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Mushroom Cultivation Mastery: A Case Study of Best Practices and Entrepreneurial Lesson

¹ Parihar Suresh Dahake*, Nirzar Kulkarni**, Prachita Patil**, and Saket Narendra Bansod**

*School of Management, Ramdeobaba University, Nagpur**

*Dr. Ambedkar Institute of Management Studies and Research, Central India***

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Abstract: A lack of information and awareness among mushroom farmers regarding the best practices and procedures essential for practical mushroom farming. The case study emphasizes that Mushroom growing is a complicated and delicate process that needs meticulous attention to detail and strict adherence to specified regulations. Many farmers lack the expertise and experience to produce optimal yields and quality, resulting in variable outcomes and income loss. According to the case study, the mushroom sector is highly competitive, with several firms contending for market share. To be successful, growers must differentiate themselves by producing high-quality mushrooms that match client requests and stand out in the marketplace. As a result, this case study aims to share insights and lessons learned from successful mushroom producers who have mastered the art and science of Mushroom growing. It emphasizes best practices, techniques, and tactics that growers may use to increase yields, quality, and profitability..

Keywords: *Entrepreneurial, Case Study, Skill Set, Management, Entrepreneurial Strategies.*

Introduction

Mr. Anil Dorle used to work as a physics Professor in a renowned engineering college in Bhilewada, district Bhandara, he was doing well, but the urge to do something different made him always keep looking for opportunities. He wanted to be his boss, which made him look beyond the mundane beaten path.

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While looking for potential opportunities, he came across a relative who was a farmer and was going to the agricultural department for some information gathering and accompanied him. While visiting the department, he learned about opportunities in organic farming and its ever-increasing demand. The concept struck an instant chord with him. Later, he explained the concept to his wife, Anjali, who supported the idea. So they decided to revisit the agriculture department and gather more information. During the visit, they collected much more information about organic food farming. They also came to know about the cultivation procedure of mushrooms. The officer also shared information about the market structure of Mushroom, which found the liking of Mr. Anil Dorle. After deliberation with his wife, he decided to start his venture. Like a true entrepreneur, he took the risk of leaving his well-settled job and decided to follow his passion for opening a new experience. But lack of knowledge of farming and farming-related activities proved a considerable obstacle. So he tried to gather the information and decided formal training would be required to proceed with the venture. While looking for the information, he came across M/S Patil Mushroom Training Center, Shahpur, in the Bhandara district, where formal training about the cultivation and packaging of mushrooms would be given. Mr. Anil Dorle joined the training program and got the basic knowledge, and the program also gave him a platform to satisfy his curiosity. After attending almost 20 such workshops, he started his "Tushar Mushroom Udyog" venture with an initial investment of one lakh rupees in 2002-2003.

While surveying the market, he found that the button mushroom, a more sold and accepted type of Mushroom, had tough competition. On the other hand, Oyster Mushroom was a relatively lesser-known commodity with a somewhat higher growth perspective. He learned the nuances well and decided to cultivate oyster mushrooms instead of the more well-known button mushroom. Furthermore, the oyster mushroom grows on many surfaces and becomes a more accessible option for beginners. Tushar Mushroom Udyog did not have much land, so the cultivation of oyster mushrooms suited him entirely.

The mushroom market was rapidly growing in the urban region due to its culinary value and nutritional and health benefits, but the situation was different in smaller towns like Bhandara. The population mindset of Mushrooms being a non-veg product was a massive hindrance in popularizing mushrooms. Even the awareness campaign could not give the desired result. Due to such a mindset, the demand in the local market was deficient and posed a considerable challenge. To make consumers aware, a massive awareness campaign was planned. Information leaflets were distributed, door to door awareness campaign was carried out. The Brochure talked about the nutritional value of mushrooms. It also had information about mushrooms being a perfectly hygienic vegetarian food. The leaflets and awareness campaign positively affected the market demand, and an overall change in inclination towards Mushroom buying could be seen. This gave Tushar Mushroom Udyog the needed shot in the arm. He further decided to up his efforts, but lack of funds was a huge hindrance. To overcome the lack of finances, they approached local lenders from whom they took two lakh rupees. Now that the funds were arranged, they proceeded with renewed vigor. They came to local Chinese corners and small hotels to sell the first batch of their Oyster Mushrooms. So he further decided to expand his business. Tushar Mushroom Udyog, a resident of Bhandara, decided to tap the Bhandara market initially. After setting up his business, he further spread his roots in other nearby towns and villages of the Bhandara district (Sakoli, Lakhani, Lakahndur, etc.). Now that

the nearby market was down and dusted, he expanded his operations in nearby cities like Nagpur, Amravati, Chandrapur, etc. He differentiated his products based on the regular and medicinal usage of Mushroom (Mushroom being a rich source of protein, Vitamin D, B2, B12, and Iron, has a high therapeutic value).

Mushroom Cultivation Mastery is a detailed case study that looks at the best ways to grow mushrooms and the business lessons that can be learned from them. Notably, growing oyster mushrooms have become popular worldwide because they can grow in different temperatures and use different types of terminology cellulosic substrates. (Getachew et al., 2019). This study aims to show how sustainable mushroom farming can help the economy and ensure enough food for everyone. Also, Oyster mushrooms have been overgrown in the last few decades, giving food security and a healthy and sustainable food source.

Research Problem:

Mushroom cultivation is an emerging agricultural crop that provides income opportunities and diversification and economic resilience for the farmers. Conversely, in rural India, particularly in the Bhandara District, mushroom farming has many challenges related to lack of market access, scalability, technology upgradation and adoption, as well as the unavailability of best practices and an unstructured approach. The new entrants are facing a lot of challenges due to these hurdles. This study aims to investigate these gaps and intends to explore how the successful mushroom cultivation in Bhandara District, Maharashtra, has navigated these problems and challenges.

Research Objectives:

- 1) To study the best practices adopted by the mushroom farmers and cultivators in Bhandara.
- 2) To understand the entrepreneurial strategies that contribute for the success of mushroom farming in the Bhandara.
- 3) To find and identify the challenges and barriers faced by the mushroom farmers, suggest solutions for their sustainability.
- 4) To suggest the solutions and insights that can be provided to the policymakers, entrepreneurs.

Review of Literature:

The tasty Mushroom with a high nutritional value is not distributed equitably across the nation. Enokitake mushrooms can only be found in modern markets in Indonesia, such as department stores. (Robi et al., 2023). Similarly, India is primarily an agricultural country, and because raw materials are easy to get and the weather is good, there is a lot of promise for growing mushrooms there. In fact (Miina et al., 2023) found out what different people think about increasing specialty wood-decay mushrooms on stumps in Finland. This is related to the cutting of trees there. Web-based surveys determined what forest owners, forest harvesting business owners, forest professionals, and natural product business owners thought.

Mushroom production is easy and cheap, and it helps to reduce poverty and gives educated, unemployed young people in rural and semi-urban places a chance to find work(Navsari Agricultural University et al., 2022). Additionally, Entrepreneurship education is required to produce dependable and qualified entrepreneurs to actualize the entrepreneurial mindset; the family is the closest source of such education. The purpose of this study is to determine the process of entrepreneurship education in the family, the cultivation of entrepreneurial spirit in children in the family, and the constraints and obstacles to the operation of entrepreneurship education in the family at the oyster mushroom industry centers in Sempu District, West Java(Rizatul Khulaifa et al., 2022).

A summary of the significance, current perspectives, methodology for mushroom growth and production, and products are provided to determine the present market status of Ganoderma mushroom products. Among these are strain characteristics, culture, and product processing. It will serve as an essential source of information for both research and commercial production(Datta & Das, 2021). In fact, Due to the rising demand for wild mushrooms, a broader interest in foraging, and the study of traditional meals, the edibility of mushroom species continues to expand, benefiting both disadvantaged populations and recreational foragers. Despite the abundance of published case studies on edible mushrooms, there is still some ambiguity about which species are safe for human consumption(Li et al., 2021).

Mushrooms can be grown successfully on various substrates, including wheat straw, barley straw, sugarcane bagasse, gram kernel, and lentil kernel. According to the results of a cost-benefit study, growing Pleurotus mushrooms is a viable business opportunity for farmers and jobless young people. When only 80% of the experimental yield was included, a profit of 156.1–264.1% was realized. Even with the worst-case scenario yield (around 60% of the trial yield), more than 100% gain was still realized(Singh et al., 2018). Moreover, Growing mushrooms is becoming a severe agribusiness in Ghana because of their nutritional and therapeutic value when entrepreneurship is promoted to relieve the burden of employment in the public sector to analyze consumer preferences for mushrooms in Ghana, the role of gamma radiation in substrate sterilization and food preservation, the Mushroom's nutritional and therapeutic properties, and current sterilization practices(Kortei et al., 2018).

The number of people growing mushrooms in Brazil is increasing. Brazilians have learned about mushrooms' health benefits and gourmet uses, and their economy has improved. But there isn't enough gardening knowledge about mushroom growth in Brazil. For a long time, Brazil used techniques from developed countries to grow mushrooms, even though their materials and climates differed from Brazil's(Dias, 2010). Consequently, the Mushrooms grown for sale are fed lignocellulose from things like straw, sawdust, and wood chips. In this way, fungi that turn trash into mushrooms turn low-quality waste streams into a high-quality food. Most of the time spent on the mushroom substrate (SMS) is seen as a waste(Grimm & Wösten, 2018).

Mushrooms for sale are fed lignocellulose from straw, sawdust, and wood chips. In this way, fungi that turn trash into mushrooms turn low-quality waste streams into a high-quality food. Most of the time spent on the mushroom substrate (SMS) is seen as a waste. This review talks about how SMS can help move toward a connected economy. Similarly, Mushroom farming is often pushed as a successful and money-making agribusiness, even though mushroom entrepreneurship has a very high rate of failure. The success of mushroom entrepreneurship depends on both the physical performance of the business and the entrepreneurial behavior of

mushroom growers. Both of these variables are affected by many factors, making it hard to understand what causes their differences. Humans use mushrooms for various purposes, not just as a food source. The pharmaceutical sector has found uses for mushrooms as antioxidants, cancer treatments, and immune system modulators. They have a dual purpose: helping people and forests as natural decomposers that recycle nutrients (Niazi & Ghafoor, 2021). Strategically establishing mushroom production as an HVC is a viable concept for the economic growth of any nation. It can help those at the very bottom of a society's economic ladder improve their health and their lot in life. It can withstand the exploitation that comes with urbanization. It is hurt by environmental concerns and climate change, unlike most other industries. Its low-investment plans, low-end technologies, small farmers, high use of space, and women's entrepreneurial spirit have proven sustainability's social, economic, and environmental components (Panda & Sharma, 2018). (Sucipto et al., 2015) examine how electricity affects Jember's oyster mushroom industry's output. The study also analyzes the impact of entrepreneurship on the success of oyster mushroom enterprises in Jember, finding instead that power and partnerships have a noticeable impact. In contrast, entrepreneurship itself has no discernible effect.

(Yadav, 2016) focused on finding good ways to sell their mushrooms and helping them form small groups. In addition to their monetary and biotechnological worth, mushrooms also benefit human health. They have a high protein and fiber content without adding many calories. (Mishra, 2008) One hundred farm women in the Khurda area of Orissa's Pipili block were chosen to learn how to grow mushrooms. Then, an impact study was done to find out how society and the economy changed after mushroom farming, what problems they ran into, and what they could do better in the future. The study found that 70% of women mushroom growers had improved their jobs. Improvements followed this in "standard of living" (36%), "better saving" (30%), "knowledge and attitude" (24%), and "social status" (10%).

This Case Study aims to add knowledge about mushroom farming and business management by recording these experiences and lessons. This case study was created to serve as a helpful tool for aspiring mushroom growers, researchers, and industry professionals interested in learning more about growing mushrooms. Hence, With the groundwork laid by the literature study, future research will thoroughly examine best practices and business lessons learned from the mastery of Mushroom growing.

Research Methodology:

In the "Mushroom Cultivation Mastery" case study, the research aims to look at and write down the best practices and business lessons learned in mushroom growth. The study seeks to understand how to grow mushrooms successfully, how to develop a business, and what problems mushroom growers face. The data collection involves in-depth interviews with the selected mushroom cultivators, business owners, managers, and employees. These interviews were structured or semi-structured and should cover topics such as cultivation techniques, marketing strategies, challenges faced, and lessons learned. Furthermore, the researcher intends to observe the mushroom cultivation process in selected farms or facilities to gather firsthand information about cultivation practices, infrastructure, and equipment used also after Analyzing existing documentation, such as business plans, financial records, marketing materials, and standard operating procedures, to understand the overall business operations,

industry trends, challenges, best practices, and strategies. The collected data will be analyzed by using qualitative and quantitative analysis techniques. Transcribe and code the data for qualitative data (interviews, observations) to identify key themes and patterns. They employ statistical analysis methods for quantitative data (survey responses) to derive meaningful insights. The compiled case study will be shared with the participants involved in the research (mushroom cultivators, business owners) to ensure accuracy and validate the findings. Incorporate their feedback and suggestions if necessary.

SWOC Analysis

Strength:

The oyster mushroom is a new idea in the market that took some time to capture people's imagination. But Tushar Mushroom Udyog had the advantage of being the pioneer, enabling him to get a more significant chunk of the market. Oyster mushrooms are easy to process and are low-maintenance products, offering higher profitability margins.

Weakness:

Oyster mushrooms were a relatively unknown commodity and lacked a strong market presence. Oyster mushrooms were a relatively unknown commodity hence professional oyster mushroom farming was out of the question. It was a big hurdle and challenge for Tushar Mushroom Udyog to take it up and create product awareness amongst the consumers. Being true to the entrepreneurial spirit, Tushar Mushroom Udyog took up the challenge head-on and successfully overcame it.

Opportunities:

Challenges were many, and so were the constraints, but the entrepreneur doesn't harbor only challenges but looks for opportunities, and so did Tushar Mushroom Udyog. India is a multi-diverse country with suitable climatic conditions for mushroom cultivation. Oyster mushroom is a rich source of protein, and that too being the veg product, started gathering a favorable public response. He surveyed the market and adopted the latest technologies in cultivating, processing, preserving, and packaging oyster mushrooms and other mushroom product variants. After covering the local market, Tushar Mushroom Udyog decided that it was time to look for opportunities in larger markets. They have expanded their business in Nagpur, Pune, and Amravati. He was getting an excellent response from the markets, but his inner entrepreneur was unsatisfied, so he hired a specialist in Mushroom processing Mr. Patil. After studying his overall business model and deliberating the further possibilities, the consultant suggested that though Tushar Mushroom Udyog was now a relatively established brand in Bhandara, People were aware of mushroom products, so the essential ground building was not necessary, what remained was to publicize the different advantages oyster mushroom had over button mushrooms for it succeeds in the larger market it was essential to improve upon the packaging to attract the targeted customers in bigger cities. Better packaging would also result in less spoilage rate. Tushar Mushroom Udyog adopted the solutions suggested by Mr. Patil and altered the mushroom packaging process to attract newer customers.

Challenges

The business was now relatively stable, and the customer base was increasing, but the growth percentage was still not very high to go gung-ho about. The canned mushrooms were posing the challenge. Customers' mindset that canned mushrooms were more hygienic than regularly packaged mushrooms posed a more significant challenge. Tushar Mushroom Udyog tackled the perspective by adapting the new packaging suggestions made by Mr. Patil, the results were slow to trickle down, but the business was now making forward strides.

Product Mix:

The success of Modern Mushrooms may be due to several things, including their emphasis on quality and innovation. They have incorporated modern mushroom production methods and procedures, such as climate-controlled growth chambers and automated harvesting systems. This has enabled them to maintain consistent quality while increasing efficiency. Now that the business had caught sufficient speed, the market base had gone from being a local market to a multistate market, so Tushar Mushroom Udyog decided that launching customer preferential based oriented product was the way to go forward. Hence he decided to introduce mushroom product variants. Tushar Mushroom Udyog thought that the higher the product offerings more accessible it would be for him to tap across the section of a customer. Serving various variants seems to do the trick as different variants proved popular among buyers depending upon the requirement and choices.

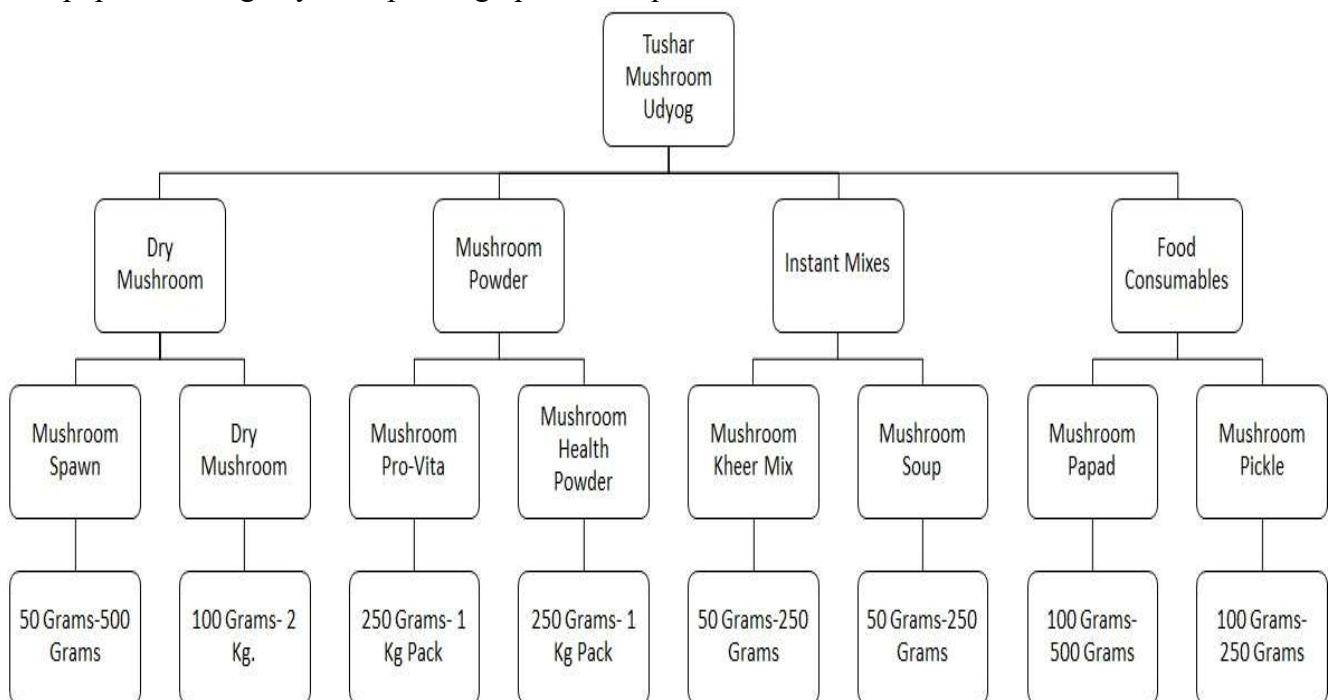


Fig.1 - Product Mix strategies of Tushar Mushroom Udyog

Distribution Channel Establishment

A mushroom is a delicate and perishable item that must be handled carefully. Mushroom has a frugal shelf life, and hence the packaging and distribution play a significant role in ensuring that the quality of mushrooms is maintained. When Tushar Mushroom Udyog started his business in the Bhandara district, a single point of contact was established from where they would distribute the Mushroom as per ordered quantity. Still, the amount collected was infrequent, so a consolidated channel could not be found. Mr. Dhanvijay, who used to assist Tushar Mushroom Udyog, fulfilled the primary demand. Mr. Dhanvijay used to plan the delivery route as per orders in the vicinity. As the business grew and the market expanded, Tushar Mushroom Udyog adopted a two-tier distribution system where the transportation was done via mini trucks and public transport. A dedicated salesperson was appointed who would travel with the mushroom consignment to ensure smooth delivery as per the order.

When it was decided that it was the right time for Tushar Mushroom Udyog to operate in other states, they also decided to look out for distributors. Established distributors were reluctant to add a new brand to their kitty, and convincing them proved a sharp nut crack. Tushar Mushroom Udyog then approached central vegetable market merchants and dealers. However, Tushar Mushroom Udyog made some efforts to persuade them the effort was worthwhile as they ensured smooth operation in their area. Now the firm has also created a solid distribution network and supply chain, allowing it to reach clients throughout Bhandara District and Maharashtra and even export its products nationwide. They've also spent money on marketing and branding to set themselves apart from competitors and establish a devoted consumer base.

Tushar Mushroom Udyog then approached local retailers, fast food joints, and hotels who, after a bit of canvassing, were ready to tie up with him. This gave him the further push required for his business.

Promotional Strategies

Tushar Mushroom Udyog supplied oyster mushrooms which were relatively new in the market. Being the pioneer in the oyster mushroom category gave Tushar Mushroom Udyog a head start, which was needed for a new business like Tushar Mushroom Udyog. The initial promotion of the company was done through the distribution of leaflets and pamphlets. To tap hotels, fast food joints, and retailers, he distributed Brochure which had all the information about different products offered by Tushar Mushroom Udyog.

Keeping with the trend of the time, Tushar Mushroom Udyog decided that rather than using the traditional mediums of advertisements which cost loads of money, it was easier for him to use social media and direct the flow of funds towards production, packaging, and distribution. So Tushar Mushroom Udyog started to make their presence felt across various social online platforms and online B2B trading channels like India Mart, Just Dial, etc. Using social media like Facebook, Instagram, and WhatsApp enabled him to save promotional budget and direct it towards other functions.

Questions

- 1) Tushar Mushroom Udyog wants to enter a suitable distribution channel into Delhi NCR, Chattisgarh, and Uttar Pradesh market devices.
- 2) Suggest an alternate distribution plan to Tushar Mushroom Udyog to prolong the shelf life of Mushrooms. What would be your suggestions for Tushar Mushroom Udyog?
- 3) Tushar Mushroom Udyog wants to launch Chocolate flavored mushroom energy drinks and Mushroom toasts, Device a promotional campaign for Tushar Mushroom Udyog.
- 4) Suggest a new product development strategy for Tushar Mushroom Udyog if it wants to launch Mushroom Biscuits.
- 5) What additional product lines Tushar Mushroom Udyog can add to his already-established business? Should he look for synergy, or should he have a diverse product portfolio?

Expected Contribution of the case:

This study intends to contribute to the body of knowledge by discussing and exploring evidence of the mushroom farming and cultivation. It will provide actionable knowledge to policymakers, farmers, agricultural institutes, and entrepreneurs. The study is carried out to examine the mushroom cultivation mastery, best practices, associated entrepreneurship, and lessons learned in the newly adopted location at Bhandara district in Maharashtra. The findings are based on a detailed, structured survey of the livelihood profile of nineteen entrepreneurs: thirteen model and six associated. The mushroom growing process is running rather successfully and the produce is marketed through local vendors. As a consequence, there is keen interest among the surrounding people. Substantial vicarious learning in the form of oral tradition is observed. After a quick replication of the process, some associated entrepreneurs have joined the emerging group. However, the emerging group has also encountered some inevitable problems in the form of non-availability and low price of raw material, lack of collateral for credit and delay in procurement of critical items (Shakil et al., 2014). Fostering a small and well-delimited model cluster, with adequate arrangements of spawn medium and implements at affordable prices, and credit in terms of inputs and labor is recommended. Registration and ancillary support by the local administration and the establishment of purchasing arrangements with local traders on a profitable basis, should also benefit some of the most needy entrepreneurs. It is postulated that failure is likely to occur in the absence of proper guidance. At the time of the venture undertaking, it is necessary to foster a policy strategy which would be in tune with the needs and potentials of the target group. This would involve an assessment of the current and prospective enterprise scenario under taken in an existence of ideal conditions. Additionally it will construct the bridge for a knowledge gap for the economic viability of mushroom cultivation in rural Maharashtra.

Synthesizing the Literature:

Past literature and data highlighting more on the Mushroom Cultivation as an economically oriented agribusiness. Balancing the pressure of shelf-life extension with the need to maintain the nutritional and sensory qualities of the product is a current challenge of the food industry,

motivating the exploration of new preservation methods for fresh agricultural products: mushrooms fill this property, having a particular perishable and high moisture nature, which makes them poor candidates for conventional postharvest strategies (Silva et al., 2024). On the other hand, beyond food safety concerns, a growing interest in the valorization of byproducts and waste generated by mushroom production is observed, which contributes with a low environmental impact the development of new alternative and sustainable uses. The term “mushroom byproduct valorisation” is centered and seven broad and distinct methods are presented and discussed as a new framework for the mushroom agroindustry. Mushroom byproduct valorization, or simply mushroom valorization, is here defined as the process of extracting value from the waste or byproducts generated during the extensive and expanding activity of cultivation and processing of mushrooms. Not only the edible fruitbodies represent the final product, but many ingredients are also used, which generates significant quantities of waste and byproducts; on the other hand, spent mushroom substrate (SMS) is generated in huge quantities and not only is difficult, expensive, and of high pollution to safely dispose of, but also constitutes a significant waste of resources. This critical analysis caresses a framework of seven general methods of mushroom byproduct valorization which were not yet the object of the review and explore the joint potential for the establishment of a comprehensive approach to increase the circularity, sustainability, and economic return of the mushroom agroindustry. The main focus is therefore on *Pleurotus ostreatus* as the main cultivated species, relatively resistant to diseases, and one of the most informative and well-characterized species, but most discussed procedures are general and applicable to other species with minimal adaptations. Mushrooms are known to be a good source of dietary minerals and vitamins (Shakil et al., 2014). The fruiting body of the mushroom represents the portion of the fungus that is commonly consumed as food. Due to high perishability and high-water content of the vegetable product, fresh mushrooms are prone to rapid spoilage and decay. Methods of preservation of mushrooms have been developed, to increase shelf-life, maintaining nutritional values and organoleptic aspects so to meet the market demand. Mushroom cultivation techniques encompass the entire interplay from choosing the basic strain, substrate preparation, specific environment conditioning, to postharvest technological solutions. The awareness of postharvest handling knowledge has boosted the functional implementation of the supply-chain. A market-oriented edible mushroom farms are aware of the quality requisites that their product must have to meet consumer desires and to fit the requests from industrial food enterprises. Broadening the respective horizons would enhance the overall gain

Research builds on or fills gaps in existing knowledge.

Mushrooms are versatile and delicious. Grown in ideal conditions, they exhibit their already formidable flavour completely on their own. It's meaty and succulent textural characteristics easily allow them to take the place of many non-vegetarian items, including pork, beef, chicken, turkey etc. They are really a staple in a vegetarian diet. Mushrooms are incredibly high in protein, loads of different vitamins, and minerals, and fiber hence down to its adaptability and consumability, getting into growing mushrooms makes total sense! This study may offer more practical roles to urban researchers or planners, who are often less involved in the study of rural dynamics than agriculturalists or demographers, in understanding the long-term impacts of such changes and designing innovative and pro-active policies (Shakil et al., 2014)

Use a structured approach (e.g., past research, gaps, and study contribution)

To promote an effective cultivation of mushrooms, a structured approach should be printed, encompassing an exhaustive literature review of the subject, summarizing outdated knowledge and pitfalls, and encapsulating tested methodologies and best practices (Silva et al., 2024). The effectiveness of different strategies should be bolstered by accurate quantification and replication designs. Novel methodologies and technological applications to the cultivation of mushrooms should be comprehensively represented, fostering both innovation and the spread of new developments. There should overall be a special focus on social and economic content that is pertinent to the entrepreneurial lesson. Due to the prepackaged and often sterilized nature of the materials for mushroom cultivation, it lends itself well as a baseline staple crop for the establishment of microprojects, which are abundant in such a marginalized setting. As is, the mushroom is generally unburdened in terms of physical and space requirements, as well as labour, so it allows for less vertical, more amateur entrepreneurs to gain a livelihood. Therefore, mushroom cultivation might be appealing for the unskilled, senior, disabled, or women entrepreneurs, as well as serving as a mere first training point for future. Also It allows for specialized product cultivation that can bypass a lot of the pitfalls in the industry. Keeping in mind the current cultural and financial limitations of the tehsil as described, low-investment technologies and household commodities are first demonstrated, such as rice spawn, which is heretofore prevalent in Bhandara due to lack of demand and centralized distribution. Special attention is also paid to the medicinal values of mushrooms. Otherwise, approximately half of the practical information presented is itself locally sourced, amassed through interviews and observations.

Research Design and Justification for Interviewee Selection:

Data collection consisted of a series of interviews to measure how entrepreneurs of mushroom cultivation in Bhandara, Maharashtra apply sustainable practices. Semi-structured interviews were conducted with 60 sustainable entrepreneurs of mushroom cultivation during a field visit to Bhandara district. The interviews occurred on December 2017. Mushrooms are the finest example of a by-product or waste being converted into an edible commodity of high market value. The inputs to Bhandara include three breeding houses and one tissue culture unit, the right planting material compost facility and the utilization of own farm compost. Bhandaran entrepreneurs also export fresh mushrooms to Gujarat, Madhya Pradesh, and Tamil Nadu, and that nature treats fractions of wastewater spilled during mushroom production in a state-of-the-art effluent treatment plant which can even use the purified water for growing vegetables and irrigating farmland. The principal investments to the entrepreneurs of mushroom cultivation in Bhandara include a tissue culture laboratory for the healthiest cultivation of milky, oyster, and button mushrooms, a unique compost formula, and software to provide every solution linked with mushroom farming.

The interviews were recorded with the use of audio notes and field notes. Before starting the interview, entrepreneurs were asked for their agreement to be recorded for research purposes, and all agreed. The interviews, mostly in Marathi language included 18 open-ended questions with primary focus on how sustainable practices are applied, and how they benefit the businesses (Kratika, 2018). The interviews were held at the offices or farms of the approached

entrepreneurs. Each interview lasted between 30 to 45 minutes, and the responses were recorded via audio notes and field notes.

Address data validation methods, such as triangulation or member-checking.

Several methods were used to address data validation, helping to ensure that the findings are not only accurate, but that recommendations that arise from the findings, and are intended to be the primary utility of the research, are also trustworthy. These methods include triangulation – the use of complementary data collection and analytic methods to generate reliable findings – and the member-checking of findings with the original study participants who had expertise as Bastar cultivators and helped to generate the research questions. These data validation methods provide a basis for viewing the research as robust, and the recommendations that derive from the data are seen as trustworthy. This case study provides an exemplar of how traditional knowledge systems were interrogated for artisanal mycocluture to both identify successful cultivation practices that enhance sustainable utilization of natural resources and to inform natural resource management plans that ensure the conservation of these resources as well. Focus groups and accompanying semi-structured interviews were conducted in 4 villages of the Bhandara district of Maharashtra state in central India to:

- (1) characterize artisanal production methods widely used among local farmers
- (2) Identify locally used substrates for the mycocluture of 11 wild, saprophytic mushroom species that flourish in diverse agro-ecological zones

Linking Findings to Theoretical Concepts

Ironically, in Bhandara, the city of Oranges and Rice bowls, the seeds of mushroom cultivation were sown. Despite a horrendous pandemic backdrop, mushroom cultivation in Bhandara scaled significant heights with formal learning stretching over 160 hours for over 250 practitioners. It's both critical and heartening for the society to understand its best practices and entrepreneurial learning dimensions. The local media captured this phenomenon with a heartfelt discovery covering the pride, challenges, and opportunities spanning public and private spheres. Many practitioner success stories showcased Unemployed & Educated Youth employment, Umbrella Cultivation Strategy, robust forward & backward integration, Organic Disclaimer USP on Green Mushroom, Private incubation, initial policy alignment, backdrop training on Field Module, local champion services, and significant yield enhancement. Private sector efforts highlighted considerably enhanced training formats, Make in India model on indigenous Agg. Machineries, rapid spawn/seed availability, bright-green innovation, passing on of best practices, cultivation, regional agri-entrepreneurial discovery, and current proximate capacity of 1 Lakh hybrid bag readiness. From a researcher perspective, projects were specifically designed to analyze the agripreneurial success factors and entrepreneurial lessons from a practitioner and policy standpoint. Bag cultivation has taken up mushroom production due to better quality, more working area per bag, and higher mushroom yield per bag. A later addition of upside umbrella cultivation technology made the farmer benefited further. Paralleled with mushroom cultivation, the hygienic processed (dried and pickled) mushrooms are also exported. Varied agri-entrepreneurial stories are chronicled with an industry life cycle undertaking mushroom cultivation. The practitioner services revolved around the success factors and challenges for newcomer mushroom cultivators and thematic analysis of the successes full practitioners. The comprehensive model possesses a transformative framework indicative of best practices, practical learning, youth entrepreneurship discovery, incubation

outreach, structural synthesis, and policy synergies in a socially impactful way. On best practices understanding, mushroom cultivation becomes a "boon" for small-scale farmers in particular and to all educated unemployed youth in general, broader implications on agri-entrepreneurship.

Comparison with Existing Literature

This study is set in Bhandara, one of the 36 districts of Maharashtra state of India, where Oyster and Milky mushrooms are predominantly cultivated in poly-house as well as open-house as an agribusiness. A large number of controlled environment cultivated or poly-house cultivated mushrooms are found in comparison to the open-house or natural environment cultivated mushrooms. Ten agribusiness entrepreneurs from the Bhandara district were purposively selected to share their best practices and entrepreneurial experiences in mushroom cultivation. The result reveals that a smaller piece of land, moderate capital to meet the initial fixed costs and operational costs and a poly-house are enough to start a commercial business in Bhandara. Changing infrastructures, newcomer educated entrepreneurs, learning process of the entrepreneur and applying new ideas and techniques to the cultivation were found to be facilitating best practices of mushroom cultivation along with making it more profitable. Besides profit maximization, mushroom cultivation also provides provenance of employment. Mushroom cultivation is considered as a strategic rural industry since it has the capacity to provide an additional income, employment generation and also nutritional security at very low capital investment. In addition, mushroom cultivation is an important alternative enterprise for the diversification of agriculture and has a substantial increase in the income, which also has been realized by the agribusiness entrepreneur of this study. It is based on the phenomena that, first, the production cost of mushrooms is much lower as compared to different vegetable farming. Second, the local market price of mushrooms is higher in comparison with many others agro-economic crops (Hassan Shakil et al., 2014). Third, the shelf life mushrooms is short that has increased the demand for fresh mushrooms in this region. Fourth, there is excellent growth in the hospitality and other channels such as health sector, market driving the higher demand for mushrooms. Moreover, there is also a great demand for mushrooms from the nearby City Nagpur, Wardha etc. Among several varieties of mushrooms, Oyster and Milky mushrooms are cultivated in poly-house as well as open-house (Al Ayub Ahmed et al., 2014). Trees like teak, sunflower, jowar and pigeon peas are grown on the boundaries of the agriculture land. Fences were made with bamboo sticks on the upper side of the trees. Alternatively, the farmer purchased a .6 mm black-polythene sheet costing 200-250 INR and six bamboo sticks costing 170 INR. On the open stage, farmers either use hybrid seeds of Oyster and Milky mushrooms or spawn which are available in the nearby well-known towns called Mohadi. The hybrid seed of Oyster spawn is purchased in the reasonable range of 50-70 INR per packet whereas in the case of Milky mushroom Rs. 20-30 (750 gm) is paid. On the other hand, for the spawn, prices were of 2-3kg packet (Rs. 50) and 6-7kg packet (Rs. 120). In the open stage, three types of fertilizers, that is nitrile, amine and phosphate; humic acid which maintains the pH; and a needle type pH measurement water instrument have been used by the farmers. A special type of cover was made with two or three inches of soil and a sack in which the mushroom needs to irrigate. Alternatively, in the poly-house, an automatic water-spraying system was installed to irrigate the mushroom.

Implications for farmers, policymakers, and researchers.

Mushroom farming can be transformed into a high-income profession if all the above conditions are properly followed. So, there is a bright prospect of engaging the mushroom cultivation profession in the rural area of Bhandara district which is situated in Maharashtra state. To get maximum benefit from this great cultivation profession, dropout students, unemployed people, entrepreneurs, young men (lower income group), and illiterate & poor women need to be trained on mushroom cultivation. By this, the entrepreneurs and unemployed educated persons can generate employment opportunities for the dropout students. Each trained person could be self-employed or create employment for at least 2-3 beneficiaries. Farmers will make maximum use of their agricultural land for double income and can avoid the debt trap from the local money lender. So to alleviate poverty, eradicate unemployment, and improve nutritional quality, it is necessary to implement the program on a priority basis. A policy switch is necessary to change from high-input high-price cultivation of luxurious vegetables and flowers to low-cost high-value mushrooms. Crude shelter and makeshift arrangements may be sufficient for mushroom growing operations. However, well settled and controlled environments are essential for cultivation of costly crops. Instantaneous marketability is another positive aspect of mushrooms. Conventional fruits and crops need time for maturation and shelf life, which after harvesting are liable to deteriorate. Agro-wastes like groundnut shell and cotton seed husk are easily available after harvesting the crops, reducing the cost of spawn running material, which is essential to inoculate the fruiting media. Live spawn of button and milky mushrooms were used to inoculate the prepared beds. The nutrient-rich milky mushroom was found to grow well in groundnut shell media while the button mushroom was found to flourish in horse dung supplemented with paddy straw beds. On the arrival of monsoon, high humidity prevails in the atmosphere, which is conducive for mushroom growing operation. Random intermingling open paddy fields delighted the creator for the cultivation of mushrooms at Bhandara district scenario. The waste products of agro residue like cotton seed husk, groundnut shell, and horse dung are easily available in the agricultural field. Experimentation was done with button and milky mushrooms. Both of the species were found to assess the nutrient value of mushrooms. Substantial nutrient values such as carbohydrates and protein were obtained. It was observed that the mushroom consumed organic matter, and the consumption rate was higher in the case of milky mushroom cultivation. A substantial amount of nitrogen, phosphorus, and potash was obtained. Hence, the utilization of the fruiting block could be applied to enrich the soil, which had a lush welcome to the agricultural field. The tradition of exchanging wishes and vegetables are offered as a greeting, so that local people entertain their guests or pandal by preparing a loitta. Mushroom cultivation can be an alternate source of income for jobless individuals which leads to eradicating poverty through social support. It was calculated that for each taka invested in mushroom cultivation, it yields a considerable return. Due to the huge marginal profit, more investment in mushroom cultivation has been made by the farmers of the area. The significant relationships between mushroom cultivation knowledge and other independent variables also have been exposed after a binary probit regression model. Nurturing a plentiful supply of mushrooms leads to poisonous scenarios since mushroom farming techniques are usually not standardized. Burning the potential of the Bhandara district is promising to harness the indigenous botanical growth of mushrooms. There are plenty of marginalized people who find it very difficult to get a job even with high qualifications. Mushroom farming can be an unrecognized profession in creating

opportunities to generate manpower. Lacunae across the study, though very eminent for young men and women, need to widespread knowledge to reduce the rate of poverty. It emphasizes professional training for mushroom farming and initiating the start-up capital for income-generating activities.

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