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IMPACT OF GOVERNMENT SCHEMES AND TRAINING PROGRAMS ON THE GROWTH OF MUSHROOM CULTIVATION IN NAGALAND

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Abstract

Mushroom cultivation has emerged as a viable pathway for sustainable income generation, nutritional security, and rural employment in Nagaland. This study assesses the role of government schemes and training programs in promoting mushroom farming across the state, drawing exclusively from secondary data sources such as government reports, statistical publications, policy documents, and previous research studies. It examines the contributions of initiatives including the Mission for Integrated Development of Horticulture (MIDH), PM Formalization of Micro Food Processing Enterprises (PM-FME), and Agricultural Technology Management Agency (ATMA) in enhancing skill development, infrastructure provision, and market linkages for mushroom growers. Analysis of existing literature and official records indicates that these interventions have facilitated the expansion of mushroom cultivation, particularly among women and youth. Nonetheless, persistent challenges related to awareness, consistent input supply, and post-harvest infrastructure continue to limit large-scale adoption. The study offers policy recommendations to improve outreach, strengthen institutional support, and increase the effectiveness of government interventions for scaling up mushroom cultivation in Nagaland.

Keywords: *Mushroom Cultivation, Government Schemes, Training Programs, Agricultural Development, Rural Livelihoods and Skill Development*

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INTRODUCTION

Mushroom cultivation is increasingly being recognized as a viable component of sustainable agriculture, especially in regions with limited arable land and high unemployment rates. In Nagaland, a predominantly agrarian state in Northeast India, mushroom farming presents significant potential for enhancing rural livelihoods, promoting nutritional security, and generating employment, particularly for women and youth. The agro-climatic conditions of Nagaland are well-suited for growing a variety of mushrooms, including oyster, button, and shiitake varieties (Yadav et al., 2021). However, the adoption and scalability of mushroom cultivation have largely depended on institutional support, particularly in the form of government schemes and training programs.

The Mission for Integrated Development of Horticulture (MIDH), Pradhan Mantri Formalization of Micro Food Processing Enterprises (PM-FME) and Agricultural Technology Management Agency (ATMA) are some of the initiatives that have contributed towards financial assistance, skilling and infrastructure support of these mushroom growers in the state. Training programmes under these schemes have

targeted to transfer technical know-how, entrepreneurial skill and awareness on market linkages (Ministry of Agriculture & Farmers Welfare, 2022). It is worthy to mention that the on-field impact of those programs toward the improvement of the mushroom cultivation sustainability and its continuation are still under-research in the academic literature.

This paper aims to fill that void by examining the contribution of Government interventions in the promotion of mushroom cultivation in Nagaland. It explores the extent to which such schemes and training programmes are affecting farmers' take-up, productivity, income and access to markets. By employing a double blend of quantitative survey and qualitative interviews of market players, this study seeks to provide the policy boding to enhance the mushroom value chain and foster inclusive rural development.

REVIEW OF LITERATURE

Mushroom cultivation has received increasing attention in recent years as a sustainable, income-generating activity suited to small and marginal farmers, particularly in the hill and tribal regions of India. According to Choudhary et al. (2020), mushroom farming is labor-intensive and offers high returns on minimal investment, making it an attractive option for rural households. In the context of Nagaland, where terrain and climatic conditions favor the growth of various mushroom species, this sector holds untapped potential for economic diversification and food security (Longkumer, 2019).

Government schemes have played a significant role in promoting mushroom cultivation across India. The Mission for Integrated Development of Horticulture (MIDH) has provided subsidies for infrastructure, spawn production units, and cold storage facilities, which are essential for the scalability of mushroom enterprises (National Horticulture Board, 2022). Similarly, the Pradhan Mantri Formalization of Micro Food Processing Enterprises (PM-FME) scheme has been instrumental in supporting value addition and marketing of processed mushroom products (Ministry of Food Processing Industries, 2022). Studies by Sharma and Bhardwaj (2021) indicate that these schemes have a positive impact on enterprise growth, provided beneficiaries receive adequate training and post-harvest support.

Training and capacity-building programs are crucial enablers for technology adoption and productivity improvement in mushroom farming. According to Yadav and Singh (2018), targeted training on spawn preparation, substrate selection, disease control, and post-harvest handling can significantly enhance yield and quality. In Nagaland, institutions such as Krishi Vigyan Kendras (KVKs) and the State Horticulture Department have organized short-term training courses under schemes like ATMA, helping farmers build technical skills and confidence (Imchen & Walling, 2021).

Despite the presence of these schemes, gaps in awareness, accessibility, and follow-up support remain challenges. A study by Singh and Devi (2020) on mushroom cultivation in Northeast India revealed that many rural farmers are either unaware of government assistance or lack the procedural knowledge to avail themselves of it. This highlights the need for better dissemination of information, localized training modules, and convergence between different government departments.

In summary, existing literature supports the assertion that government schemes and training programs can significantly boost the mushroom cultivation sector. However, the regional context, especially in tribal-dominated areas like Nagaland, demands a more integrated and culturally sensitive approach to policy design and implementation.

OBJECTIVES OF THE STUDY

1. To assess the impact of government schemes on the growth and adoption of mushroom cultivation in Nagaland.
2. To evaluate the effectiveness of training programs in enhancing the skills and productivity of mushroom growers.
3. To analyze the role of institutional support in improving access to inputs, technology, and markets for mushroom farmers.
4. To identify key challenges and constraints faced by beneficiaries of government schemes and training programs in Nagaland.
5. To recommend strategies for improving the implementation and effectiveness of government interventions in mushroom cultivation in Nagaland.

RESEARCH METHODOLOGY

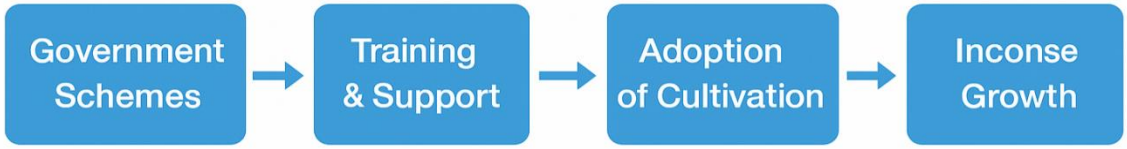
The paper is largely based on secondary data sources in the context of the study on the Impact of Government Schemes and Training Programmes on the Growth of Mushroom Cultivation, Nagaland. Data were obtained from government reports, statistical handbooks and official publications of the Department of Horticulture Nagaland. Use has been made of the information available from KVKs, ICAR institutions, training manuals etc., to know the role of human resource development programmes. Andhra Pradesh) through another study and data on national and state level schemes announced by the Ministry of Agriculture & Farmers Welfare, NABARD and other relevant organisations have been considered for understanding assistance being provided to mushroom growers. Reference has also been made to secondary sources like journals, conference proceedings and online databases in addition to government records. The approach is based on public domain documents and reports to give brief overview of the growth pattern, its support structure and impact of different schemes / training programmes to develop mushroom cultivation in Nagaland.

RESULT AND DISCUSSION

Findings of the study indicate that government schemes and training courses have been instrumental in mushroom development in Nagaland. Farmers were motivated to incorporate mushroom cultivation as an alternative sustainable source of income through financial support, technical support and awareness programs. More involvement in training programs improved the skills which resulted in higher production, higher income and higher overall acceptance towards mushroom cultivation.

1.1 Impact of Government Schemes on the Growth and Adoption of Mushroom Cultivation in Nagaland

Mushroom cultivation has emerged as a viable livelihood option in Nagaland, offering income and nutritional benefits. Government schemes and training programs play a crucial role in promoting its adoption by providing financial assistance, technical support, and capacity-building opportunities. These initiatives aim to enhance productivity, encourage entrepreneurship, and strengthen rural economies through sustainable mushroom farming practices.



1. Financial Support and Subsidies: Government schemes such as the **Mission for Integrated Development of Horticulture (MIDH)** and **National Horticulture Mission (NHM)** have provided significant financial incentives for mushroom cultivation in Nagaland. Farmers and entrepreneurs receive subsidies ranging from **50% to 75%** for infrastructure like mushroom production units, spawn labs, and low-cost bamboo/poly house structures. This financial assistance has reduced initial investment barriers, encouraging more farmers, Self-Help Groups (SHGs), and small entrepreneurs to adopt mushroom farming.

2. Training and Capacity Building: The **Department of Horticulture, Krishi Vigyan Kendras (KVKs),** and **ICAR–National Research Centre for Mushroom** have organized regular training programs for farmers, rural youth, and women groups. These programs cover **technical aspects of cultivation,** including spawn preparation, pest and disease management, post-harvest handling, and value addition. The training initiatives have equipped participants with practical skills, leading to better productivity and quality in mushroom cultivation.

3. Access to Quality Inputs and Technology: Government schemes have facilitated the establishment of **local spawn production units**, ensuring timely and affordable supply of high-quality spawn to growers. In addition, schemes have introduced **low-cost and climate-suitable mushroom houses** made from bamboo and locally available materials. These innovations have made mushroom cultivation more accessible and adaptable to Nagaland's climatic conditions.

4. Promotion of Value Addition and Market Linkages: Through schemes like **PM Formalization of Micro Food Processing Enterprises (PM-FME)** and various horticulture missions, growers are encouraged to engage in **value addition** by producing mushroom pickle, powder, and dehydrated products. Government-supported **fairs, exhibitions, and buyer-seller meets** have provided platforms for marketing fresh and processed mushrooms. These initiatives have enhanced market access and created additional income opportunities for farmers and SHGs.

5. Employment Generation and Livelihood Support: Mushroom cultivation has emerged as an **important source of income** for rural households due to its **low land requirement, short production cycle, and high profitability.** Many **women SHGs and unemployed youth** have taken up mushroom farming as a micro-enterprise, supported by subsidies, training, and market facilitation. This has contributed to both **employment generation** and **economic empowerment** of marginalized groups.

6. Environmental Sustainability and Waste Management: Government-supported mushroom cultivation promotes **sustainable agricultural practices** by utilizing agricultural residues such as rice straw, maize cobs, and sawdust as substrates. This approach not only reduces waste but also aligns with Nagaland's **organic farming policies** and environmental conservation goals.

7. Challenges in Implementation: Despite the progress, challenges remain in fully realizing the potential of mushroom cultivation. **Limited awareness** of government schemes in remote areas, **lack of cold storage facilities, inconsistent production cycles**, and **overdependence on subsidies** hinder sustained growth. Continuous follow-up, improved market infrastructure, and **cluster-based production models** are essential to address these issues.

Government schemes have played a **transformational role** in expanding mushroom cultivation in Nagaland by providing financial support, technical training, and market facilitation. With enhanced infrastructure, continued capacity building, and strengthened market networks, mushroom cultivation can develop into a **major sustainable agro-based enterprise** in the state.

1.2 Effectiveness of Training Programs for Mushroom Growers

Training programs are vital for enhancing the knowledge and skills of mushroom growers. They provide practical guidance on production techniques, disease management, and post-harvest practices. In Nagaland, such programs empower farmers with technical know-how,

improving productivity and quality. Effective training ensures sustainable cultivation, promotes entrepreneurship, and strengthens mushroom farming as a profitable livelihood option.

2 Table - 1 Effect of Training Programs on Mushroom Growers – Pre vs. Post Training

Indicator	Pre-Training Situation	Post-Training Outcome
Technical Knowledge	Limited awareness of proper cultivation methods; reliance on trial and error.	Improved understanding of spawn preparation, substrate management, pest control, and hygiene.
Productivity (Yield per batch)	Low yield due to contamination, poor substrate preparation, and improper environmental control.	Higher yield due to proper sterilization, controlled humidity/temperature, and improved methods.
Quality of Produce	Irregular size, poor texture, and shorter shelf life.	Uniform size, better texture, improved shelf life, and higher market acceptability.
Use of Inputs & Resources	Inefficient use of raw materials; higher wastage of substrates.	Efficient use of substrates (paddy straw, sawdust); reduced wastage and cost savings.
Value Addition Skills	Little or no processing; mostly sold as raw fresh produce.	Introduction of mushroom drying, powder production, pickle making, increasing income opportunities.
Market Access	Limited to local village markets; low bargaining power.	Access to local urban markets, fairs, exhibitions, and sometimes e-marketing platforms.
Income Levels	Low and inconsistent due to low production and quality.	Increased and stable income due to higher yield, better prices, and value-added products.
Women and Youth Participation	Limited involvement; cultivation seen as small-scale household activity.	Higher participation of women SHGs and youth entrepreneurs as a viable livelihood.
Sustainability of Cultivation	Dependent on subsidies and external support; risk of discontinuation.	More self-sustained due to better skills, profitability, and confidence in techniques.

Source: Department of Horticulture, Nagaland reports, Krishi Vigyan Kendras (KVKs), ICAR training manuals, and published studies on mushroom cultivation.

The table 1 highlights the transformative role of training programs in mushroom cultivation. Prior to training, growers faced challenges such as low yields, poor quality produce, inefficient resource use, and limited market access. Post-training outcomes reveal significant improvements in technical knowledge, productivity, and product quality. Farmers adopted better cultivation techniques, reduced wastage, and explored value addition, enhancing profitability. Training also expanded market linkages and empowered women and youth through greater participation. Importantly, growers shifted from dependence on subsidies to self-sustained practices, ensuring long-term viability. Thus, training programs have not only improved production and income levels but also strengthened entrepreneurship and livelihood opportunities in mushroom farming.

1. Knowledge Transfer and Skill Enhancement: Training programs organized by **Department of Horticulture**, **KVKs**, and **ICAR-NRCM** have been effective in providing growers with **practical knowledge** of the entire mushroom cultivation process. Participants gain skills in **spawn preparation, substrate sterilization, pest and disease control, and post-harvest handling**. This knowledge directly translates to better production practices and improved yields.

2. Improvement in Quality and Productivity: Well-trained growers are able to **maintain proper hygiene, regulate temperature and humidity**, and use the right cultivation techniques. These practices significantly reduce crop contamination and increase **overall productivity and quality** of mushrooms, making them more competitive in the market.

3. Adoption of Innovative and Low-Cost Techniques: Training programs have introduced **region-specific innovations** such as low-cost bamboo structures, locally available substrate use, and improved composting methods that are well suited for Nagaland's climate. This **reduces production costs** and encourages more farmers to adopt the practice.

4. Promotion of Value Addition Skills: Advanced training sessions often include **value addition techniques** such as mushroom drying, powder production, and pickle making. These skills enable growers to **diversify their product range**, extend shelf life, and fetch **higher prices** in the market.

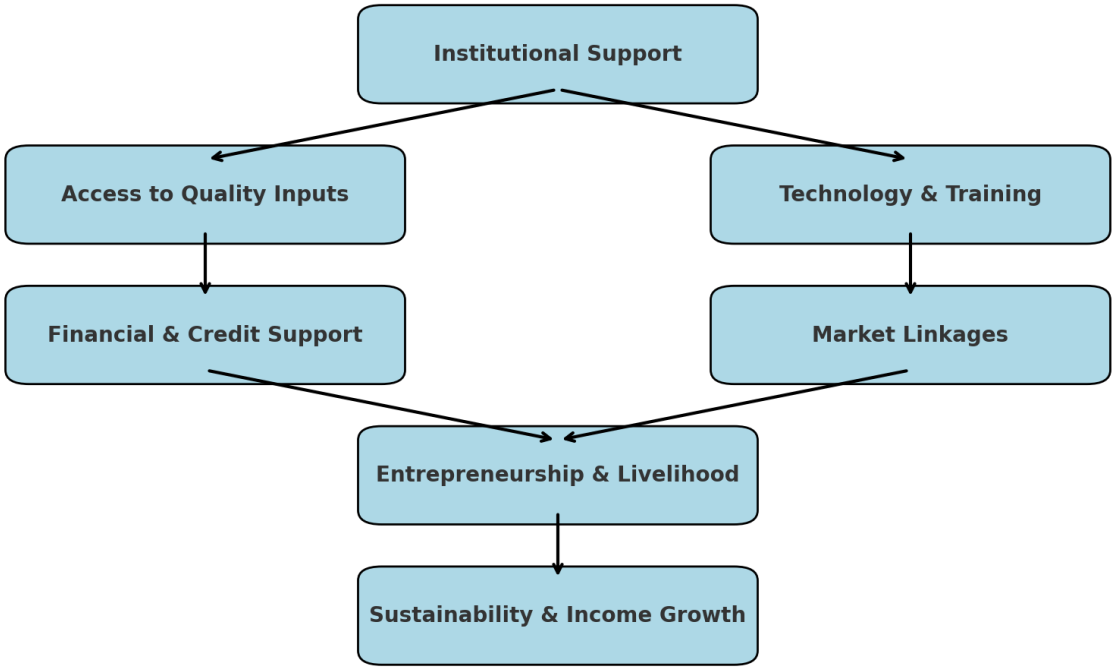
5. Encouragement of Entrepreneurship: Training programs don't just focus on technical aspects they also include **entrepreneurship and business management components**. Farmers learn about **marketing strategies, packaging, pricing, and customer outreach**, which help them operate mushroom cultivation as a **profitable business enterprise**.

6. Enhanced Participation of Women and Youth: Training programs have been particularly effective in mobilizing **women Self-Help Groups (SHGs)** and **educated unemployed youth**. Skill-building initiatives have empowered these groups to run **micro-enterprises**, thereby contributing to **income generation and employment**.

7. Demonstration of Best Practices: On-site demonstrations and exposure visits to **successful mushroom farms** help farmers visualize practical applications of techniques. This hands-on approach builds **confidence**, leading to better implementation in their own units.
8. Long-Term Impact on Sustainability: Repeated training sessions, refresher courses, and follow-up visits by trainers help ensure **continuous improvement** in practices. This enhances the **long-term sustainability** of mushroom cultivation projects beyond the initial government support phase.
Training programs have proven to be highly effective in enhancing the skills and productivity of mushroom growers by improving technical knowledge, promoting innovation, and supporting entrepreneurship. However, **regular follow-ups, advanced training modules, and stronger market linkages** are necessary to maintain momentum and ensure consistent productivity gains.

The Role of Institutional Support in Improving Access to Inputs, Technology, and Markets for Mushroom Farmers
Institutional support plays a vital role in strengthening mushroom farming by providing farmers with quality inputs, financial aid, technology, and training. These interventions bridge gaps in resources, improve production practices, and connect farmers to wider markets. Through such coordinated support, institutions empower farmers to adopt mushroom cultivation as a profitable and sustainable livelihood option.

Flowchart: Role of Institutional Support in Mushroom Farming



The flowchart highlights how institutional support leads to entrepreneurship, improved livelihoods, and income stability. By ensuring access to inputs, training, credit, and markets, institutions reduce risks, enhance productivity, and promote self-reliance. Ultimately, this integrated approach fosters sustainable growth of mushroom farming and strengthens rural economies.

1. **Access to Quality Inputs:** Institutions such as the Department of Horticulture, ICAR, and KVKs provide certified spawn, recommended substrates, and necessary materials. This ensures farmers reduce risks of contamination and achieve better yields.
2. **Technology Transfer and Training:** Institutional support helps disseminate modern cultivation practices, scientific methods, and post-harvest techniques. Training programs and demonstrations improve farmers' skills in environmental control, pest management, and value addition.
3. **Financial and Credit Support:** Government schemes and banks, often backed by NABARD, provide credit facilities, subsidies, and loans. These enable small and marginal farmers to invest in infrastructure like mushroom units, dryers, and packaging facilities.
4. **Market Linkages:** Institutions create platforms through fairs, exhibitions, and buyer-seller meets, connecting farmers with urban markets. Digital platforms and cooperative models further enhance bargaining power and price realization.
5. **Entrepreneurship and Livelihood Promotion:** Support to women's Self-Help Groups (SHGs) and youth entrepreneurs has encouraged collective farming, processing, and marketing. This fosters employment opportunities and reduces dependency on subsidies.
6. **Sustainability:** By combining access to inputs, technology, and markets, institutional support ensures that mushroom farming evolves from a subsistence activity into a sustainable and profitable enterprise.

Key Challenges and Constraints Faced by Beneficiaries of Government Schemes and Training Programs in Mushroom Cultivation

Mushroom cultivation in Nagaland, though supported by government schemes and training programs, faces challenges like limited awareness, input shortages, market constraints, and inadequate infrastructure, restricting wider adoption and sustainable growth.

1. **Limited Access to Quality Inputs:** Despite subsidies and provision under schemes, beneficiaries often face delays, quantity shortages, or receive low-quality spawn and compost. These hampers yield potential and leads to discouragement among first-time growers.
2. **Inadequate Infrastructure:** Lack of low-cost, weather-resistant mushroom houses, inadequate ventilation, humidity control systems, and absence of solar dryers or cold storage make year-round production difficult. Seasonal dependence leads to fluctuating incomes.
3. **Financial Constraints and Credit Barriers:** Formal credit remains inaccessible to many small-scale growers due to collateral demands, lengthy paperwork, and rigid repayment schedules. This limits the ability to expand production or invest in better technology.
4. **Market Access Issues:** Growers struggle to access consistent and profitable markets. Middlemen often dictate prices, transportation costs are high, and distant urban markets require better packaging and preservation facilities.
5. **Post-Harvest Losses:** Mushrooms have a short shelf life (1–3 days without preservation). Lack of cold chains, drying units, or processing plants leads to spoilage, particularly during peak production seasons.
6. **Gaps in Training Follow-Up and Extension Support:** While training programs provide valuable knowledge, there is often no follow-up mentoring to solve on-ground problems. The absence of trained extension officers in remote areas leaves farmers without expert advice during crises.
7. **Low Awareness and Motivation:** In many rural pockets, people are either unaware of mushroom farming opportunities or view it as a risky side activity rather than a primary income source. Misconceptions about profitability hinder adoption.
8. **Technical Challenges in Cultivation:** Contamination during spawn preparation, pest and disease outbreaks, and difficulties in maintaining optimal temperature and humidity remain constant challenges, especially without mechanized climate control systems.
9. **Cultural and Dietary Preferences:** Certain local communities have low mushroom consumption due to traditional food habits or misconceptions (e.g., believing some mushrooms are unsafe). This narrows local market demand.
10. **Policy and Coordination Gaps:** Multiple agencies agriculture, horticulture, rural development may run overlapping programs without synergy, leading to duplication, resource wastage, and confusion among beneficiaries.
11. **High Input Costs Despite Subsidies:** Even with subsidies, the price of quality spawn, compost, and packaging materials remains high. Beneficiaries often cannot afford recurring costs, leading to dropouts from the program.
12. **Transportation and Logistics Issues:** Poor rural road connectivity, lack of refrigerated transport, and high fuel costs make it difficult for farmers to deliver fresh produce to lucrative markets in time.
13. **Limited Processing and Value Addition:** Most schemes focus on production but neglect processing support, such as mushroom chips, pickles, or powder. Without value addition, farmers remain dependent on fresh sales, which are risky.
14. **Climate Vulnerability:** Sudden temperature changes, high humidity fluctuations, and prolonged monsoon seasons can damage crops. Farmers without environmental control systems face high crop failure rates.
15. **Lack of Collective Marketing and Farmer Cooperatives:** Individual growers lack bargaining power. Without producer cooperatives or marketing federations, they remain price-takers and vulnerable to exploitation by intermediaries.

Addressing constraints through better training, timely inputs, stronger market linkages, and infrastructure support can enhance effectiveness of interventions, ensuring mushroom cultivation contributes meaningfully to rural livelihoods and economic development in Nagaland.

Expanded Strategies for Improving Implementation and Effectiveness of Government Interventions in Mushroom Cultivation in Nagaland

Government interventions in mushroom cultivation in Nagaland require expanded strategies focusing on training, inputs, markets, infrastructure, and research to strengthen adoption, ensure sustainability, and promote inclusive rural development.

1. Strengthening Training and Capacity Building: Regular refresher courses, field-based workshops, and use of local languages improve knowledge transfer. Model farms as demonstration hubs enhance practical learning, ensuring farmers gain confidence, adopt improved methods, and sustain profitable mushroom cultivation.

2. Ensuring Timely and Quality Input Supply: Decentralized centers ensure timely spawn and input delivery. Certification systems maintain quality, while local spawn production through cooperatives reduces dependency and costs. These measures enhance efficiency, reduce contamination risks, and support sustainable mushroom farming.

3. Enhancing Market Linkages and Value Chain Development: Cooperatives strengthen bargaining power, while tie-ups with hotels and processors create steady demand. Value addition through pickles and powders increases profitability. Branding and packaging support improve visibility, enabling farmers to access wider markets and better prices.

4. Improving Infrastructure and Logistics: Community cold storage minimizes post-harvest losses. Solar dryers and small processing units extend shelf life. Improved transport networks enable quick delivery to urban markets, helping farmers expand reach, reduce wastage, and maximize income opportunities.

5. Sustained Financial and Institutional Support: Extending schemes ensures continuity and stability. Low-interest credit and subsidies support infrastructure investments. Public–private partnerships (PPPs) enhance technology transfer and marketing. Sustained support builds resilience, reduces dependency, and strengthens long-term growth in mushroom farming.

6. Research and Development Support: Research collaboration develops locally suitable varieties. Focus on low-cost substrates reduces expenses. Pest- and disease-resistant strains stabilize yields. Continuous innovation enhances productivity, reduces risks, and promotes sustainable mushroom farming adapted to local agro-climatic conditions.

7. Monitoring, Evaluation, and Feedback Mechanisms: Digital platforms enable farmer interaction, advice, and reporting. Regular impact assessments measure effectiveness, while feedback fine-tunes training and resource allocation. Monitoring ensures accountability, transparency, and continuous improvement in mushroom cultivation practices.

8. Promotion and Awareness Campaigns: District-level exhibitions showcase innovations. Mass and social media spread awareness of benefits. Involving schools and youth organizations encourages participation, builds future entrepreneurs, and promotes mushroom farming as a sustainable and profitable livelihood option.

Strengthened interventions enhance productivity, empower farmers, and promote entrepreneurship. By ensuring institutional support, innovation, and sustainability, mushroom cultivation can emerge as a reliable livelihood, fostering rural income growth and economic resilience in Nagaland.

FINDINGS

The study revealed that government schemes and training programs have significantly increased awareness about mushroom cultivation as a sustainable and profitable income-generating activity, particularly among rural and semi-urban populations in Nagaland. Beneficiaries reported notable skill development, gaining technical knowledge in spawn preparation, composting, disease control, and post-harvest handling, which enhanced production efficiency. Exposure to hands-on training and demonstration units encouraged the adoption of modern cultivation techniques, leading to better yields and improved product quality. Institutional support under these schemes also enhanced access to quality spawn, growing sheds, packaging materials, and financial assistance. Furthermore, market linkages facilitated by government agencies and NGOs created opportunities for farmers to sell their produce in local and regional markets at competitive prices. As a result, many farmers experienced an increase in household income, although the extent of this improvement depended on market access, production scale, and consistency in cultivation. However, despite these positive outcomes, challenges persist, including inadequate cold storage facilities, irregular supply of inputs, limited marketing infrastructure, and short-term project support, which continue to hinder the large-scale adoption and long-term sustainability of mushroom cultivation in the region.

CONCLUSION

Government schemes and training programs have played a transformative role in promoting mushroom cultivation in Nagaland by equipping farmers with essential skills, improving access to quality inputs, and creating pathways to markets. These interventions have contributed to economic diversification, rural employment generation, and nutritional improvement in local communities. However, the long-term sustainability of these gains requires continuous support in the form of market infrastructure development, technology upgrades, cold storage facilities, and year-round training. A coordinated effort between government agencies, research institutions, and private stakeholders is essential to ensure that mushroom cultivation evolves from a supplementary livelihood activity to a commercially viable and competitive agri-business in the state.

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