



Improvement of Mushroom Business Management Technique

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Abstract: Sembalun Bumbung Village faces significant challenges in maintaining a stable food supply and achieving economic resilience due to its location in a disaster-prone area. The region is at risk, making it dangerous to clear new land for agricultural cultivation. To address these issues, the Sembalun Mushroom Initiative aims to enhance food security and disaster resilience in the village by improving the quality of mushroom products and providing support in business management. The cultivation of straw mushrooms presents an alternative agricultural development that can support food security and boost the local economy. The advantages of straw mushroom cultivation include the fact that it does not require clearing new land or forests, and it typically yields good market prices. However, farmers in Sembalun Bumbung Village currently lack the knowledge and technology necessary to produce high-quality straw mushrooms and manage their businesses effectively. To help overcome these challenges, a community service team from the University of Mataram is assisting with advanced cultivation technology and business management practices. Their efforts include developing training programs that cover business management, marketing strategies, and resource management.

Keywords: Food Security, Straw Mushroom, Business Management, Marketing Strategy, Resource Management.

Introduction

Located gracefully on the Great Slope of Mount Rinjani, Sembalun Bumbung Village is a beautiful pocket in the East Lombok Regency of Indonesia (Figure 1). Famous for its amazing natural scenery, the highlands village is surrounded by green rolling hills, multilevel agricultural land, and foggy mornings that greet residents and visitors with calm beauty (<https://www.sembalunbumbung.com>). Agriculture isn't merely a profession here. It's a deeply rooted tradition that intertwines with the rhythm of daily village life. Families tend their plots with pride, and seasonal harvest festivals celebrate the earth's bounty with vibrant ceremonies, traditional music, and communal feasting.

The village of Sembalun, nestled in the fertile highlands of East Lombok, faces persistent challenges in maintaining a stable food supply and achieving

economic resilience. Despite its rich soil and favorable climate, which make the area highly suitable for agricultural activities, the community still grapples with a range of socioeconomic hurdles that hinder long-term prosperity. While traditional farming practices, primarily focused on cultivating vegetables, continue to support the livelihoods of many people. These methods have not evolved to keep pace with modern agricultural standards. As a result, villagers remain exposed to unstable income, food insecurity, and limited employment opportunities.

One of the most promising yet underdeveloped opportunities in the region is mushroom cultivation. Specifically, straw mushrooms offer a viable and sustainable alternative that aligns well with the region's agricultural strengths. Straw mushrooms (*Volvariella volvacea*) are well-suited for cultivation in tropical climates like Sembalun and have high market demand due to their short production cycle, nutritious qualities,

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and culinary versatility (Kubala, J. (2024); Husna, N. (2023); Zakiya et al., 2024). However, despite the clear potential, mushroom farming in the village has not been fully embraced or developed. This gap is primarily due to a lack of awareness, inadequate access to technical knowledge, and an absence of infrastructure and training programs that could equip local farmers with the necessary skills for successful mushroom production.

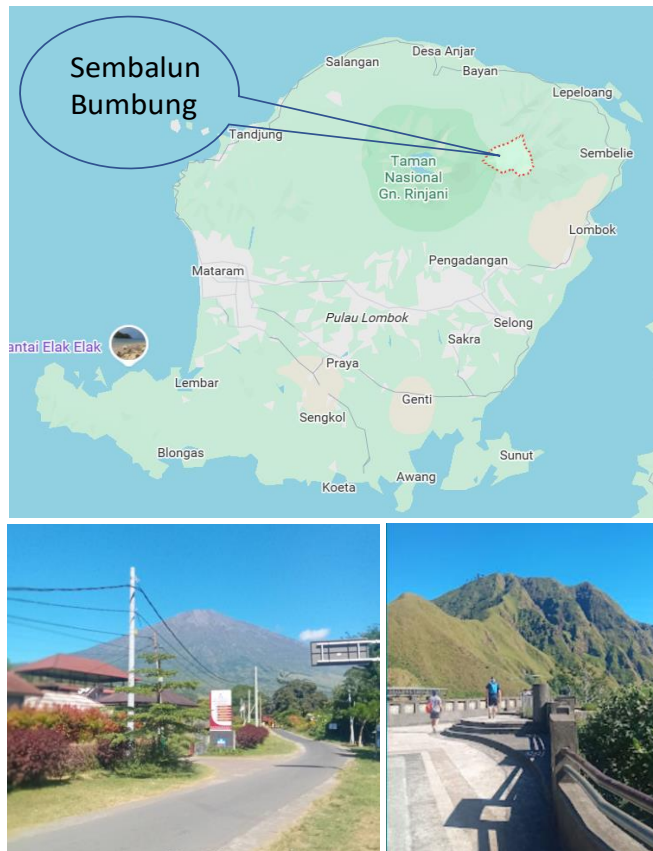


Figure 1. Sembalun Bumbung Village

Most farmers in Sembalun have traditionally relied on seasonal vegetable cultivation, which brings a unique set of challenges. Income generation is largely tied to fluctuating crop prices and the limited growing season, leaving families vulnerable during off-peak periods. Additionally, due to limited access to wider markets, many producers depend heavily on middlemen, which further reduces their profits. Without consistent income and diversified economic activities, the village struggles to maintain financial stability. Technical proficiency alone is not sufficient for success. Farmers also require training in business management, marketing strategies, and financial literacy to turn mushroom cultivation into a viable enterprise (Pardian, et al., 2024).

The Sembalun Mushroom Initiative Aims to improve Food Security and Disaster Resilience in

Sembalun Bumbung Village by Enhancing Mushroom Product Quality and Providing Business Management Assistance. The University of Mataram's Community Service Team is Exploring Advanced Cultivation Technologies and Business Management Practices to Address These Challenges

Method

In a forward-thinking initiative to boost agricultural innovation and entrepreneurial capacity in rural communities, the Pondok Pesantren Al-Qur'an At-Tazkiyyah has partnered with Fatoni University in Thailand and the Industry Office of West Nusa Tenggara (NTB) Province. This collaboration merges academic knowledge, government support, and grassroots engagement to create a sustainable model for mushroom cultivation, education, and business development. The program operates across three main phases: infrastructure development, cultivation implementation, and product marketing with a particular emphasis on business management training.

Phase 1: Construction of Mushroom Houses and Facilities

The first stage of the program involves the establishment of dedicated mushroom houses. These purpose-built facilities are constructed to support advanced mushroom farming using eco-efficient technologies. The structures are equipped with climate control systems, sterilization chambers, and substrate preparation zones, ensuring optimal conditions for mushroom growth. This infrastructure not only enables experimental cultivation within a controlled environment but also serves as a training ground for students, educators, and local farmers.

Phase 2: Implementation of Mushroom Cultivation

Once the physical infrastructure is in place, the program transitions into its second phase: active mushroom planting. Here, participants learn both traditional and modern cultivation techniques for species such as straw mushrooms and oyster mushrooms. Guided by agricultural experts, students and community members engage in preparing substrates, managing moisture and temperature levels, and monitoring fungal growth cycles. This hands-on experience is critical for deepening technical understanding and fostering an appreciation for sustainable agriculture.

Phase 3: Marketing and Business Management Training, which includes:

a. Business Management Training

The final phase of the program focuses on ensuring the sustainability of mushroom cultivation through

economic empowerment. Participants are trained in essential business management skills to help them transform mushroom farming into viable enterprises. This sub-phase includes several key components:

- Curriculum Development
 - Workshops and Seminars
 - Training Materials Distribution
- b. Development of Marketing Strategies (Yuliana & Sakdiah, 2024):
 - Market research
 - Branding and packaging
 - Marketing Channels
 - Promotion Campaign
 - c. Advanced Cultivation Engineering Training (Nugrahani, 2023):
 - Develop detailed training modules.
 - Organizing direct workshops
 - Distribute comprehensive guidelines, manuals, and videos
 - d. Quality Control and Halal Guarantee (Sudirman et al., 2024):
 - Establish and disseminate quality standards for mushroom production
 - Perform periodic inspections of mushroom farms
 - Obtain halal certification from the Halal Certification Institute
 - Provide feedback to farmers
 - e. Evaluation of this program, including (Munawar et al., 2007):
 - Monitoring and data collection.
 - Performance analysis.
 - Feedback mechanism.
 - Reporting.
1. Business Management Training
 - a) Develop Training Curriculum
 - b) Conduct Workshops and Seminars
 - c) Provide Training Materials
 2. Marketing Strategy Development
 - a) Market Research
 - b) Branding and Packaging
 - c) Marketing Channels
 - d) Promotional Campaigns
 3. Advanced Cultivation Techniques Training

Substrate Preparation

 - Material Selection: Introduce farmers to various substrate materials such as straw, sawdust, coffee grounds, and agricultural waste, explaining their nutritional profiles and suitability for different crops, especially mushrooms.
 - Sterilization and Pasteurization Techniques: Teach both chemical and thermal methods to eliminate

contaminants, ensuring optimal conditions for spawn colonization.

- Moisture and pH Balance: Explain how to monitor and adjust substrate parameters to suit the needs of the crop.

Spawn Production

- Culture Selection and Maintenance: Guide participants in selecting high-quality parent cultures and maintaining sterile environments to prevent contamination.
- Grain Spawn Preparation: Walk them through techniques to produce grain spawn using millet, wheat, or rice, detailing sterilization procedures and incubation methods.
- Liquid Spawn Production: For more advanced learners, introduce liquid culture techniques and their applications in commercial-scale production.

Inoculation Techniques

- Sterile Technique Mastery: Train participants to work within laminar flow hoods or still air boxes to reduce contamination during inoculation.
- Inoculation Protocols: Demonstrate how to accurately transfer spawn to substrate containers, emphasizing spatial distribution for optimal mycelial growth.

Incubation

- Environmental Monitoring: Discuss ideal temperature, humidity, and ventilation levels for various crops.
- Contamination Identification: Educate farmers on recognizing early signs of mold, bacteria, or pests, and provide protocols for effective remediation.

Harvesting

- Timing and Indicators: Explain maturity indicators and timing for harvesting to maximize quality and shelf life.
 - Harvest Techniques: Train on gentle and efficient harvesting practices that reduce damage and promote regrowth (if applicable).
 - Post-Harvest Handling: Include instructions for drying, packaging, and storage to retain maximum value.
 - Each module should be accompanied by interactive visuals, step-by-step instructions, quizzes to reinforce learning, and real-world case studies to contextualize the material.
4. Quality Control and Halal Assurance

Quality control and halal assurance are critical components in the mushroom production process, especially within markets that prioritize both high product standards and religious compliance. This section delves into the essential practices for ensuring quality consistency in mushroom farming while also guaranteeing that products meet halal requirements.

By combining technical precision with cultural and religious sensitivity, producers can secure consumer trust, elevate product value, and open access to broader domestic and international markets.

Steps to Halal Certification:

1. **Application Submission:** Farmers or processing units submit an application detailing their operation, including ingredients, materials, and processes.
2. **Audit of Facilities and Processes:** Inspectors assess the production site to ensure it aligns with halal principles. This includes checking for cross-contamination risks, cleanliness, and the absence of non-halal substances.
3. **Documentation Review:** All product inputs, supplier certifications, and hygiene protocols are scrutinized to ensure compliance.
4. **Training and Awareness:** Staff must be educated about halal principles, especially regarding handling procedures, hygiene, and religious considerations.
5. **Halal Logo Authorization:** Once approved, producers can label products with the official halal logo, making them recognizable and trusted by Muslim consumers.

Result and Discussion

In recent years, the integration of agricultural innovation within educational institutions has taken on new dimensions, blending tradition with modernity in remarkable ways. A compelling example of this can be found in the construction of the Mushroom House at Pondok Pesantren Al-Qur'an At-Tazkiyyah, located in the highlands of Sembalun, East Lombok. This facility symbolizes a transformative approach to agricultural education, where hands-on learning and sustainability are at the heart of the curriculum. As depicted in Figure 2, the Mushroom House is more than a physical space for cultivation, it operates as a dynamic laboratory for students and community members to engage in the intricacies of mushroom farming, particularly the cultivation of straw mushrooms (*Volvariella volvacea*).

Through workshops, guided experiments, and daily farming activities, learners are exposed to techniques such as sterilization, substrate preparation, incubation, and harvesting. These processes not only foster technical know-how but also encourage problem-solving, collaboration, and eco-consciousness. By integrating these modern agricultural practices into a pesantren environment, a place traditionally focused on religious and moral education, the Mushroom House exemplifies how innovation can enrich and broaden learning experiences. Moreover, it empowers students to develop practical skills with economic potential while nurturing a deeper connection to their natural surroundings and local communities.

The Mushroom House provides a designated space equipped with advanced technologies and innovative methods for the cultivation of mushrooms, especially straw mushrooms (*Volvariella volvacea*). Its design integrates controlled humidity systems, sterilization chambers, and sustainable substrate preparation techniques, allowing precise regulation of growing conditions and improved yield. These features turn the facility into more than just a growing site, it becomes an experiential classroom where learning is tactile, collaborative, and engaging. Students, teachers, and local residents are invited to step beyond conventional textbook knowledge and immerse themselves in scientific exploration and experimentation.



Figure 2. Making a Mushroom House in Sembalun Bumbung Village

The development of the Mushroom House and the organization of the Mushroom Festival at Pondok Pesantren Al-Qur'an At-Tazkiyyah represent more than a local initiative, they embody a powerful intersection between faith-based education, scientific innovation, and grassroots activism. These achievements reflect a commitment to not just agricultural development, but a broader vision of environmental stewardship and community empowerment. The pesantren has successfully positioned mushrooms as more than a food source, they have become symbols of sustainable progress and resilience.

As the program expands, it offers new opportunities to integrate practical knowledge with spiritual values. By continuing to promote awareness, enhance public education, and provide hands-on training, the pesantren is nurturing a generation that views farming not just as a livelihood but as a platform for social transformation. These efforts lay the

groundwork for economic independence among vulnerable groups, especially women and youth, while encouraging eco-conscious practices and healthier diets (Figure 3).



Figure 3. Implementation of Mushroom Cultivation Extension and Festival in Sembalun Bumbung Village

This collaboration with the NTB Office of Industry underscores a long-term commitment to empower both women and farmers in the community. It ensures that they are equipped with the necessary resources and knowledge to succeed in developing new agricultural ventures, particularly in the cultivation and commercialization of mushroom products, which have shown increasing potential in the area.

To strengthen this partnership, the initiative includes key training programs specifically focused on marketing, packaging, and branding. These workshops are designed to enhance the skills of farmers and community members in promoting their mushroom products more effectively. By learning how to create attractive packaging and build a strong brand identity, residents of Sembalun Bumbung can increase the marketability and sales of their mushrooms. This capacity-building effort contributes directly to the economic sustainability and long-term development of the community.

Additionally, the initiative collaborates with Fatoni University in Thailand, an institution renowned for its dedication to quality food standards and halal certification (Figure 4).

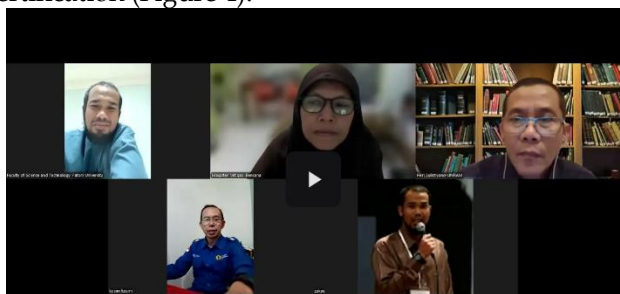


Figure 4. Communication and Interaction Between the Unram Team and the Fatoni University Team

As illustrated by the interaction between the University of Mataram (Unram) team and the Fatoni University team, this partnership seeks to leverage Fatoni's expertise in food quality assurance and halal standards. The aim is to improve the overall quality and market appeal of Sembalun's mushroom products, ensuring they meet the necessary requirements for halal certification—an increasingly important factor in both domestic and international markets.

Fatoni University, an Islamic higher education institution in Thailand, has a strong track record in promoting peace and delivering high-quality education. Founded with the mission of integrating Islamic teachings with modern knowledge, the university plays a pivotal role in nurturing future leaders with strong moral and ethical values. Its curriculum spans Quranic studies, Islamic knowledge, and peace education, and it supports a wide range of community service programs, leadership camps, workshops, and seminars aimed at fostering a more educated and harmonious society.

By partnering with Fatoni University, the Sembalun Mushroom Initiative stands to benefit from valuable insights and support in maintaining high product standards and expanding its consumer base. This collaboration not only reinforces the credibility of mushroom products in terms of halal certification but also strengthens the confidence of consumers. Ultimately, it enhances the sustainability of the agricultural ecosystem in Sembalun and opens up broader economic opportunities, particularly for women and aspiring farmers in the region.

Equally important is the aroma of the mushroom. Fresh straw mushrooms emit a mild, earthy scent that is pleasant and not overpowering. If a mushroom gives off a pungent or rotten smell, it is a clear indicator that the product has started to decay. Olfactory inspection is often used by experienced sellers and consumers alike to determine edibility. An offensive odor suggests the presence of harmful bacteria or mold growth, rendering the mushroom unsuitable for consumption. The structure of the mushroom cap, or "tudung," also provides valuable information (Figure 5). Quality straw mushrooms generally have caps that are still closed or only slightly open. This stage of development means the mushroom is fresh and has not yet released its spores. Once the cap opens widely and begins to shed a significant number of spores, the mushroom enters an overripe phase. While still edible in some cases, overripe mushrooms may have altered textures and flavors and degrade faster. For market purposes, mushrooms with intact, unbroken caps are more desirable.



Figure 5. Good Quality Straw Mushrooms

Straw mushroom (*Volvariella volvacea*) cultivation presents a promising opportunity for sustainable agriculture and economic growth, particularly in tropical regions where demand for high-quality edible fungi continues to rise. However, like any agricultural enterprise, straw mushroom farming is not without its challenges. For farmers to achieve optimal yields and maintain consistency in quality, a range of environmental and technical hurdles must be addressed. This essay explores the key obstacles commonly faced in the cultivation of straw mushrooms and highlights considerations for overcoming them.



Figure 6. Explanation and Practice of Mushroom Product Packaging

A representative from Rumah Kemasan NTB provided a detailed explanation on mushroom packaging to the local community. Following the presentation, participants immediately practiced using the packaging equipment (Figure 6).

Conclusion

Based on the analysis of this community service project, the following conclusions can be drawn:

1. Straw mushroom cultivation faces local climate constraints, as the average temperature in Sembalum Village is less than 30°C.
2. Special technology is required to maintain the ideal temperature in the mushroom growing room.
3. Public enthusiasm is high, but due to environmental factors, many are starting to choose button mushrooms as a more suitable alternative.
4. Current marketing strategies still focus on direct/offline sales.
5. A lack of assistance in digital marketing and online sales capabilities hampers market expansion.

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