom pickle, mushroom soup powder *etc.*
2	Horticulture department include State Horticulture Mission - Kerala	State Horticulture Mission – Kerala is promoting mushroom cultivation under the project entitled as "Promotion of mushroom cultivation units in Kerala" this is acting under RKVY for each financial year. This project is implemented by District Horticulture Mission through Krishi Bhavans. Under this scheme each mushroom entrepreneurs will receive support for their mushroom enterprise in the form of subsidy of Rs/- 11,250. The main criteria for receiving this subsidy is that, each beneficiaries have to establish 80 – 100 beds / cycle, enabling a production of 400 – 500 kg / annum. The authorized officers such as PAO's, AO, Deputy Director of Agriculture *etc.* will conduct the field inspection periodically. The rate of subsidy is admissible as per NHM norms under RKVY guidelines, the cost of cultivation for 400 – 500 kg mushroom per annum is

		estimated to be Rs/- 28,125. Assistance to each beneficiaries will be provided @ 40% of the cost limited to Rs/- 11,250. The major beneficiaries under this scheme are small or marginal mushroom entrepreneurs, including women growers, institutions or farmers group. The major highlights of this scheme is to create general awareness among people about the nutritional benefits of mushroom. Increase the production and value addition in mushroom and create more employment opportunities.
3	Kudumbasree District Mission	Kudumbasree District Mission will provide support for mushroom cultivation to various SHGs functioning under each district. The support will be providing in the form of training, subsidies and marketing support. Various training regarding mushroom cultivation and value addition in mushroom will be providing. The subsidy is provided under Agribusiness Venture Scheme. Under this scheme each mushroom unit will receive an amount according to the number of persons involved in the group. For each person an amount of Rs/- 10,000 will be receiving in the form of subsidy. The first half of subsidy will provide at the starting time of mushroom unit and second half will provide at the end of mushroom cultivation season. Various marketing support are provided in the form of nano markets, online marketing and local markets at panchayath level, block level and district level.

Table 42: Summary statistics for independent variables

Sl. No	Independent variables	Mean	SD	Range of scores	
				Min.	Max.
1	Age	2.48	0.85	1	4
2	Education	4.34	1.03	0	6
3	Family occupation	3.2	1.53	1	5
4	Size of production unit	2.2	0.75	1	3
5	Income	2.2	0.74	1	3
6	Type of mushroom shed	1.8	1.05	1	5
7	Yield	2.32	0.77	1	3
8	Experience	2.58	1.09	1	4
9	Source of labour	2.65	0.65	1	3
10	Marketing avenue	2.72	1.62	1	6
11	Mode of transport for sale of goods	1.5	0.88	1	4
12	Economic motivation	2.01	0.44	1	5
13	Risk orientation	1.87	0.68	1	5
14	Extension contact	2.08	0.52	0	2
15	Institutional support	2.12	1.05	1	5

4.2.4 Other salient findings from the study

Here the information regarding the gender, entrepreneur status, source of finance, type of mushroom cultivated, source of getting spawn, packing material, difference in yield and quality of spawn and trade mark.

4.2.4.1 Gender

Table 43: Distribution of mushroom entrepreneurs on the basis of gender

Sl. No	Gender categories	Frequency	Percentage
1	Female	74	61.66
2	Male	46	38.33
	Total	**120**	**100**

From the above Table 43 it is understood that, 61.66 per cent of mushroom entrepreneurs were female and 38.33 per cent of mushroom entrepreneurs were male. Hence the result shows that females were more engaged in mushroom cultivation than males.

4.2.4.2 Entrepreneur status

Table 44: Distribution of mushroom entrepreneurs on the basis of entrepreneur status

Sl. No	Entrepreneur status categories	Frequency	Percentage
1	Sole	103	85.83
2	Joint	17	14.16
	Total	**120**	**100**

From the above Table 44 it is understood that, majority (85.83 %) of mushroom entrepreneurs were sole entrepreneurs and 14.16 per cent of mushroom entrepreneurs were joint entrepreneurs.

4.2.4.3 Source of finance

Table 45: Distribution of mushroom entrepreneurs on the basis of source of finance

Sl. No	Source of finance categories	Frequency	Percentage
1	Rural bank	8	6.66
2	Private money lender	0	0
3	Cooperative bank / society	11	9.16
4	Private organisations	0	0
5	Nationalized / Public sector banks	3	2.5
6	Own investments	98	81.66
	Total	**120**	**100**

From the above Table 45 it is seen that, 81.66 per cent of mushroom entrepreneurs had their own investment as their source of finance for mushroom enterprise, followed by 9.16 per cent of them had source of finance from cooperative bank / society, 6.66 per cent of them had rural bank as their finance source and remaining 2.5 per cent of the mushroom entrepreneurs had source of finance from nationalized / public sector banks. None of the entrepreneurs had finance source from private organisations and private money lenders.

4.2.4.4 Type of mushroom cultivated

Table 46: Distribution of mushroom entrepreneurs on the basis of type of mushroom cultivated

Sl. No	Type of mushroom cultivated categories	Frequency	Percentage
1	Oyster	82	68.33
2	Milky	5	4.16
3	Oyster and milky	30	25
4	Button	3	2.5
5	Paddy straw	0	0
6	Shiitake	0	0
	Total	**120**	**100**

From the above Table 46 it is seen that, 68.33 per cent of mushroom entrepreneurs were cultivating oyster mushroom, followed by 25 per cent of mushroom entrepreneurs were cultivating both oyster and milky type of mushroom, 4.16 per cent of mushroom entrepreneurs were cultivating milky mushroom and remaining 2.5 per cent of mushroom entrepreneurs were cultivating button mushroom. None of the mushroom entrepreneurs were cultivating paddy straw mushroom and shiitake mushroom.

4.2.4.5 Source of getting spawn

Table 47: Distribution of mushroom entrepreneurs on the basis of source of getting spawn

Sl. No	Source of getting spawn categories	Frequency	Percentage
1	Government source	42	35
2	Local traders	19	15.83
3	Government source and local traders	31	25.83
4	Outside traders	8	6.66
5	Government source and outside traders	4	3.33
6	Local and outside traders	10	8.33
7	Government source, local and outside traders	6	5
	Total	**120**	**100**

From the above Table 47 it is understood that, majority (35%) of mushroom entrepreneurs depended upon government source for getting spawn, 25.83 per cent of them depended upon both from government and local traders, 15.83 per cent of them depended upon local traders, 8.33 per cent of them were depend upon both local and outside traders, 6.66 per cent of them were depend upon outside source, 5 per cent of them were depend upon government source, local traders and outside traders and remaining 3.33 per cent of the mushroom entrepreneurs were depends upon both government source and outside traders.

4.2.4.6 Trade mark

Table 48: Distribution of mushroom entrepreneurs on the basis of trade mark

Sl. No	Trade mark categories	Frequency	Percentage
1	Yes	70	84
2	No	30	36
	Total	**120**	**100**

The above Table 48 shows that, majority (84%) of the mushroom entrepreneurs were having trade mark or brand name and 36 per cent of them do not have trade mark or brand name.

4.2.4.7 Packing material

Table 49: Distribution of mushroom entrepreneurs on the basis of packing material

Sl. No	Packing material categories	Frequency	Percentage
1	Polythene cover	91	75.83
2	Polythene cover and corrugated boxes	27	22.5
3	Mushroom trays	0	0
4	Polythene cover and mushroom trays	2	1.66
	Total	**120**	**100**

From the above Table 49 it is seen that, 75.83 per cent of mushroom entrepreneurs were using polythene covers alone for packing, 22.5 per cent of them were using both polythene covers and corrugated boxes and 1.66 per cent of them were using both polythene covers and mushroom trays. None of the respondents were using mushroom trays alone for packing.

4.2.4.8 Difference in yield and quality of spawn

Table 50: Distribution of mushroom entrepreneurs on the basis of difference in yield and quality of spawn

Sl. No	Difference in yield and quality of spawn categories	Frequency	Percentage
1	No	95	79.16
2	Yes	25	20.83
	Total	**120**	**100**

From the Table 50 it is understood that, 79.16 per cent of mushroom entrepreneurs didn't face any obstacles regarding the difference in yield and quality of mushroom spawn, whereas, 20.83 per cent of mushroom entrepreneurs said that they were facing obstacles with difference in yield and quality of mushroom spawn.

4.3 Analyses of mushroom entreprise characteristics

4.3.1 Type of mushroom shed with yield per season

Table 51: Relationship between type of mushroom shed with yield per season

(N=120)

Categories	**Yield per season**		
Type of mushroom shed	**<100 Kg**	**100 – 150 Kg**	**>150 Kg**
Kutcha	18 (15.0%)	23 (19.2%)	**24 (20.0%)**
Pucca	5 (4.2%)	9 (7.5%)	10 (8.3%)
Kutcha and pucca	0 (0%)	2 (1.7%)	22 (18.3%)
High-tech	0 (0%)	1 (0.8%)	2 (1.7%)
Kutcha and high-tech	0 (0%)	0 (0%)	4 (3.3%)

Chi-square = 27.201, df = 8, p-value = < 0.001

From the above Table 51 it is understood that, there exist a positive significant relationship between type of mushroom shed and yield. Majority (20%) of the mushroom entrepreneurs with kutcha type of mushroom shed for cultivation were having high yield. The National Horticulture Board (NHB, 2011) data show that, kutcha type shed is more favourable for mushroom cultivation, as it can provide suitable environmental factors which can contribute towards the high yield of mushroom.

4.3.2 Marketing avenue with family occupation

From Table 52 it could be inferred that, there exist a significant relationship between marketing avenue and family occupation. Majority (13.3%) of mushroom entrepreneurs marketing to both directly to consumers and local market were having mushroom along with agriculture as their main family occupation. From the study

findings it shows that, mushroom entrepreneurs who were having both agriculture and mushroom as their family occupation are having a clear knowledge and familiarization with different marketing outlets. This might be because, as they were regularly marketing their agricultural produce in various marketing outlets, through that they are occupying a well-known connection with these marketing outlets. So along with agricultural commodities they are marketing the mushrooms and its value added products. And the study also points out that, majority of mushroom entrepreneurs were selling directly to consumers, due to highly perishable nature of mushrooms and low keeping quality at room temperature. Also mushroom entrepreneurs can earn a stable income by selling directly to consumers.

4.3.3 Marketing avenue with income per season

From Table 53 it could be inferred that, there exist a significant relationship between marketing avenue and income. Around 21.7 per cent of mushroom entrepreneurs marketing both directly to consumers and to local market were having medium level of income. From the study it points out that majority of mushroom entrepreneurs who were marketing directly to consumers and local markets were only engage in production and marketing sectors. Here the mushroom entrepreneurs are not engage in value addition of mushroom, this might be one of the reason they were receiving income between Rs/- 25,000 - 50,000. Another reason pointed out from the study that, due to the price fluctuation of fresh mushroom especially between markets of two districts Trissur and Palakkad. In Trissur fresh mushrooms are fetching up high market price between (Rs/- 65 – 80 for 200 gram packets), whereas in Palakkad district it is comparatively low the market price for fresh mushroom only fetching between (Rs/- 40 to 70 for 200 gram packets). This might be due to the societal influence, in Palakkad the market support and diversification is very less and people were marketing only within their surroundings. While in Trissur marketing diversification is much improved, and people were marketing to wide areas within the districts. Also the study pointed out that in Trissur mushroom units promoted under SHGs are getting wide marketing support through nano markets, kudumbasree based local markets, online markets *etc*. whereas, this marketing support is found to be lacking in Palakkad district.

Table 52: Relationship between marketing avenue and family occupation (N = 120)

Categories Marketing avenue	Family occupation				
	Mushroom	**Mushroom + Agriculture**	**Mushroom + Retired employment + Agriculture**	**Mushroom + Business**	**Mushroom + Others**
Directly to consumers	0 (0%)	15 (2.5%)	3 (2.5%)	5 (4.2%)	11 (9.2%)
Directly to consumers and local markets	1 (0.8%)	**16 (13.3%)**	1 (0.8%)	4 (3.3%)	15 (12.5%)
Directly to consumers and town markets or super markets	1 (0.8%)	1 (0.8%)	0 (0%)	4 (3.3%)	4 (3.3%)
Directly to consumers and sold to wholesalers	0 (0%)	8 (6.7%)	0 (0%)	2 (1.7%)	3 (2.5%)
Directly to consumers, local markets and sold to wholesalers	9 (7.5%)	3 (2.5%)	0 (0%)	1 (0.8%)	6 (5.0%)
Directly to consumers, town markets / super markets and sold to wholesalers	4 (3.3%)	1 (0.8%)	0 (0%)	0 (0%)	2 (1.7%)

Chi-Square = 60.060, df = 20, p – value = < 0.000

Table 53: Relationship between marketing avenue and income per season (N=120)

Categories Marketing avenue	Income per season		
	< Rs/-25,000	**Rs /- 25,000 – 50,000**	**> Rs/- 50, 000**
Directly to consumers	21 (17.5%)	13 (10.8%)	0 (0%)
Directly to consumers and local markets	2 (1.7%)	**26 (21.7%)**	9 (7.5%)
Directly to consumers and town markets or super markets	0 (0%)	4 (3.3%)	6 (5.0%)
Directly to consumers and sold to wholesalers	0 (0%)	5 (4.2%)	8 (6.7%)
Directly to consumers, local markets and sold to wholesalers	0 (0%)	2 (1.7%)	17 (14.2%)
Directly to consumers, town markets / super markets and sold to wholesalers	0 (0%)	0 (0%)	7 (5.8%)

Chi-Square = 97.034, df = 10, p – value = < 0.000

4.4 Performance index of representative mushroom units with their dimensions

Four dimensions of performance index *i.e.*, Social Capital Indicators (SCI), Good Mushroom Cultivation Practices (GMCP), Efficiency Indicators (EI) and Incremental Expansion (IE) were considered for the study. And on the basis of the performance index the scores were obtained with respect to all the mushroom entrepreneurs.

4.4.1 Performance index dimensions

4.4.1.1 Social Capital Indicators (SCI)

Table 54: Distribution of mushroom units on the basis of Social Capital Indicators (SCI)

Sl.No	Social capital indicators categories	Frequency	Percentage
1	Low	15	12.50
2	Medium	85	70.83
3	High	20	16.66
	Total	**120**	**100**

From the above Table 54 it is understood that, majority (70.83%) of mushroom units had medium SCI, followed by 16.66 per cent of the mushroom units which had high SCI and remaining 12.50 per cent had low SCI.

Table 55: Distribution of type of units on the basis of Social Capital Indicators (SCI)

Categories	Production and marketing units (N = 68)		Production, processing and marketing units (N = 52)	
	Frequency	Percentage	Frequency	Percentage
Low	12	17.64	3	5.76
Medium	54	79.41	31	59.16
High	2	2.94	18	34.61
Total	**68**	**100**	**52**	**100**

From the above Table 55 it is seen that, 54 mushroom units from production and marketing type and 31 mushroom units from production, processing and marketing type had medium SCI, 18 mushroom units from production, processing and marketing type and 2 mushroom units from production and marketing type had high SCI and 12 mushroom units from production and marketing type and 3 mushroom units from production, processing and marketing type had low SCI.

4.4.1.2 Good Mushroom Cultivation Practices (GMCP)

Table 56: Distribution of mushroom units on the basis of Good Mushroom Cultivation Practices (GMCP)

Sl.No	Good mushroom cultivation practices categories	Frequency	Percentage
1	Low	8	6.66
2	Medium	87	72.5
3	High	25	20.83
	Total	**120**	**100**

From the above Table 56 it is understood that, majority (72.5%) of mushroom units had medium GMCP, whereas 20.83 per cent had high GMCP and remaining 6.66 per cent had low GMCP.

Table 57: Distribution of type of unit on the basis of Good Mushroom Cultivation Practices (GMCP)

Categories	Production and marketing units (N = 68)		Production, processing and marketing units (N = 52)	
	Frequency	Percentage	Frequency	Percentage
Low	4	5.88	4	7.69
Medium	57	83.82	30	57.69
High	7	10.29	18	34.61
Total	**68**	**100**	**52**	**100**

From the above Table 57 it is seen that, 57 mushroom units from production and marketing type and 30 mushroom units from production, processing and marketing type had medium GMCP, 18 mushroom units from production, processing and marketing type and 7 mushroom units from production and marketing type had high GMCP and 4 mushroom units from production, processing and marketing type and 4 mushroom units from production and marketing type had low GMCP.

4.4.1.3 Efficiency Indicators (EI)

Table 58: Distribution of mushroom unit on the basis of Efficiency Indicators (EI)

Sl.No	Efficiency indicators categories	Frequency	Percentage
1	Low	26	21.66
2	Medium	92	76.66
3	High	2	1.66
	Total	**120**	**100**

From the above Table 58 it is understood that, 76.66 per cent of mushroom units had medium EI, followed by 21.66 per cent which had low level of EI and remaining 1.66 per cent had high level of EI.

Table 59: Distribution of type of unit on the basis of Efficiency Indicators (EI)

Categories	Production and marketing units (N = 68)		Production, processing and marketing units (N = 52)	
	Frequency	Percentage	Frequency	Percentage
Low	20	29.41	6	11.53
Medium	46	67.64	46	88.46
High	2	2.94	0	0
Total	**68**	**100**	**52**	**100**

From the above Table 59 it is seen that, 46 mushroom units from production, processing and marketing type and 46 mushroom units from production, and marketing type had medium EI, 20 mushroom units from production and marketing type and 6 mushroom units from production, processing and marketing type had low EI and 2 mushroom units from production and marketing type had high EI and none of the mushroom units from production, processing and marketing type had high EI.

4.4.1.4 Incremental Expansion (IE)

Table 60: Distribution of mushroom unit on the basis of Incremental Expansion (IE)

Sl.No	Incremental expansion categories	Frequency	Percentage
1	Low	26	21.66
2	Medium	71	59.16
3	High	23	19.16
	Total	**120**	**100**

From the above Table 60 it is understood that, majority (59.16%) of mushroom units had medium IE, followed by 21.66 per cent which had low IE and remaining 19.16 per cent had high IE.

Table 61: Distribution of type of unit on the basis of Incremental Expansion

Categories	Production and marketing units (N = 68)		Production, processing and marketing units (N = 52)	
	Frequency	Percentage	Frequency	Percentage
Low	19	27.94	7	13.46
Medium	47	69.11	24	46.15
High	2	2.94	21	40.38
Total	**68**	**100**	**52**	**100**

From the above Table 61 it is seen that, 47 mushroom units from production and marketing type and 24 mushroom units from production, processing and marketing type had medium IE, 19 mushroom units from production and marketing type and 7 mushroom units from production, processing and marketing type had low IE and 21 mushroom units from production, processing and marketing type and 2 mushroom units from production and marketing type had high IE.

4.4.1.5 Overall performance score

Table 62: Distribution of mushroom unit on the basis of overall performance score

Sl.No	Overall performance categories	Frequency	Percentage
1	Low (<57)	25	20.83
2	Medium (57-77)	75	62.50
3	High (>77)	20	16.66
	Total	**120**	**100**
	Mean = 67.67 **SD = 10.28**		

From the above Table 62 it is understood that, in the case of overall performance score, majority (62.50%) of the mushroom units were in the medium performers category, followed by 20.83 per cent in the low performers category and remaining 16.66 per cent in the high performers category.

Table 63: Distribution of type of unit on the basis of overall performance score

Categories	Production and marketing units (N = 68)		Production, processing and marketing units (N = 52)	
	Frequency	Percentage	Frequency	Percentage
Low	18	26.47	7	13.46
Medium	48	70.58	27	51.92
High	2	2.94	18	34.61
Total	**68**	**100**	**52**	**100**

From the above Table 63 it is seen that, 70.58 per cent of mushroom units from production and marketing type and 51.92 per cent of mushroom units from production, processing and marketing type were in the medium performers category, 26.47 per cent of mushroom units from production and marketing type and 13.46 per cent of mushroom units from production, processing and marketing type were in the low performers category and 34.61 per cent of mushroom units from production, processing and marketing type and 2.94 per cent of mushroom units from production and marketing type were in the high performers category.

Table 64: Distribution of mushroom growing units based on their dimensions of performance index

(N = 120)

Sl. No.	Dimensions	Category	Frequency	Percentage
1	Social capital indicators	Low	15	12.50
		Medium	85	70.83
		High	20	16.66
2	Good mushroom cultivation practices	Low	8	6.66
		Medium	87	72.50
		High	**25**	**20.83**
3	Efficiency indicators	Low	**26**	**21.66**
		Medium	**92**	**76.66**
		High	2	1.66
4	Incremental expansion	Low	**26**	**21.66**
		Medium	71	59.16
		High	23	19.16
5	Overall performance score	Low	25	20.83
		Medium	**75**	**62.50**
		High	20	16.66

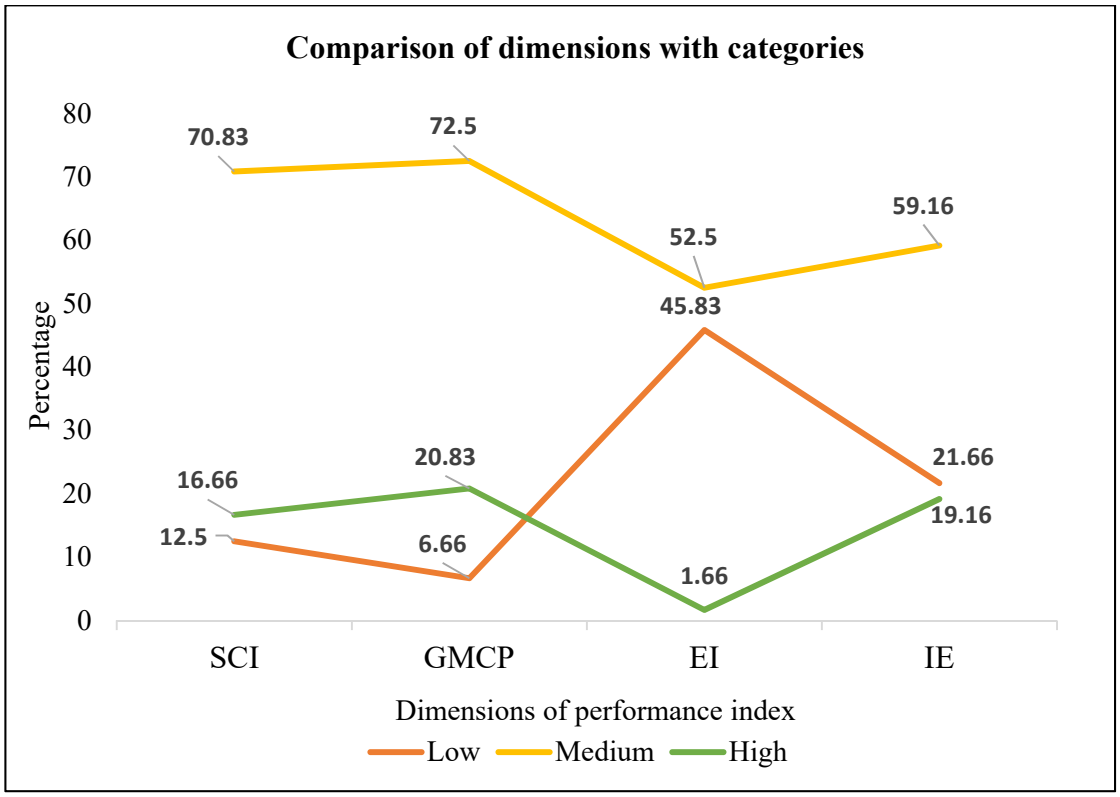


Figure 21: Comparison of dimensions with categories

From the above Table 64 and Figure 21 it is understood that, among the four dimensions, majority (20.83%) of mushroom units performers under the high category were in the dimension good mushroom cultivation practices, followed by 19.16 per cent in incremental expansion, 16.66 per cent in social capital indicator and 1.66 per cent in efficiency indicators. In the case of medium category, 76.66 per cent of mushroom units performers in the medium category were under the dimension efficiency indicators, followed by 72.50 per cent in good mushroom cultivation practices, 76.83 per cent in social capital indicator and remaining 59.16 per cent were in incremental expansion. In the case of low category, an equal proportion nearly 21.66 per cent of mushroom units performers under the low category were in the dimension efficiency indicators and incremental expansion, followed by 12.50 per cent in social capital indicators and remaining 6.66 per cent under good mushroom cultivation practices. The overall performance index score based on the cumulative scores of all dimensions found that, majority (62.50%) mushroom units were belongs to medium performers category whereas, 20.83 per cent in the low performers category and remaining 16.66 per cent in the high performers category.

4.5 Comparison of performance index dimensions with the type of units (production and marketing and production, processing and marketing)

4.5.1 Binary logistic regression analysis

Table 65: Comparison of performance index dimensions with the type of units using binary logistic regression

Categories	B	S.E.	Wald	df	Sig	Odds ratio
SCI	0.77	0.24	10.515	1	**.001****	**1.080**
GMCP	0.44	0.36	1.518	1	.218	1.045
EI	-0.23	0.63	.135	1	.713	.977
IE	0.002	0.23	.007	1	.932	1.002

From the above Table 65 it is seen that, the dimension Social Capital Indicators (SCI) shows a significant relationship with the type of units, *i.e*, production and marketing units and production, processing and marketing units. As the dimension SCI increases the chance of mushroom entrepreneur to move in to production, processing and marketing type of unit increases. Other dimensions such as Good Mushroom Cultivation Practices (GMCP), Efficiency Indicator (EI) and Incremental Expansion (IE) are not showing any significant relationship with the type of units.

4.5.2 Discriminant analysis

Table 66: Comparison of performance index dimensions with the type of units using discriminant analysis

Categories of dimensions	Function
Social Capital Indicators (SCI)	**.853**
Good Mushroom Cultivation Practices (GMCP)	.283
Efficiency indicator (EI)	-.090
Incremental Expansion (IE)	0.13

Test of Functions (s)	Wilk's Lambda	Chi-Square	df	Sig
	.739	35.118	4	**.000****

The above Table 66 shows that, the Social Capital Indicators (SCI) is the deciding factor that separates two types of units such as production and marketing unit and production, processing and marketing unit.

The above Table 65 and Table 66 shows that, both Binary logistic regression and Discriminant analysis indicated that Social Capital Indicator (SCI) is the major dimension, which shows significant relationship with type of mushroom units. This might be due to several reasons such as degree of networking of mushroom entrepreneurs with other mushroom entrepreneurs, consumers and marketing associations, interaction with advisory services, exchanging knowledge and information about recent developments in mushroom cultivation technology with the other mushroom entrepreneurs, utilization of mass media for promoting mushroom enterprises, access to various input based services *etc*. Thus it can be deduced that for evaluating the overall performance and development of mushroom enterprises SCI can be a major contributing dimension. Here, the efficiency indicators are negatively influencing and this is clearly pointed out from the survey that marketing difficulty is significantly affecting efficiency indicators.

4.6 Relationship of independent variables with the performance of mushroom units using Spearman's rank correlation coefficient

Relationship of independent variables with dependent variable are mainly analysed by using Spearman's rank correlation coefficient method. The obtained results were interpreted in Table 67 and it is understood that the independent variables such as size of production unit, income, type of mushroom shed, yield, experience, marketing avenue, mode of transport for sale of goods, risk orientation, extension contact and institutional support had a positive significant relationship with the performance index at 0.01 per cent level. The independent variables like family occupation and source of labour had a negatively significant relationship with the performance index at 0.01 per cent level. Whereas, education possess a negative significant relationship with the performance index at 0.05 per cent level. A part from that the independent variables such as economic motivation and age doesn't shows any significant relationship with the performance index of mushroom units.

Table 67: Relationship of independent variables with the performance of mushroom units

Sl. No	Independent variables	Correlation value (r_{sp})
1	Age	0.124
2	Education	-0.200*
3	**Family occupation**	**-0.394****
4	**Size of production unit**	**0.641****
5	**Income**	**0.786****
6	**Type of mushroom shed**	**0.265****
7	**Yield**	**0.750****
8	**Experience**	**0.736****
9	**Source of labour**	**-0.483****
10	**Marketing avenue**	**0.718****
11	**Mode of transport for sale of goods**	**0.354****
12	Economic motivation	0.152
13	**Risk orientation**	**0.319****
14	**Extension contact**	**0.356****
15	**Institutional support**	**0.286****
Note :- ** Significant at 0.01 level (2 – tailed) * Significant at 0.05 level (2 – tailed)		

The size of production unit shows a positive significant relationship with the performance index. Here as the production unit size get increases, more number of mushroom beds can be accommodated. Thus the production capacity also get increases. Income shows a positive significant relationship with performance index. As the income level of mushroom entrepreneurs increases their correlation with performance index also get increases. The study revealed that mushroom entrepreneurs who engage in production, processing and marketing were receiving high income. Type of mushroom shed shows a positive significant relationship with the performance index. Kutcha type shed favours with all necessary environmental conditions required for the mushroom

production, hence mushroom entrepreneurs with kutcha type shed shows a positive correlation with the performance index. Yield shows a positive significant relationship with the performance index. So mushroom entrepreneurs with higher yield will have a better performance index.

Experience shows a positive significant relationship with performance index. Mushroom entrepreneurs with high experience were having an enhanced performance index. Marketing avenue shows a positive significance relationship with performance index. Mushroom entrepreneurs with a proper marketing avenue had improved performance index. Mode of transport for sale of goods shows a positive significant relationship with the performance index. The study pointed out that, mushroom entrepreneurs with own vehicle were having a better performance index. Here the transportation charge is less while comparing with that of public transportation.

Risk orientation shows a positive significant relationship with performance index. Mushroom entrepreneurs with better risk orientation capacity were having improved performance index. Mushroom entrepreneurs with high extension contact were having better performance index. Here the mushroom entrepreneurs are receiving better advisory or consultancy services, thus their performance index also increasing. Institutional support shows a positive significant relationship with the performance index. Mushroom entrepreneurs receiving better institutional support were having high performance index.

Family occupation shows a negative significant relationship with performance index. It can be inferred from the study that majority of the mushroom entrepreneurs were cultivating mushroom as their secondary occupation. This might be because most of the mushroom entrepreneurs are seasonal cultivators and they take up mushroom cultivation as a source of additional income. Source of labour shows a negative significant relationship with performance index. It could be inferred from the study that, majority of the mushroom entrepreneurs had family / group labour than hired labour as their labour source. It might be due to lack of skill and technological knowledge and also the family / group labour take up more time for mushroom cultivation activities than the skilled labour.

4.7 Constraints faced by producers

Constraints of mushroom entrepreneurs were analysed using Garret ranking method. Several constraints faced by mushroom entrepreneurs were listed out in the key informant interview schedule and they were asked to rank them according to the importance felt by them. And the following ranking was obtained.

Table 68: Constraints faced by producers

Sl. No	Constraints	Mean score	Rank
1	Marketing difficulty	88.95	1
2	Price instability	78	2
3	Lack of market information	76.91	3
4	Lack of financial support from government	76.16	4
5	Lack of consumer awareness	75.03	5
6	Lack of knowledge about value addition	73.66	6
7	Non-availability of quality spawn	71.5	7
8	Pest and disease infestations	71.25	8
9	Lack of training facilities	68.48	9
10	Lack of processing equipments	67.55	10
11	Lack of storage facilities	66.47	11
12	Climatic irregularities	62.92	12
13	Lack of space	61.21	13
14	High investment cost	44.65	14
15	High labour cost	41.1	15

Major constraints faced by mushroom entrepreneurs were, marketing difficulty, price instability, lack of market information, lack of financial support from government, lack of consumer awareness, lack of knowledge about value addition, non-availability of quality spawn and lack of training facilities. Similar study findings related to mushroom constraints were identified by, Deshmukh *et al*., (2001), Kunwar (2002), Thakara and Gupta (2004), Singh and Singh (2006), Patnayak and Mishra (2008), Singh *et al*., (2008) and Singh *et al*., (2011).

4.8 Scenario analysis

Table 69: Drivers and Trends of mushroom enterprises

Sl. No	Drivers	Trends
1	Favorable consumer preference	1) Domestic demand increases
2	Initial investment and maintenance of mushroom enterprise	2) Labour costs increases 3) Requires high skilled labours
3	Better technical support	4) Diversification of value added products 5) Branding of mushroom and its products 6) Government support and schemes
4	Export opportunities	7) Round the year production of mushroom 8) Promoting mushroom varieties rendering to various climatic conditions 9) Advancement in storage and packing of mushroom products
5	Creating more awareness and capacity building programmes among women	10) Involvement of women increases
6	Wider reach of social media networks	11) Promotes through social media networks
7	Enhancing skills and trainings	12) Possibility of secondary occupations from mushroom cultivation

Table 69 reveals about the twelve trends seen in the mushroom enterprises along with its seven drivers to forecast the possible future scenario for this sector.

Table 70: Trends analysis

Sl. No	Trends	Uncertainty Score	Importance Score	Total Score	Rank
1	**Domestic demand increases**	**12**	**11**	**23**	**I**
2	Labour costs increases	2	3	5	XI
3	High Skilled labour	1	9	10	VIII
4	Branding of mushrooms and its products	3	1	4	XII
5	**Government support and schemes**	**11**	**10**	**21**	**II**
6	Involvement of women	6	2	8	X
7	Promotes through social media networks	5	4	9	IX
8	Diversification of value added products	10	6	16	V
9	Round the year mushroom production	7	5	12	VI
10	Promoting different mushroom varieties rendering to various climatic conditions	8	12	20	III
11	Advancement in storage and packing of mushroom products	4	7	11	VII
12	Possibility of secondary occupations from mushroom cultivation	9	8	17	IV

Table 70 shows the trends analysis of mushroom enterprises, in which the trends were ranked according to their level of uncertainty and importance. For each one of the trends a total score was calculated using, uncertainty-importance scoring. By projecting in a graph, the trends with the first two ranks, *i.e.*, domestic demand increases and government support and schemes were chosen for future interpretation.

Figure 22 shows the futures derived from scenario analysis and it was observed that FUTURE B was the most idealistic future in which both domestic demand and government support schemes were high, this leads to increase in infrastructure and equipments, increase in small scale mushroom enterprise, more product diversification and increase in quality and mushroom types. While FUTURE A was the most likely or realistic future in which domestic demand were high whereas government support and schemes where low, this encourages entry of more private actors, establishment of entrepreneurs association, increase in product diversification and more utilization of social media and online marketing platforms.

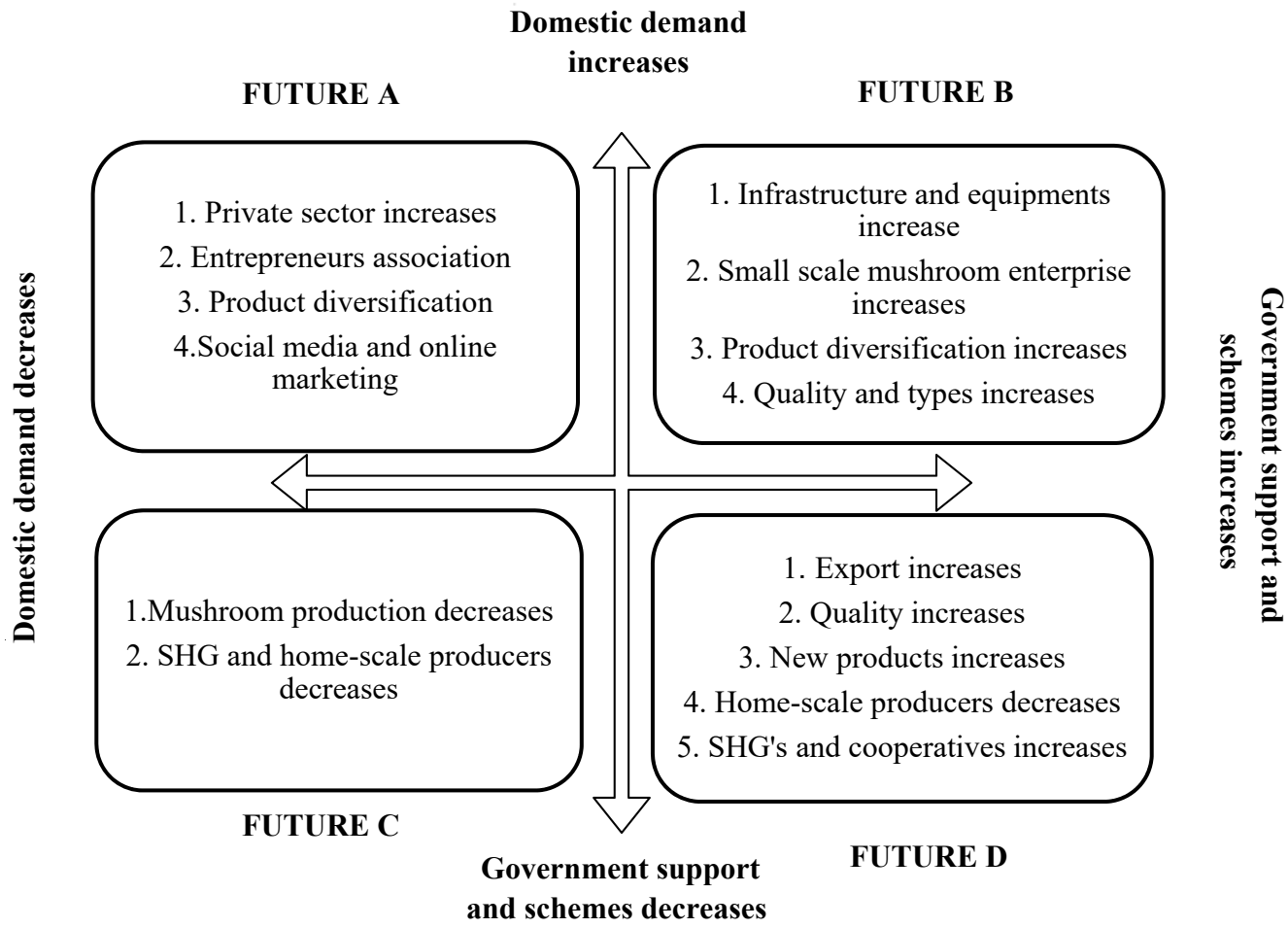


Figure 22: Futuristic scenario for the mushroom enterprises in Kerala.

Summary and conclusions

CHAPTER V

SUMMARY AND CONCLUSION

Mushrooms have aroused man's interest since the dawn of civilization. Mushrooms are deliberated as a complete source of health food, due to their nutritional and therapeutic characteristics as well as their capacity to produce proteins required for the body. Mushroom cultivation offers high level of satisfaction, employment opportunities, revenue and continued practice of mushroom cultivation leads to a complete fulfilment for both the families and villages. It also have the capacity to assist rural society in establishing more long term economic growth. Even though a field with great scope for exploration, the studies with extension aspects are very limited in this area. Hence, this gives the importance of studying scenario analysis of mushroom microenterprises. With these reflections in mind, the current study was conducted with the underlying objectives.

1. To analyse the type and structure of the mushroom enterprises.
2. To evaluate the performance of representative mushroom units.
3. To document the characteristics of the mushroom entrepreneurs.
4. To identify the constraints experienced by the producers.
5. To suggest measures for improvement of the mushroom enterprise.

The present study was conducted in the Thrissur and Palakkad districts of Kerala state. Criterion based random sampling was used for district selection, having the highest number of mushroom units under SHG's RKVY including the home scale based micro producing units. Sixty mushroom entrepreneurs each from Thrissur and Palakkad districts, mainly engaged in production (spawn / mushroom) and marketing; production, processing and marketing were randomly selected for the study, thus making a total of 120 respondents. The independent variables and dependent variable required for the study were selected through judges rating with expert extension professionals. Then an interview schedule had prepared and data from the mushroom entrepreneurs were obtained using this interview schedule. The obtained data were arranged, scored and analysed using various statistical tools. The analysis of the obtained data were done using, statistical tools such as descriptive statistics, two way

contingency table, chi-square test, binary logistic regression, discriminant analysis, garret ranking method and Spearman's rank correlation coefficient method.

In descriptive statistics, the methods viz. frequency table, arithmetic mean, standard deviation and percentages were used to classify the type of mushroom units, the structure of mushroom units, mushroom entrepreneurs characteristics and institutional support into various categories. A two way contingency table and chi-square test were used to study the relationship between mushroom entrepreneurs characteristics. The performance index for representative mushroom units was calculated using the method adopted from the study of (Shirur *et al*., 2018). The performance index consists of four dimensions viz. SCI, GMCP, EI and IE. Finally the dimensions of the performance index was compared with the type of mushroom units, inorder to find out the major dimension which shows a positive significant relationship with the type of mushroom units. The analysis was performed using the methods binary logistic regression and discriminant analysis. Various constraints faced by the mushroom producers were analysed using the Garret ranking method. Using Spearman's rank correlation method, the relationship between independent variables and the dependent variable was found. Finally a scenario analysis was also conducted to predict the futuristic possibilities of mushroom enterprises in Kerala.

5.1 Remarkable findings of the study were:

5.1.1 Type of mushroom units

- Out of 120 mushroom units, majority (56.66%) of the units were engaged in production and marketing activities, while 43.33 per cent of mushroom units were engaged in production, processing and marketing activities.
- The majority (61.66%) of the production and marketing type of mushroom units were located more in the Palakkad district. Whereas, only 51.66 per cent of production and marketing units were in Thrissur district.

- The Thrissur district was home to a sizable proportion of mushroom production, processing and marketing units, accounting for nearly 48.33% of all mushroom units. Only 38.33 percent of production, processing and marketing units were located in the Palakkad district.
- Production and marketing units were mainly engaged in activities such as production of fresh mushroom and mushroom beds preparation.
- Production, processing and marketing units were engaged in production of fresh mushroom, production of mushroom beds and preparation of several value added mushroom products. The value added products includes mushroom pickle, mushroom biscuits, dry mushroom, mushroom powder, mushroom cutlet, mushroom roll, mushroom burger, mushroom pakovada *etc.*

5.1.2 Profile characteristics of mushroom entrepreneurs

- Majority (43.33%) of the mushroom entrepreneurs belong to the age category of 31-40 years. And it showed that the majority 48.07 per cent of mushroom entrepreneurs from production, processing and marketing units were more under this age category.
- Among the mushroom entrepreneurs most of them had graduate level of education around 40.83 per cent. The study also pointed out that most of the mushroom entrepreneurs nearly 44.23 per cent from production, processing and marketing units were having graduate level of education.
- Mushroom along with agriculture was the major family occupation for majority (37.5 %) of the mushroom entrepreneurs. The study pointed out that most of the mushroom entrepreneurs around 50 per cent from production and marketing units were had mushroom along with agriculture as their main source of family occupation.
- Majority (41.66%) of the mushroom entrepreneurs had a medium level of income per season. And among that 57.35 per cent of mushroom entrepreneurs from production and marketing units earned more than a medium level income per season.

- Majority (51.66%) of the mushroom entrepreneurs obtained high yield from mushroom cultivation. The study pointed out that the majority (75%) of the mushroom entrepreneurs from production, processing and marketing units had high yield.
- Mushroom entrepreneurs around 28.33 per cent of them possess experience in the range of three and half to five years. Among that majority, 35.29 per cent of mushroom entrepreneurs from production and marketing units had experience of three and half to five years.
- Marketing directly to consumers and to local markets were the major marketing avenue of the majority (30.83%) of mushroom entrepreneurs. From the study, it was pointed out that the majority (36.76%) of mushroom entrepreneurs from production and marketing units were choosing more direct marketing avenues to consumers and local markets.
- Own vehicle was used by the majority (68.33%) of the mushroom entrepreneurs as the source of transportation for the sale of mushroom goods. Among those, 85.29 per cent of mushroom entrepreneurs from production and marketing units were using their own vehicle.
- Eighty per cent of mushroom entrepreneurs had medium level of economic motivation.
- Majority (54.16%) of the mushroom entrepreneurs had medium level of risk orientation.
- A high proportion of mushroom entrepreneurs around 71.66 per cent possess medium level of extension contact.
- Majority (48.33%) of mushroom entrepreneurs were availing institutional support in the form of training and SHM subsidy.
- The various institutions providing support for mushroom cultivation include Kerala Agricultural University, Extension Centers, Research Organizations, State Horticulture Mission and Kudumbasree District Mission office.

- From the study it could be inferred that the mobility of mushroom entrepreneurs differs according to the frequency of travel opted for various purposes.
- Mushroom entrepreneurs characteristics such as type of mushroom shed with yield per season; family occupation with marketing avenue; marketing avenue with income per season showed a positive significant relationship in the two way contingency table and chi-square analysis.

5.1.3 Structure of mushroom unit

- Around 40.83 per cent of the mushroom entrepreneurs had a production unit size of more than 500 sq.feet. Majority (63.46%) of mushroom entrepreneurs from production, processing and marketing units had a production unit size of above 500 square feet.
- Majority (54.16%) of the mushroom entrepreneurs had Kutcha type of mushroom shed for cultivation. The study pointed out that majority (63.23%) of mushroom entrepreneurs from production and marketing units had Kutcha type shed.
- A high percentage of family or group labour was used by 75.83 of mushroom entrepreneurs as a source of labour. Majority (88.23%) of mushroom entrepreneurs from production and marketing units used more family or group labour.
- Most of the mushroom entrepreneurs had various equipments within the range of 2 – 4 numbers.

5.1.4 Other salient findings from the study:-

- A large proportion nearly 61.66 per cent of the mushroom entrepreneurs were females.
- Majority (85.83%) of mushroom entrepreneurs were sole entrepreneurs.
- From the study it showed that the majority (81.66%) of mushroom entrepreneurs used their own source of investment for mushroom enterprise related purposes.

- Oyster mushrooms were being cultivated by a large proportion of mushroom entrepreneurs, nearly 68.33 per cent.
- Thirty five per cent of mushroom entrepreneurs were collecting spawn for mushroom production from government sources.
- A majority (84%) of mushroom entrepreneurs received trade marks for their mushrooms and its products.
- Majority (75.83%) of mushroom entrepreneurs were using polythene cover as their packing material for packing fresh mushrooms and its products.
- Majority (79.16%) of mushroom entrepreneurs don't have any difference with respect to the yield and quality of spawn, whereas 20.83 per cent of them had problems regarding yield and quality of spawn.

5.2 Performance of representative mushroom units

- Four performance index dimensions were mainly taken for the study. The dimensions were Social Capital Indicator (SCI), Good Mushroom Cultivation Practices (GMCP), Efficiency Indicator (EI) and Incremental Expansion (IE).
- Majority of mushroom units (70.83%) had a medium level of social capital indicator. Among that 54 mushroom units from production and marketing type were more in the medium category of SCI dimension.
- A high proportion of mushroom units around 72.50 per cent had a medium level of good mushroom cultivation practices. Among that 57 mushroom units from production and marketing type were more in the medium category of GMCP dimension.
- Around 59.16 per cent of mushroom units had a medium level of incremental expansion. Among those an equal proportion of 46 mushroom units from the production, processing and marketing type and 46 mushroom units from production and marketing type had medium EI.

- Majority of mushroom units around 52.50 per cent had a medium level of efficiency indicator. Among that 47 mushroom units from production and marketing type were more in the medium category of IE dimension.
- The overall performance score for mushroom units revealed that majority (62.50%) of mushroom enterprises were in medium performers category.
- The dimension Social Capital Indicator (SCI) showed a more significant relationship with the two types of units; production and marketing units and production, processing and marketing units. Thus it can be deduced that for evaluating the overall performance and development of mushroom units SCI can be a major contributing dimension.

5.3 Relationship of independent variables with the performance of mushroom units

The relationship of independent variables with the performance index was mainly assessed by using the Spearman's rank correlation coefficient method. The obtained results pointed out that education, family occupation and source of labour had a negative significant relationship with the performance index. Whereas the independent variables like size of production units, income per season, type of mushroom shed, yield per season, experience, marketing avenue, mode of transport for sale of goods, risk orientation, extension contact and institutional support were positively correlated.

5.4 Constraints faced by mushroom producers

The major constraints faced by mushroom entrepreneurs were; marketing difficulty, price instability, lack of market information, lack of financial support from government, lack of consumer awareness, lack of knowledge about value addition, non-availability of quality spawn and lack of training facilities.

5.6 Futuristic scenario

The futuristic scenario of mushroom enterprises had been analysed using the drivers and trends, based on their importance and uncertainty. It was observed from the study that the most realistic or likely future is FUTURE A and the idealistic future is FUTURE B.

5.7 Suggestions for the improvement of mushroom enterprise

Mushroom entrepreneurs are facing various problems regarding the several aspects such as mushroom production, processing and marketing. Based on the constraints faced by mushroom entrepreneurs various suggestions have been developed. The suggestions have been developed on the basis of data and information obtained during the data collection. The suggestions were pooled and listed out below:-

- As majority of the mushroom entrepreneurs are facing difficulties in marketing, suitable marketing support, fixing proper price for mushrooms and exploration of new marketing channels need be implemented.
- Promote more direct marketing methods for both fresh and processed mushrooms.
- Creating more awareness among the public can increase the demand for mushroom and thus the marketing can also improve.
- Provide trainings to mushroom producers on accessing marketing information, value addition techniques and post-harvest storage facilities.
- Schemes to support the working of mushroom enterprise more smoothly need be implemented.
- Extension interventions need to be designed for supporting the mushroom enterprises and reducing constraints.
- Various mushroom based activities like diverse type of processing, compost production *etc.* should be promoted among mushroom entrepreneurs.
- Creating mushroom entrepreneurs association and promoting mushroom units through social media.
- Enhancing managerial skill among mushroom entrepreneurs through capacity building programs.

Plate 1: Visit to production, processing and marketing unit

Plate 2: Interaction with mushroom entrepreneurs

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Appendices

APPENDIX I

INTERVIEW SCHEDULE FOR THE MUSHROOM ENTREPRENEURS

KERALA AGRICULTURAL UNIVERSITY

COLLEGE OF AGRICULTURE, VELLANIKARA, THRISSUR

DEPARTMENT OF AGRICULTURAL EXTENSION

'Scenario analysis of mushroom microenterprises'

1. General information of the mushroom entrepreneurs

Name:- ……..

Place:-……..

District:-……..

Gender:- Male ☐ Female ☐

Phone number:-……

2. Socio-economic profile of the mushroom entrepreneurs

Age:- 1) Below 30 years ☐ 2) 31- 40 years ☐

3) 41-50 years ☐ 4) Above 50 years ☐

Education level:-

Sl. No	Education level categories	
1	Illiterate	
2	Primary education	
3	Secondary education	
4	High school	
5	Higher secondary	
6	Graduate	
7	Post graduate	

Family occupation:-

Sl. no	Name	No. of. family members	Relationship with the respondent	Occupation	
				Main	Secondary

Entrepreneur status:-

1) Sole entrepreneur ☐ 2) Joint entrepreneur ☐

Size of production unit in (Sq. feet):-

1) Less than 250 ☐ 2) 250 - 500 ☐ 3) Above 500 ☐

Source of finance:-

1) Rural bank ☐ 2) Private money lender ☐

3) Cooperative society / Bank ☐ 4) Private organizations / NGO ☐

5) Nationalized / Public sector bank ☐ 6) Others (Specify) …….

Income per season:-

Income from mushroom microenterprise alone ……. (Rs/-)

1) < Rs 25,000/- ☐ 2) Rs 25,000/- – Rs 50,000/- ☐

3) > Rs 50,000/- ☐

Type of mushroom cultivated:-

1) Oyster mushroom ☐ 2) Button mushroom ☐

3) Milky mushroom ☐ 4) Paddy straw mushroom ☐

5) Shiitake mushroom ☐

Type of mushroom shed

1) Kutcha shed ☐ 2) Pucca shed ☐ 3) High-tech shed ☐

Source of getting spawn:-

1) Government source ☐ 2) Local traders ☐

3) Outside traders ☐ 4) Own producers ☐

Do you find any difference in yield and quality of spawn received from various sources?

Yes ☐ No ☐

If yes, please explain…….....

Name the variety of spawn you used for mushroom production……

Do you have a spawn producing unit? Yes ☐ No ☐

How much monthly income you generate through spawn producing …… (Rs/-)

Yield per season:-

a) What is the yield of mushroom from one harvest/ single bed?

b) How many times do you grow mushroom in a year?

c) What will be the average yield / season ?

Do you sell mushroom on the same day of harvest? Yes ☐ No ☐

If No, within how many days please explain……..

Do you face any problem of spoilage of mushroom? Yes ☐ No ☐

If yes, please explain **……..**

Experience:-

1) 6 months – 1 1/2 years ☐ 2) 1 ½ - 3 years ☐

3) 3 ½ - 5 years ☐ 4) Above 5 years ☐

Source of labour:-

Sl. No	**Category**	**Wage paid (Rs/-)**	**No. of. labours**	**No. of days engaged**
1	Permanent labour			
2	Temporary labour			
3	Family labour / Group labour			

What kind of packing material is used for mushroom packing?

1) Corrugated boxes ☐ 2) Mushroom trays ☐

3) Polythene covers ☐ 4) Others (Specify) ……

Do you have any trade mark / brand name on the packaging? Yes ☐ No ☐

If any, Please mention it ……..

Marketing avenue:-

a) Marketing of fresh mushroom

Sl. No	**Marketing channel**	**Quantity marketed (g) or % marketed**	**Price (Rs/-)**	**Returns (Rs/-)**
1	Local market			
2	Town market / Super markets			
3	Directly to consumers			
4	Sold to wholesaler			
5	Others (Specify)			

Are you doing value addition in mushroom? Yes ☐ No ☐

If yes, list the value added products

Sl. No	Items

b) Marketing of processed mushroom products:-

Sl. No	Marketing Channel	Quantity Sold / year	Price (Rs/-)	Return (Rs/-)
1	Local markets			
2	Town markets / Super market			
3	Directly to consumers			
4	Sold to wholesalers			
4	Others (Specify)			

Mode of transport for sale of goods:-

1) Own vechicle ☐ 3) Through public conveyance ☐

2) Group owned vechicle ☐ 4) Others (Specify)……

Mobility

How often do you travel?

Sl. No	Categories	Frequency of visit (Yearly)			
		Local areas	Nearby panchayath	Nearby town	Distant town
1	Mushroom enterprise				
2	Agriculture related				
3	Entertainment purpose				
4	General purpose				
5	Marketing purpose				

Economic motivation:-

Sl. No	Statement	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
1	Entrepreneur works towards longer production and economic profits					
2	A most successful entrepreneur puts in constant efforts to make economic prospective					
3	An entrepreneur takes risks in trying innovations which fetch him more profit					
4	Entrepreneur expands his production unit for better income					
5	Entrepreneurs are money minded and this approach affects the social value of the community					
6	Everything cannot be evaluated in economic terms, one should bother more for social prestige					

Risk orientation:-

Sl. No	Statement	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
1	Entrepreneur who is willing to take greater risk than the average entrepreneur usually do better financially					
2	It is good for an entrepreneur to take risks when he knows his chance of success is fairly light					
3	Trying an entirely new technology in enterprise by an entrepreneur involves risk but it is worth					
4	An entrepreneur should take more of a chance in making big profit than to be contented with the smaller but less risky					
5	Entrepreneur should adopt large number of improved technologies to avoid greater risks involved in adopting one or two technologies					
6	It is better for an entrepreneur not to adopt new technology unless others do					

Extension contact:-

Sl. No	Particulars	Frequency of contact		
		Regularly	**Occasionally**	**Never**
1	Agriculture department officers			
2	Scientists of research organisation			
3	Private consultants			
4	Officials of NGO			
5	Kudumbashree block coordinator			
6	SHM field assistant			

3. Performance of mushroom units

Social Capital Indicators : Mark the appropriate response for your mushroom unit

1) Extent of your clients network and marketing linkages for mushroom micro enterprise is
   a) Limited to Block level b) District level c) State level
2) Extent of your network with the other growers and marketing linkage for mushroom enterprise is
   a) Limited to Block level b) District level c) State level
3) Your access to quality input services for day to day operations
   a) Rarely b) Often c) Most of the times
4) Frequency of other mushroom growers seeking your advice for their problems
   a) Rarely b) Often c) Most of the times
5) Your interaction with the advisory or consultancy services to discuss about mushroom enterprise?
   a) Rarely b) Often c) Most of the times

6) Extent of using social media / print media to advertise and promote your enterprise?
   a) Rarely b) Often c) Most of the times
7) Your access to machinery services for operating your enterprises
   a) Rarely b) Often c) Most of the times

Good Mushroom Cultivation Practices : Mark the appropriate response for your mushroom unit

Sl. No	Statements (GMCPs)	Never / Rarely	Often	Regularly
1	I cultivate different varieties of mushroom for farm diversification and income stability			
2	I give sufficient attention for maintaining hygiene in and around the farm			
3	The quality of compost / substrate, casing and growing conditions in every part of the growing room are uniform			
4	I always maintain proper records of farm inputs, mushroom yield, farm operations, accounts, costs and profits.			
5	I adopt physical and cultural control measures for managing pests and disease in the farm			
6	I take measures for proper disposal of mushroom residues and spent mushroom substrates			

Efficiency Indicators : Mark the appropriate response for your mushroom unit

1) Quantum of fresh mushroom produced per kg in one season

Sl. No	Productivity	Button mushroom	Milky mushroom	Oyster mushroom	Paddy straw mushroom	Others
1	Low					
2	Medium					
3	High					

2) Benefit cost ratio of mushroom unit

a) Less than 1.0 b) 1.0 – 1.5 c) More than 1.5

Sl. No	Inputs	Cost	Output	Costs	B:C ratio
1	Mushroom shed		Raw mushroom		
2	Water and electricity		Processed mushroom		
3	Labours		Compost		
4	Equipment's		Spawn		
5	Spawn				
6	Mushroom				
7	Paddy straw/ Compost/ Saw dust				
8	Miscellaneous				
9	Interest on fixed cost				

3) Keeping quality of fresh mushroom from your unit under normal room conditions

Sl. No	Keeping quality	Button	Milky	Oyster	Paddy straw	Shiitake
1	Low					
2	Medium					
3	High					

4) Marketability and salability of fresh mushroom produced in the mushroom unit

Sl. No	Marketability and Salability	Criteria
1	Low	Partly sold fresh at average price
2	Medium	Partly sold fresh at premium price
3	High	All sold fresh at premium price

5) Ratio of first grade mushrooms to second grade mushrooms in the unit

a) Less than 60% b) 60 – 80 % c) More than 80%

Incremental Expansion: Mark the appropriate response for your mushroom unit

Sl. No	Statements	Never / Rarely	Often	Regularly
1	The machinery and infrastructure in the unit are being upgraded with the passage of time			
2	The scale and size of the unit are increasing with the passage of time			
3	The social capital of the unit are improving with the passage of time			
4	The Good Mushroom Cultivation Practices (GMCPs) of the unit are emphasized more with the passage of time			
5	The efficiency parameters of the unit are improving with the passage of time			

Equipment's:-

Sl. No	Particulars	Number	Price	Maintenance cost / year
1	Spray pump			
2	Weighing machine			
3	Sealing machine			
4	Irrigation equipments			
5	Thermohygrometer			
6	Others (Specify)…..			

Do you get any institutional support? Yes ☐ No ☐

Which scheme? …….

What type of incentive or support? .....

1) Training ☐ 2) SHM Subsidy ☐

3) Kudumbasree subsidy ☐ 4) Marketing support ☐

5) SHM subsidy & Kudumbasree subsidy ☐

Constraints faced by mushroom entrepreneurs:-

Sl. No	Constraints	
1	Climatic irregularities	
2	Lack of processing equipments	
3	Less profitable	
4	Marketing difficulty	
5	Price instability	
6	Lack of space	
7	Lack of working capital	
8	High investment cost	

9	Non availability of quality spawn	
10	Non availability of raw material	
11	Lack of skilled labour	
12	Insufficient water and electricity supply	
13	Pest and disease infestations	
14	Lack of storage facility	
15	Lack of market information	
16	Lack of knowledge about value addition	
17	Lack of consultancy services	
18	Poor risk taking ability	
19	Non availability of skilled labours	
20	Lack of consumer awareness	
21	Lack of financial support from government	

If any other constraints please specify ……..

Explain about the organizational structure of your mushroom unit? .....

APPENDIX II (A): INTRODUCTORY LETTER TO JUDGES FOR JUDGES RATING

KERALA AGRICULTURAL UNIVERSITY
Communication Centre, Mannuthy - 680651
Phone: 0487 2370773
e-mail: ccmannuthy@kau.in

Dr. Jayasree Krishnankutty M.
Professor and Head
Communication Centre, Mannuthy
Major Advisor

Vellanikkara
22-01-2021

Dear Sir / Madam,

I would like to bring to your kind notice that Ms. Swathy Suresh K. S. (Ad. No. 2019-11-180) is undertaking a research study as a part of her Post-Graduate programme entitled 'Scenario analysis of mushroom microenterprises' under my guidance. The main objectives of her study is to analyze the type and structure of the mushroom enterprises, evaluate the performance of representative mushroom units, document the characteristics of the mushroom entrepreneurs, identify the constraints experienced by the producers and suggest measures for improvement of the mushroom enterprise.

Considering your vast knowledge and experience, we request you to be a judge for rating the relevancy of the variables enlisted in the enclosed appendix. I request you to indicate the appropriate variables to be included in the study by marking (✓) in the relevant column. You can also suggest variables that you feel important for the study and also rate them under the appropriate column. I would like to request you to spare a little of your valuable time to go through them and rate them according to their relevance so as to formulate the final questionnaire.

Thanking you,

Yours faithfully,

Sd/-

Jayasree Krishnankutty M.

APPENDIX II (B): LIST OF INDEPENDENT VARIABLES FOR JUDGES RATING

Title of the study: Scenario analysis of mushroom microenterprises

1) To analyze the type and structure of the mushroom enterprises
2) Evaluate the performance of representative mushroom units
3) Document the characteristics of the mushroom entrepreneurs
4) Identify the constraints experienced by the producers
5) Suggest measures for improvement of the mushroom enterprise

Independent variables

The following independent variables are identified for the study based on available literatures. Please (✓) mark the relevancy of variables in terms of MOR – Most Relevant, MR – More Relevant, R – Relevant, LR – Less Relevant and LER – Least Relevant against the appropriate column.

Sl. No	Variables	MOR	MR	R	LR	LER
1	**Age** : chronological years completed by the mushroom entrepreneurs during the time of collection of data.					
2	**Gender** : indicates the sex category of mushroom entrepreneurs					
3	**Educational level** : defined as the highest level of formal education accomplished by the respondent at the time of data collection					
4	**Family size** : refers to the number of individuals residing in the household of mushroom entrepreneurs					

5	**Family occupation** : defined as the major occupation of the respondents family which earns more income and enables the family to sustain					
6	**Entrepreneur status** : refers to the type of enterprise possessed by mushroom entrepreneurs as either sole or joint					
7	**Land holding** : defined as the extent of land area actually obsessed by the mushroom entrepreneurs					
8	**Size of production unit** : defined as the floor area of the mushroom unit in square feet, utilized by the mushroom entrepreneurs for mushroom cultivation					
9	**Income per season** : defined as the money earned by the mushroom entrepreneurs during one season of mushroom cultivation					
10	**Type of mushroom cultivated** : refers to the variety of mushroom preferred for cultivation by mushroom entrepreneurs					
11	**Yield per season** : defined as the total productivity (kg) of mushroom obtained during one season of mushroom cultivation.					
12	**Source of getting spawn** : refers to the location from where the mushroom entrepreneurs collect the spawn for mushroom cultivation					

13	**Mobility** : defined as the extent to which mushroom entrepreneurs travel often to different locations for various purposes					
14	**Type of mushroom shed** : defined as the shed structure which is used for mushroom cultivation by the mushroom entrepreneurs					
15	**Source of finance** : refers to the place where mushroom entrepreneurs depend upon for their various financial investments for mushroom cultivation					
16	**Economic motivation** : defined as the extent to which the mushroom entrepreneur were battle to benefit all chances in order to increase the financial status of the mushroom unit					
17	**Risk orientation** : defined as the degree to which the mushroom entrepreneurs have the ability to take risk and to make apt decisions with respect to their mushroom unit					
18	**Mass media participation** : refers to the frequency of usage of various mass media devices by mushroom entrepreneurs					
19	**Competition orientation** : refers to the extent to which mushroom entrepreneurs were oriented to place themself in a competitive position in relation to other entrepreneurs					
20	**Extension contact** : defined as the degree to which mushroom entrepreneurs were					

	efficient to interact with various extension bodies as well as experts in order to acquire guidance or support on different activities related to mushroom enterprise					
21	**Extension involvement** : refers to the extent of participation of the mushroom entrepreneurs with respect to various extension activities like exhibition, krishi melas *etc*. related to mushroom cultivation					
22	**Social participation** : states to the extent of involvement of the mushroom entrepreneurs in formal and informal social organizations as a member					
23	**Source of labour**: defined as the utilization of various type of manpower resources for cultivation of mushroom.					
24	**Mode of transport for sale of goods** : defined as the transportation mode opted by the mushroom entrepreneur mainly to market their produce at their respective marketing location					
25	**Marketing avenue** : defined as the place where the mushroom entrepreneurs market their produce					
26	**Cosmopoliteness** : refers to the degree to which the mushroom entrepreneurs is oriented outside their immediate social system					
27	**Credit orientation** : refers to the extent of orientation of mushroom entrepreneurs					

	towards various credit sources and its repayment					
28	**Experience** : defined as the involvement of mushroom entrepreneur in mushroom cultivation with respect to total number of years					
29	**Achievement motivation** : refers to the degree to which the mushroom entrepreneurs is oriented towards various achievement in mushroom cultivation					
30	**Institutional support** : defined as the degree of providing assistance or support by various governmental institutions through training, schemes and subsidies to mushroom entrepreneurs.					
31	**Equipments** : defined as various items which are essential for the working of an enterprise.					
32	**Others (Please specify)**					

APPENDIX III: INDEPENDENT VARIABLES AND THEIR MEAN RELEVANCY SCORES – JUDGES RATING RESULTS (DESCENDING ORDER)

Sl. No	Variables	Mean relevancy scores obtained on judges rating
1	Educational qualification	4.63
2	Family occupation	4.56
3	Size of production unit	4.53
4	Income per season	4.40
5	Type of mushroom shed	4.36
6	Yield per season	4.26
7	Source of labour	4.23
8	Mobility	4.20
9	Institutional support	4.16
10	Economic motivation	4.13
11	Risk orientation	4.06
12	Extension contact	3.93
13	Marketing avenue	3.90
14	Experience	3.86
15	Equipments	3.8
16	Mode of transport for sale of goods	3.66
17	Age	3.63
18	Mass media participation	3.59

19	Entrepreneur status	3.54
20	Type of mushroom cultivated	3.46
21	Credit orientation	3.41
22	Achievement motivation	3.40
23	Competition orientation	3.39
24	Extension involvement	3.35
25	Gender	3.33
26	Cosmopoliteness	3.30
27	Social participation	3.26
28	Family size	3.24
29	Source of finance	3.17
30	Land holding	3.11

SCENARIO ANALYSIS OF MUSHROOM MICROENTERPRISES

By

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ABSTRACT OF THE THESIS

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ABSTRACT

Mushrooms have aroused man's interest since the dawn of civilization. They are considered as one of the most important high quality protein rich vegetable crops. Mushroom entrepreneurship if promoted, will offer plenty of advantages and have the capacity to assist rural society in establishing more long term economic growth. Kerala has an immense potential for mushroom production due its low cost, easy availability of raw materials, and round-the-year production capability. Even though a field with great scope for exploration, the studies with extension aspects are very limited and in this backdrop the present study was conducted to know about the current scenario of mushroom cultivation.

The current study entitled “Scenario analysis of mushroom microenterprises” was conducted in Kerala Agricultural University. Data collection was carried out among 120 mushroom entrepreneurs. Sixty mushroom entrepreneurs each from Thrissur and Palakkad districts, mainly engaged in production (spawn / mushroom) and marketing; production, processing and marketing were randomly selected. The independent and dependent variables were selected for the study on the basis of judges rating. An interview schedule was prepared to collect data from mushroom entrepreneurs. Then the collected data were arranged, scored and analyzed using suitable statistical tools.

The results revealed that among the 120 mushroom units, majority (56.66%) units were production and marketing type and 43.33 per cent of mushroom units were production, processing and marketing type. The analysis of mushroom unit structure showed that, majority (40.83%) of mushroom entrepreneurs had production unit size above 500 sq.feet; 54.16 per cent had kutcha type of mushroom shed; family or group labour was the source of labour for 75.83 per cent of mushroom entrepreneurs and majority of them had equipments in the range of 2 to 4 in numbers.

A large proportion (43.33%) of mushroom entrepreneurs belongs to the age category 31-40 years and around 40.83 per cent of them were graduates. Agriculture along with mushroom cultivation was the family occupation of majority (37.5%) of the mushroom entrepreneurs. Nearly 41.66 per cent of mushroom entrepreneurs were

received income per season in the range of Rs/- 25,000 – 50,000 and around 51.66 per cent had obtained yield per season above 150 Kg. Majority (28.33%) per cent of mushroom entrepreneurs had an experience of two and half to three years and about 30.83 per cent choose direct selling to consumers and local markets as their major marketing avenue. For transporting the mushroom products 68.33 per cent of mushroom entrepreneurs were used their own vehicle. Majority of the mushroom entrepreneurs had medium level of economic motivation (80%), risk orientation (54.16%) and extension contact (71.66%). In case of mobility, the frequency of visit for most of the mushroom entrepreneurs were to nearby panchayath and town for various purposes. Institutional supports like training and SHM subsidy were availed by majority (48.33%) of the mushroom entrepreneurs. The various institutions providing support includes Kerala Agricultural University, Extension Centres, Research Organizations, State Horticulture Mission and Kudumbasree District Mission. The analyses of producer characteristics were carried out using two way contingency table and chi-square test, and inferred that there exist a positive significant relationship between the type of mushroom shed and yield; marketing avenue and income; marketing avenue and family occupation.

Other salient findings from the study revealed that majority (61.66%) of mushroom entrepreneurs were females and nearly 85.83 per cent were sole entrepreneurs. Around 81.66 per cent of mushroom entrepreneurs had their own source of investment for mushroom cultivation. Oyster mushroom was the major type cultivated by 68.33 per cent of mushroom entrepreneurs, 35 per cent of them were collecting mushroom spawns from various government sources and nearly 79.16 per cent didn't face any problem regarding the quality of yield and spawn. Around 84 per cent of mushroom entrepreneurs had trade mark for their mushroom products. Polythene cover was the packing material used by 75.83 per cent of mushroom entrepreneurs.

The performance of mushroom units includes four dimensions *ie*., Social Capital Indicators (SCI), Good Mushroom Cultivation Practices (GMCP), Efficiency Indicators (EI) and Incremental Expansion (IE). The overall performance score shows that, majority (62.5%) of mushroom units performs under medium category. Using discriminant analysis and binary logistic regression, a comparison was done with

dimensions of performance index and type of units. The result stated that the dimension Social Capital Indicators (SCI) is the significantly discriminating one for type of units.

The relationship of independent variables with the performance of mushroom units had been analyzed using Spearman's rank correlation coefficient method. The independent variables like size of production unit, income per season, yield per season, experience, type of mushroom shed, marketing avenue, risk orientation, extension contact, mode of transport for sale of goods and institutional support shows a positive significant relationship and the variables such as source of labour and family occupation shows a negative significant relationship with the performance of mushroom units. The major constraints faced by mushroom entrepreneurs were marketing difficulty, price instability and lack of market information. Finally, strategic options such as promotion of direct marketing method, extension interventions, creating public awareness, providing trainings, *etc*. were suggested for the improvement of mushroom enterprises. A futuristic scenario analysis was also conducted to predict the futuristic possibilities of mushroom enterprises in Kerala.