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Original Article

Mushroom Cultivation and Processing as Entrepreneurial Opportunities in Bulacan, Philippines

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Abstract. Mushroom cultivation and processing are increasingly promoted in the Philippines as livelihood options for rural families. However, empirical evidence on their performance as sources of income remains limited. Accordingly, this study examined the viability of household mushroom cultivation and processing as income-generating activities and entrepreneurial opportunities in Bulacan, Central Luzon, Philippines. A descriptive multiple-case design was used, involving four mushroom entrepreneurs (three cultivators and one processor) purposively selected, along with key informants from the Central Luzon State University Mushroom Center and the Department of Trade and Industry in Bulacan. Semi-structured interviews documented enterprise characteristics, challenges, support services, opportunities, and income patterns. In addition, simple cost and revenue estimates were prepared for a cultivation setup with 10,000 fruiting bags and a crispy mushroom processing operation using about 100 kilograms of fresh mushrooms per day. The findings show that most mushroom ventures are home-based, require modest capital, and allow household members, particularly women, to combine income-earning activities with family responsibilities. Furthermore, the cases reveal recurring issues in input sourcing, contamination, labor, and market access, which are partly addressed through technical training, product development assistance, shared service facilities, and enterprise development programs provided by support institutions. Financial analysis suggests that cultivators can achieve profit margins of approximately 63-99 percent, depending on the extent of outsourced inputs, whereas processors can generate an estimated 42 percent profit margin. Overall, the study indicates that mushroom cultivation and processing, when supported by appropriate technologies and when given active institutional support, can provide a regular household income and serve as viable entrepreneurial pathways for rural families in Bulacan. Moving forward, the study highlights the need for targeted capacity building, compliance support, market development, and cooperative or cluster initiatives to strengthen mushroom enterprises.

Keywords: *Entrepreneurial opportunities; Household enterprise; Mushroom cultivation; Mushroom processing; Philippines.*

Mushrooms are increasingly recognized as functional foods that contribute to nutrition, health, and environmental sustainability. They provide protein, fiber, vitamins, minerals, and bioactive compounds that support disease prevention and overall well-being (Feeney et al., 2014; Valverde et al., 2015; Roncero-Ramos & Delgado-Andrade, 2017). Because of these attributes, mushrooms are no longer seen only as

ingredients in meals. They are also viewed as potential drivers of local value chains, microenterprises, and diversified household livelihoods (Aditya et al., 2024; Jayaraman et al., 2024).

Accordingly, mushroom cultivation aligns well with more inclusive forms of agricultural development. It can be done on a small scale, requires relatively little land, and often uses agricultural byproducts as growing substrates. Production cycles are also relatively short, allowing households to generate income more frequently and to adjust output in response to demand. These characteristics make mushroom enterprises attractive to women, informal workers, and rural families who need livelihood activities compatible with household responsibilities and modest capital (Dey et al., 2020; Raut, 2019). In this sense, mushrooms represent both a food product and a practical livelihood option.

At the global level, the mushroom sector has expanded in terms of production volume, product diversity, and market reach. Demand for fresh mushrooms and value-added mushroom products has risen alongside shifts toward more plant-based and health-conscious diets and growing interest in climate-resilient food systems (Feeney et al., 2014; Jayaraman et al., 2024). However, the extent to which small producers benefit from these trends still depends on how they manage technical risks, organize labor, and access input and output markets, as well as how they respond to quality expectations along the value chain (Aditya et al., 2024; Raut, 2019). These considerations are also evident in country-level experiences, including those of the Philippines.

In the Philippines, mushroom cultivation has been actively promoted through state universities, local government units, and national livelihood programs. Studies in Nueva Ecija and other areas show that mushroom initiatives can supplement household earnings, support women's participation in income generation, and contribute to community-based development efforts (Mina et al., 2020; Dey et al., 2020; Domingo, 2025; Menor, 2022). In addition, recent work on market assessment and product development notes a growing demand for oyster mushrooms and processed mushroom products in Luzon, but also raises concerns about supply stability and product quality (Iglesia, 2025). More recently, a value chain analysis in Camarines Sur documented how mushroom growers, processors, and traders participate in local markets and showed that value-adding activities can improve returns while still being constrained by input costs, compliance requirements, and limited market reach (Rodriguez, 2024). Together, these studies suggest that mushroom enterprises can play a meaningful role in rural livelihoods when technical and market conditions are favorable.

These livelihood efforts operate within a broader policy environment for micro and small enterprises. Laws such as the Magna Carta for Small Enterprises and the Barangay Micro Business Enterprises (BMBE) Act aim to provide incentives, training, and support services to small firms (Republic of the Philippines, 1991, 2002). Recent assessments indicate that BMBE registration and related incentives can improve capital, profitability, and asset growth among microenterprises. At the same time, entrepreneurs continue to encounter gaps in information, compliance support, and program coordination, which can limit actual take-up and impact (Codon, 2025; Tomas, 2025). Thus, while the policy framework is supportive on paper, its benefits may not be fully realized at the household enterprise level.

Within this national context, Bulacan in Central Luzon provides a valuable setting for examining mushroom-based livelihoods. The province comprises rural and peri-urban communities, is close to major markets in Metro Manila, and hosts a range of microenterprises engaged in agricultural and processed-food activities. Mushroom cultivation and processing have been introduced and supported by universities and government agencies in the area, and local producers participate in training, fairs, and product development initiatives. However, existing documentation has primarily focused on technical aspects, project descriptions, and general livelihood outcomes rather than on detailed household-level enterprise dynamics (Domingo, 2025; Iglesia, 2025).

Despite these efforts, there is still a clear gap in empirical evidence on how mushroom enterprises perform at the household level. Most Philippine studies emphasize technical practices, training outcomes, or overall livelihood benefits, but they provide limited information on actual income flows, profit margins, and day-to-day enterprise decisions of household growers and processors (Mina et al., 2020; Menor, 2022; Domingo, 2025). In particular, household-level income performance and enterprise behavior have not been described in sufficient detail to show how mushroom ventures function as ongoing businesses rather than one-time projects. This gap impedes program implementers' and policymakers' ability to assess whether mushroom cultivation and processing can reliably support rural families over the long term.

To address this gap, the present study examines mushroom cultivation and processing as household enterprises in selected municipalities of Bulacan. Specifically, it analyzes how household-based mushroom ventures operate as income-generating activities and entrepreneurial opportunities for rural families, and how they function as small businesses with respect to labor roles, cost structures, and marketing practices. It also provides indicative cost, revenue, and profit margin estimates for representative cultivation and processing setups. By linking household narratives with simple financial analysis, the study offers a clearer picture of household-level income performance and enterprise behavior. Moving forward, these insights can guide livelihood and enterprise development programs to strengthen mushroom-based enterprises in rural communities.

Methodology

Research Design

A qualitative, descriptive, multiple case design was employed. This approach was appropriate because the study aimed to describe how different household mushroom enterprises function in their real-life contexts rather than to test hypotheses or estimate population parameters (Creswell & Poth, 2018). Each household enterprise was initially treated as a separate case with its own history, production practices, and market arrangements. The cases were then compared to identify common patterns and important differences across enterprise types. In addition, key informant interviews with representatives from the Central Luzon State University Mushroom Center and the Department of Trade and Industry Bulacan, were used to situate the household cases within the broader support system for mushroom-based enterprises.

Participants and Sampling Technique

The primary participants were four household mushroom entrepreneurs in selected municipalities of Bulacan. Three cases focused on cultivating fresh oyster mushrooms using fruiting bags, while one case focused on processing fresh mushrooms into crispy mushroom products. All enterprises were based in or near the family residence, with production and processing areas located on home lots, in side yards, or in simple structures attached to the house. Purposive sampling was used to select cases that were information-rich and met specific criteria. The enterprises had to be household-based, operated primarily by family members, and engaged in mushroom cultivation, processing, or both. They also needed at least 3 years of operation and to be willing to share basic information on production practices, costs, and earnings. To capture the institutional context, additional key informants were drawn from the Central Luzon State University Mushroom Center and the Department of Trade and Industry Bulacan. These informants provided information on training programs, shared-service facilities, product development assistance, and on how government initiatives reach household mushroom enterprises in practice.

Research Instrument

The main research instruments were semi-structured interview guides developed separately for household participants and institutional key informants. For household enterprises, the guide covered enterprise history, production and processing practices, labor arrangements, input and market sources, perceived challenges, support received, and income patterns. In addition, the guide prompted participants to explain how mushroom-related income fits into their overall household budget and how it interacts with other livelihood activities. For institutional key informants, the questions focused on existing programs related to mushroom production and processing, types of technical and business development services, beneficiary targeting and selection, and observed outcomes among growers and processors.

To help ensure content validity, the initial interview guides were reviewed by two faculty members with experience in qualitative research and rural enterprise development. Their comments led to minor adjustments to the wording, the sequence of questions, and the prompts related to income and cost items. The revised guides were then pre-tested with one mushroom grower outside the final sample to check clarity, flow, and approximate interview length. Feedback from this pre-test was used to simplify terms further and to add follow-up probes for participants who needed more guidance in recalling financial information. The guides were drafted in English but were translated or explained in Filipino during the interviews when needed, so that participants could respond comfortably and clearly.

Data Gathering Procedures

Data collection involved scheduled visits to the participating households and institutions. At the start of each visit,

the researcher introduced the study, explained its purpose and procedures, and obtained informed consent from each participant. Once consent was obtained, semi-structured interviews were conducted at locations selected by participants, typically within or near their homes or workplaces. Interviews with household participants documented daily operations, production or processing routines, sales practices, cost items, and perceived benefits and risks. When possible, the researcher also observed production or processing activities and took brief field notes on facilities, materials, and work routines. Basic financial information, such as typical volumes, selling prices, and recurring cost items, was gathered to support simple cost and revenue estimates.

Key informant interviews were conducted at the Central Luzon State University Mushroom Center and at the Department of Trade and Industry Bulacan office. These conversations focused on training offerings, shared service facilities, product development support, and the participation of household mushroom enterprises in livelihood and market development programs. During data collection, the researcher used follow-up questions and on-the-spot summaries to assess the researcher's understanding of participants' responses. When participants described numerical values or income patterns, the interviewer repeated the figures back to them for confirmation or correction. This process served as an initial form of member checking during the interviews.

Data Analysis

Interview recordings were transcribed and organized by case. Initially, the transcripts were read several times to gain an overall sense of the data. Guided by the steps of reflexive thematic analysis proposed by Braun and Clarke (2006, 2019), the researcher then coded meaningful segments related to enterprise characteristics, challenges, institutional support, opportunities, and income experiences. Accordingly, codes were grouped into broader categories and themes that captured recurring patterns across cases. These themes were then compared with existing literature on mushroom-based livelihoods, gender roles, and rural microenterprises to deepen interpretation and highlight points of convergence or contrast. In parallel, simple cost and revenue estimates were prepared for a cultivation setup with 10,000 fruiting bags and a small-scale crispy mushroom processing operation using about 100 kilograms of fresh mushrooms per day. These computations relied on self-reported data, supplemented by typical cost figures from training materials and institutional informants. The resulting estimates were used to illustrate potential gross profit and profit margin levels under different enterprise configurations.

To strengthen trustworthiness, several strategies were used. First, data triangulation was employed by drawing on multiple sources: household interviews, institutional key-informant interviews, field observations, and available training or program documents. Second, member checking was conducted informally during interviews by restating key points and numerical estimates and asking participants to confirm or clarify them. Third, an audit trail was maintained through clear documentation of coding decisions, theme development, and revisions to the codebook, as well as brief analytic memos explaining the rationale for interpretations. Finally, the study adhered to the basic principles of qualitative rigor outlined by Creswell and Poth (2018), including transparency in procedures, careful use of direct quotations, and attention to consistency across cases.

Ethical Considerations

The study adhered to fundamental ethical principles in social research, including respect for persons, beneficence, and justice. Before each interview, participants were informed about the purpose of the study, the kinds of questions that would be asked, the expected duration of the interaction, and how the data would be used. They were also advised that participation was voluntary, that they could decline to answer any question, and that they could withdraw at any point without negative consequences. Written or verbal informed consent was obtained before starting each interview and, when applicable, before recording the conversation. The researcher clarified that individual financial figures would be used only in aggregate or illustrative form and would not be linked to identifiable names. To protect privacy, the report uses general labels such as Grower A, Grower B, Grower C, or Grower D instead of real names. Specific addresses and identifying details about the enterprises and institutions are omitted or generalized to prevent unintended disclosure. Finally, data files and recordings were stored in password-protected devices and accessed only by the researcher involved in the project.

Results and Discussion

This section presents the main findings on household mushroom enterprises in Bulacan and relates them to earlier studies on mushroom-based livelihoods, women's income contribution, and rural microenterprises. The results are organized into themes that address the research objectives, followed by brief discussions for each theme.

Household Mushroom Enterprises in Bulacan

The four household enterprises in this study represent two main types of activity. Three cases focus on cultivating fresh oyster mushrooms, while one centers on processing crispy mushroom products. All four operate within or beside the family residence, using spare lots, side yards, or simple structures attached to the house as work areas. Table 1 summarizes the enterprises' basic profiles by years in operation, scale, products, and markets. The cultivators manage mushroom houses with several thousand fruiting bags and sell fresh oyster mushrooms to nearby households, wet market vendors, small eateries, and resellers. The processor purchases fresh mushrooms, converts them into crispy products, and sells these through resellers, trade fairs, specialty shops, and repeat customers.

Table 1. *Summary Profile of Household Mushroom Enterprises in Bulacan*

Case	Enterprise Type	Years in Operation	Typical Scale of Operation	Main Products	Primary Markets
Grower A	Cultivator (Fresh Oyster Mushrooms)	5 years or more	Mushroom house targeting around 10,000 fruiting bags.	Fresh Oyster Mushrooms	Local Households, Wet Market Vendors, and Nearby Resellers
Grower B	Cultivator (Fresh Oyster Mushrooms)	3–5 years	Several thousand fruiting bags in a backyard mushroom house.	Fresh Oyster Mushrooms	Wet Market Stalls, Neighborhood Buyers, Small Retailers
Grower C	Cultivator (Fresh Oyster Mushrooms)	3–5 years	A few thousand fruiting bags are integrated into the home compound.	Fresh Oyster Mushrooms	Local Eateries, Community Buyers, and Small Traders
Grower D	Processor (Crispy Mushroom Products)	5 years or more	Processes about 100 kg of fresh mushrooms per production day.	Crispy Mushroom Products (various flavours/pack sizes)	Trade Fairs, Pasalubong, Specialty Shops, Resellers, and Repeat Customers

These spatial arrangements and work routines are consistent with earlier studies that underline the suitability of mushroom production for household enterprises. Dey et al. (2020) reported that small mushroom units in rural India enabled women to earn income from work done near or inside the home. In the Philippines, Mina et al. (2020) and Menor (2022) described similar patterns in Nueva Ecija and Ilocos Sur, where families used mushroom houses as sources of income while continuing to perform domestic roles. The Bulacan cases support these findings and add concrete details on scale and market reach at the household level.

Livelihood Pathways, Family Roles, and Income Contribution

Before entering mushroom production or processing, participants engaged in a range of other livelihood activities. These included palay farming, pig and poultry raising, vegetable production, small sari-sari stores, and occasional wage work. Shifting to mushrooms followed different paths but reflected common motivations. Households wanted an income source that could be managed at home, did not require land expansion, and provided more frequent cash flow than seasonal crops.

The narratives show that women hold central roles in these enterprises. They generally manage recordkeeping, coordinate with buyers, supervise helpers, and conduct quality checks on harvested or processed products. Men typically perform physically demanding tasks, such as constructing and repairing mushroom houses, moving heavy materials, and transporting raw materials and finished goods. Older children assist with bag filling, sorting, packing, and basic accounting tasks when school schedules allow.

This division of roles is consistent with earlier work. Dey et al. (2020) found that mushroom units contributed to women's economic empowerment by enabling them to participate in daily management and decision-making. Likewise, Mina et al. (2020) and Menor (2024) observed that mushroom projects encouraged shared household roles that reflect both gender norms and practical needs. The Bulacan cases add specific examples of how each family member contributes and confirm that mushroom enterprises can strengthen women's economic roles while

remaining compatible with family responsibilities.

In terms of income, participants shared that mushroom earnings help pay for food, utilities, children's education, and, in some cases, business reinvestment. While some households retain small side activities, they now treat mushroom cultivation or processing as their primary or most reliable source of income. These accounts align with prior Philippine evidence that mushroom projects can shift from a supplemental source of income to a central contributor to household livelihoods when adequately supported (Mina et al., 2020; Menor, 2022; Domingo, 2025).

Challenges in Input Supply, Production, and Marketing

Although the enterprises show promising income potential, participants encounter several recurring challenges. These constraints fall into three broad areas: input supply, production and processing, and marketing. For input supply, cultivators reported difficulty in securing consistent, high-quality spawn and substrate. Some shared experiences in which sawdust or rice bran from suppliers resulted in high contamination rates or poor yields. These accounts echo findings from community-based mushroom projects, where unstable input quality has limited the success of small producers (Mina et al., 2020; Menor, 2022). The processor, meanwhile, depends on a reliable volume of fresh mushrooms from partner growers. Any drop in supply disrupts production schedules and affects the ability to serve regular customers.

During production, contamination remains a significant source of risk. Growers described instances in which mold, pests, or improper moisture levels reduced the number of productive bags. Although they had attended training at the Central Luzon State University Mushroom Center, they admitted that maintaining ideal conditions in backyard structures is challenging due to weather fluctuations and limited control over temperature and humidity. These experiences are similar to those in previous projects, in which consistent sanitation and environmental control were difficult to maintain in small facilities (Mina et al., 2020). On the other hand, in processing, the main issues relate to batch consistency and rising costs. The processor noted that as volumes increased, maintaining the same texture and flavor across batches became more difficult. At the same time, fuel, cooking oil, and packaging costs increased, putting pressure on profit margins when selling prices could not be adjusted immediately.

Marketing presents a different set of concerns. Fresh mushrooms have a short shelf life. When daily harvests exceed expectations, some quantities must be sold quickly at lower prices or used for domestic consumption to prevent spoilage. In contrast, the processor benefits from the longer shelf life of crispy products and from repeated orders from resellers and loyal customers. However, participation in trade fairs and organized sales events requires investment in packaging, labeling, and regulatory compliance.

Altogether, these patterns support observations from other contexts. Dey et al. (2020) and Menor (2022) emphasized that sustainable mushroom enterprises require ongoing support in input quality, contamination control, and market access. The Bulacan cases confirm that these are not one-time obstacles but continuing management challenges that growers and processors confront in their daily operations.

Institutional Support and Entrepreneurial Opportunities

The household mushroom enterprises in Bulacan do not operate in isolation. They are embedded in a support environment shaped by state universities, national agencies, and local government units. The Central Luzon State University Mushroom Center provides training on spawn production, fruiting bag preparation, contamination control, and basic processing methods. It also provides technical advice, demonstration facilities, and starter kits to help new growers begin with less trial and error.

The Department of Trade and Industry (DTI) Bulacan complements these efforts through enterprise development programs. These include product development and packaging assistance, mentoring for microentrepreneurs, shared service facilities for food processing, and access to trade fairs and market-matching events. Through these programs, the household growers and processors in this study were able to join short courses, improve packaging, and reach buyers beyond their immediate communities. These forms of assistance mirror the broader MSME support system envisioned under the Magna Carta for Small Enterprises and related policies (Republic of the Philippines, 1991, 2002).

However, participation in support programs is uneven. Some growers are active beneficiaries of training and

mentoring, while others have only limited or one-time contact with institutions. A few enterprises remain informal and are not registered as Barangay Micro Business Enterprises (BMBEs), even though they meet the size requirements. They cited limited information, perceived complexity of requirements, and competing household responsibilities as reasons for non-registration. These concerns are consistent with BMBE implementation studies, which show that while formal registration and incentives can strengthen capital and profitability, many entrepreneurs still face gaps in awareness, compliance support, and interagency coordination (Codon, 2025; Tomas, 2025).

Overall, the cases suggest that institutional programs create important opportunities for household mushroom enterprises to move beyond subsistence. When households can combine their own initiative with accessible training, shared facilities, and market exposure, mushroom cultivation and processing become more viable entrepreneurial pathways rather than side activities.

Financial Performance of Household Mushroom Enterprises

The financial analysis focused on two representative configurations: a cultivator managing 10,000 fruiting bags and a small-scale processor operating at an average daily capacity of 100 kilograms of fresh mushrooms. Table 2 summarizes the estimated sales, costs, gross profit, and profit margins for these setups based on self-reported data and typical figures from training materials and institutional informants.

Table 2. *Estimated Sales, Costs, Gross Profit, and Profit Margin for Standard Cultivation and Processing Scenarios*

Enterprise Type	Scenario Description	Time Basis	Sales (Php)	Cost of Sales (Php)	Gross Profit (Php)	Gross Profit Margin (%)
Cultivation (10,000 fruiting bags)	Own resources for direct materials and family labor; only overhead paid in cash.	Annual	472,500	6,000	466,500	98.7
Cultivation (10,000 fruiting bags)	Outsourced direct materials; family labor; overhead paid in cash.	Annual	472,500	77,000	395,500	83.8
Cultivation (10,000 fruiting bags)	Outsourced direct materials and hired labor; overhead paid in cash.	Annual	472,500	177,000	295,500	62.6
Processing (100kg fresh mushrooms per production day, 20 days per month)	Crispy mushroom products with outsourced materials and hired helpers.	Monthly	1,000,000	576,000	424,000	42.4

For the cultivation cases, annual gross revenue reflects multiple harvest cycles, with sales of 10,000 bags, sold mainly as fresh oyster mushrooms. Operating costs include spawn, substrate materials, plastic bags, labor, utilities, and basic repairs. Under these assumptions, cultivators can earn an annual gross profit ranging from Php295,500 to Php466,500. Estimated profit margins range from 63 to 99 percent, depending on the extent to which inputs such as spawn and substrate preparation are outsourced rather than produced in-house. These figures are broadly consistent with previous Philippine studies that describe mushroom projects as financially attractive when contamination is controlled and markets are accessible (Mina et al., 2020; Domingo, 2025; Menor, 2022).

For the processor, the analysis considered a monthly production scheme in which fresh mushrooms are purchased from growers and converted into crispy mushroom products. Major cost items include raw materials, cooking oil, seasonings, fuel, packaging, and labor. Under these conditions, the processor can generate a monthly gross profit of about Php424,000, with an estimated profit margin of around 42 percent. Compared with cultivation, processing requires higher working capital and more intensive labor per unit of output. However, it benefits from a more extended shelf life and the potential for premium pricing through branding and value addition.

These results suggest that both cultivation and processing can be financially viable at the household level, although their risk profiles differ. Cultivators are more exposed to contamination, climate-related risks, and price fluctuations in fresh produce markets. Processors, in contrast, must manage the reliability and consistency of input supply, rising packaging and compliance costs, and the demands of food product regulations.

Emerging Entrepreneurial Opportunities and Value Chain Linkages

Beyond basic production and direct sales, the cases identify several emerging opportunities across the mushroom value chain. Upstream, there is scope for specialized enterprises to supply high-quality spawn, substrate materials,

and basic equipment to household growers. Reliable input providers can reduce contamination risks and stabilize yields, thereby supporting the growth of small cultivation units (Aditya et al., 2024; Raut et al., 2019).

At the production and processing level, households can explore additional mushroom-based products and bundled offerings. In addition to fresh mushrooms and crispy chips, participants mentioned potential products such as mushroom burger patties, siomai, and ready-to-cook packs. These ideas align with trends in functional foods and plant-based diets, which have been associated with rising global demand for mushroom products (Feeney et al., 2014; Jayaraman et al., 2024). Local market assessments also indicate that urban and peri-urban consumers in Luzon are increasingly willing to try mushroom-based snacks and dishes, especially when these are promoted with clear branding and product information (Iglesia, 2025).

Downstream, household enterprises can strengthen linkages with resellers, institutional buyers, and digital platforms. Resellers and small stores help move products into neighborhood markets, while participation in trade fairs and weekend bazaars exposes mushroom products to broader consumer segments. Furthermore, social media and online marketplaces create opportunities for direct-to-consumer sales, pre-orders, and subscription-style delivery of fresh or processed mushrooms. These strategies can help smooth demand, reduce unsold inventory, and increase the visibility of household brands.

Figure 1 presents a simplified view of the household mushroom enterprise in Bulacan within its local value chain and support environment. It illustrates how inputs and resources, household activities, markets and buyers, support institutions and programs, and the policy environment are linked. The figure also highlights feedback between households and support institutions, underscoring that the enterprise operates within a broader ecosystem rather than in isolation.

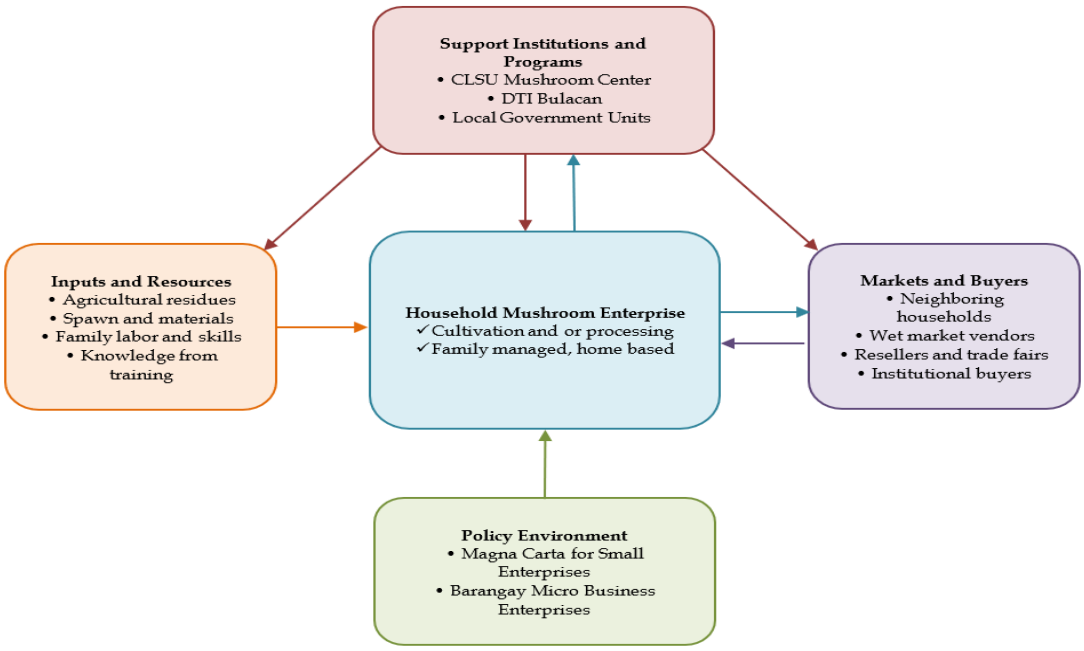

Figure 1. *Household Mushroom Enterprise in Bulacan, Value Chain, and Support Environment*

Taken together, these patterns suggest that mushroom cultivation and processing in Bulacan are not single, uniform livelihoods, but a set of related entrepreneurial pathways. Households may enter the value chain at different points and can move among roles as cultivators, processors, resellers, or coordinators as their skills, capital, and networks grow.

Proposed Action Plan for Strengthening Household Mushroom Enterprises in Bulacan

Based on the findings, the study outlines an action plan to support the growth and sustainability of household mushroom enterprises in Bulacan. The matrix in Table 3 presents the proposed interventions, lead institutions, and indicative time frames. The plan is organized around four main thrusts: capacity building, tax and compliance

awareness, market development, and cooperative or cluster strengthening.

Table 3. *Proposed Action Plan for Household Mushroom Enterprises in Bulacan*

Program	Objective	Key Activities	Lead Partners	Suggested Timeline
Capacity Building Program	To equip existing and potential mushroom growers and processors with practical skills in production, business compliance, simple record keeping, and product development.	Implement a training series with four sessions: Mushroom Growing Made Easy, Business Compliance, Simple Bookkeeping, and Product Development; conduct sessions in community venues and on-site in mushroom houses and processing areas; develop simple manuals and visual materials in Filipino and English to support learning.	Central Luzon State University Mushroom Center; College of Business Administration; Department of Trade and Industry Bulacan; College of Hospitality and Tourism Management; Local Government Units	Short term, within four to six weeks for one complete cycle of the training series, with repeat cycles as demand arises.
"*Ligtas sa Buwis*" Program	To increase awareness and actual use of legal and tax-related incentives for microenterprises, especially under the Barangay Micro Business Enterprises law.	Conduct orientation sessions that explain in simple terms the requirements and benefits of BMBE registration and related MSME laws; organize step-by-step clinics where mushroom growers and processors prepare and process their papers with on-site guidance; link qualified enterprises to available financing and business support programs.	College of Business Administration; Department of Trade and Industry Bulacan; Local Government Units; Bureau of Internal Revenue Representatives (where possible)	Short to medium term, within six to twelve months, to reach initial batches of growers and processors.
"Mushroom All You Can" Program	To widen the network and market exposure of mushroom growers and processors through collective promotion and selling events.	Organize a three-day trade fair that brings together mushroom growers and processors from Bulacan to showcase fresh and processed products in a visible venue, such as a Metro Manila mall or major provincial event; coordinate with the provincial government and tourism office to brand Bulacan as a center for mushroom products; provide basic marketing and branding coaching before the event.	Provincial Government of Bulacan; Provincial Tourism Office; Department of Trade and Industry Bulacan; College of Business Administration; Private Venue Partners	Short-term for an initial event within one year, with potential annual repetition.
"*Kabutehan ng Bulacan*" Program	To support the formation and strengthening of an association or cooperative of mushroom growers in Bulacan.	Assist interested growers in organizing an association or cooperative; provide guidance on documentation, bylaws, and registration requirements; conduct workshops on leadership, simple governance, and member responsibilities; encourage members to explore contract growing and shared services through the group.	College of Business Administration; Provincial Cooperative and Enterprise Development Office; Local Government Units; Interested Mushroom Growers	Medium term, within twelve months to complete initial organization and registration processes.
"Adopt a Cooperative" Program	To ensure continuity of support and monitoring for the established mushroom cooperative and its members.	Develop a memorandum of understanding between the College of Business Administration and the *Kabutehan ng Bulacan* Cooperative or an equivalent organization; plan regular follow-up visits, mentoring sessions, and basic monitoring of enterprise performance; integrate the cooperative into extension, research, and student practicum activities to provide a sustained stream of assistance.	College of Business Administration; *Kabutehan ng Bulacan* Cooperative or Association; Central Luzon State University Mushroom Center; Department of Trade and Industry Bulacan	Medium term, over about twelve months after the cooperative has been formed, with the option to extend based on results.

First, capacity building focuses on upgrading the technical and business skills of growers and processors. This includes periodic training in contamination control, spawn and substrate preparation, basic record-keeping, and cost monitoring. State universities and government agencies can coordinate to offer modular short courses scheduled at times convenient for household participants, especially women.

Second, tax and compliance awareness aims to help microentrepreneurs understand the implications of BMBE registration, food safety regulations, and basic business licensing. Moving forward, DTI, local government units,

and revenue agencies can design simplified orientations, checklists, and one-on-one clinics that walk household enterprises through the steps of registration and compliance. This responds to observed gaps in awareness and perceived complexity of formalization noted in BMBE assessments (Codon, 2025; Tomas, 2025).

Third, market development targets improvements in both products and channels. Recommended actions include strengthening product development and packaging support, enhancing participation in local and regional trade fairs, and encouraging the use of digital platforms for promotion and ordering. In addition, collaboration with institutional buyers, such as schools, restaurants, and corporate canteens, can be explored to create more stable demand for fresh and processed mushroom products (Domingo, 2025; Iglesia, 2025).

Lastly, cooperative and cluster strengthening seek to organize household mushroom enterprises into groups that can access resources and opportunities more effectively. Through cooperatives, associations, or producer clusters, households can pool input purchases, share equipment or facilities, and coordinate training and market-participation schedules. These collective arrangements can reduce individual risks and transaction costs while improving bargaining power in both input and output markets.

Overall, the proposed action plan is intended to be practical and incremental. It builds on existing programs and institutional strengths rather than creating entirely new structures. When implemented in a coordinated manner, these measures can help transform small mushroom projects into more resilient and scalable family enterprises that contribute meaningfully to rural livelihoods in Bulacan.

Conclusion

This study examined mushroom cultivation and processing as household enterprises in selected municipalities of Bulacan, Central Luzon, Philippines. Using a descriptive multiple-case design, it documented how four household-based mushroom ventures organize their operations, share roles among family members, interact with support institutions, and generate income. The analysis also provided indicative estimates of costs, revenues, and profit margins for representative cultivation and processing setups, enabling a closer examination of household-level income performance and enterprise behavior.

The findings show that mushroom cultivation and processing can serve as viable income-generating activities for rural households when basic technical skills, input supply, and market access are in place. Most enterprises are home-based, require modest capital, and allow women and other household members to combine income-earning activities with family responsibilities. At the same time, the cases highlight recurring challenges in input quality, contamination control, labor demands, and marketing, as well as uneven access to institutional support and formal incentives such as those provided under the BMBE law. These patterns underscore that mushroom enterprises function not only as livelihood options but as small businesses that must manage risk, maintain product quality, and build markets over time.

Beyond their immediate contributions to livelihoods, the results carry broader implications for education, entrepreneurship development, and community-based livelihood programs. For higher education institutions and training providers, the study underscores the value of integrating case studies on mushroom enterprises into curricula and extension programs in agribusiness, entrepreneurship, and community development. Course modules and practicum activities can be designed around real household experiences in production, processing, cost monitoring, and marketing, thereby linking classroom learning with actual enterprise behavior. Capacity-building frameworks can also be strengthened by combining technical training on contamination control and product development with basic financial literacy, recordkeeping, and simple market analysis.

For entrepreneurship development and community-based initiatives, the findings suggest that mushroom enterprises are well-suited to cooperative or cluster-based approaches. Organizing growers and processors into groups can support bulk purchasing of inputs, shared use of facilities, and joint participation in trade fairs and digital marketing. Local government units, state universities, and agencies such as DTI can use the action plan outlined in this study as a reference for designing coordinated capacity-building, compliance support, and market development activities that respond directly to household-level constraints and opportunities.

Finally, the study opens several directions for future research. Quantitative studies can be conducted to validate and refine the income and profit estimates presented here across a larger sample of mushroom enterprises.

Longitudinal research can track household income, enterprise growth, and risk management strategies over time to see how mushroom ventures evolve beyond their initial stages. In addition, value chain analysis can examine how household producers, processors, input suppliers, resellers, and institutional buyers interact and how these linkages affect income distribution and enterprise sustainability. Moving forward, such studies can complement the present qualitative findings and provide a stronger empirical basis for educational programs, extension activities, and policies aimed at strengthening mushroom-based livelihoods in rural communities.

Contributions of Authors

Author: conceptualization; methodology; data gathering; data analysis; visualization (tables and figure); original draft; review and editing; project administration

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Conflict of Interests

The authors declare no conflict of interest.

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