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Developing MSMEs through Hongkong Caterpillar Cultivation

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ABSTRACT

This study analyzes the development strategy of Hong Kong caterpillar cultivation MSMEs (Tenebrio molitor) in Suka Makmur Village, Lalat Regency. With a qualitative approach of case studies on 10 selected respondents, data was collected through interviews, observations, and documentation, and then analyzed thematically. The results showed an average production of 65–75 kg per cycle with an initial capital of IDR 1,500,000. The running nucleus-plasma partnership pattern is asymmetrical, limiting market access and profit margins for farmers, although local innovations in feed and reinvestment support business sustainability. The main obstacles include limited capital, dependence on one core partner, and low digital marketing competence. On the other hand, these efforts contribute to increasing income, job creation, and converting organic waste into fertilizer. As a recommendation, the development strategy is focused on increasing human resource capacity, product diversification, digital marketing, and expanding access to financing and market networks to support the independence and competitiveness of MSMEs.

INTRODUCTION

As a national strategic sector with a strong legal foundation based on Law No. 7 of 2021, MSMEs offer a variety of development potentials. One of the potentials that has not been cultivated optimally is the cultivation of hongkong caterpillars (Tenebrio molitor), which has high economic value as animal feed and an alternative source of protein. Suka Makmur Village, Lalat Regency, presents an interesting case study considering the development of this cultivation business in the midst of various challenges.

Hong Kong caterpillars are a commodity with high economic value due to the stable market demand of the poultry farming industry. The advantages of this cultivation business include relatively low capital, environmentally friendly, and can be managed traditionally. Despite their potential, these MSMEs face complex challenges such as limited access to capital to increase production capacity, lack of application of modern cultivation technology, and marketing that still relies on middlemen. As a result, business growth is stagnant, income is not optimal, and the contribution to the village economy has not been maximized. Without strategic intervention, this local potential risks being eroded by competition with other regions.

Previous research on Hong Kong caterpillar cultivation has focused on technical, biological, and nutritional aspects, but it is still poorly integrated with rural MSME development strategies. One of the references of this research is a study that has been conducted in West Java Province by Wulandari (2023), for example, which only evaluates financial feasibility without touching on institutional and strategic management aspects. This research is here to fill this gap by offering an integrated solution-based analysis from upstream to downstream, while enriching case studies in the North Sumatra region that are still rarely studied (Baliota et al., 2025).

The urgency of this research lies in three main things. (1) the need for diversification of alternative protein sources to support national animal feed resilience, where Hong Kong caterpillars have the potential to be a strategic commodity. (2) The potential of Suka Makmur Village as a locus for bioeconomy-based village economic development that can be a model for local innovation; and (3) Competitive challenges for MSMEs due to limited capital, technology, and market access, which require adaptive and solution-based development strategies (Ministry of Agriculture Republic of Indonesia, 2022).

The novelty of this research lies in the integration of institutional analysis, partnership patterns, and SWOT-based MSME development strategies in one comprehensive case study framework in the context of rural North Sumatra an area that is still rarely studied in contrast to previous research that focused more on technical, biological, or financial aspects of cultivation

Based on the above description, this study aims to: (1) analyze the profile of Hong Kong caterpillar cultivation MSMEs in Suka Makmur Village as a portrait of economic development based on local potential; (2) examine the pattern of partnerships and production processes that take place, as well as their implications for the bargaining position and sustainability of the business; (3) analyze how SWOT plays a role in the development of MSMEs and has implications (4) formulate a solution-based MSME development strategy that is adaptive to the dynamics of local market needs and opportunities; and (5) analyze the economic impact of Hong Kong caterpillar cultivation on the welfare of business actors and the community. The results of this research are expected to not only contribute to the academic realm, but also to guide actions that are beneficial for business actors and related stakeholders, with the aim of encouraging the growth and sustainability of MSMEs in the area.

RESEARCH METHODOLOGY

This study uses a qualitative descriptive design to understand the development strategy of Hong Kong caterpillar cultivation MSMEs in Suka Makmur Village in August 2025. A qualitative approach was chosen to explore practices, partnership mechanisms, business challenges, and development prospects that are not quantitatively measurable.

Data were collected through triangulation methods, including field observations, in-depth interviews, and literature studies. The selection of informants used a purposive sampling technique involving 10 informants from the productive age group relevant to the aquaculture ecosystem, consisting of business actors, local feed suppliers, and village officials. Interviews are conducted with semi-structured guides that discuss production costs, marketing, financial management, and core-plasma partnerships. Secondary data is sourced from literature related to MSMEs, insect cultivation, and community empowerment Data analysis uses thematic analysis by grouping data into themes such as production, marketing, and partnerships, then interpreted systematically. The validity of the data is maintained through triangulation of sources between core actors, plasma, and observation results, as well as member checks to ensure the suitability of the researcher's interpretation with the informant's experience (Zed, 2008).

To ensure the credibility of the findings, triangulation of sources and methods was applied by matching field data, secondary literature, and interviews to minimize bias. This methodological framework is expected to identify strategic interventions that support the competitiveness of MSMEs and sustainable rural economic development.

RESULTS AND DISCUSSION

Profile of Hong Kong Caterpillar Cultivation MSMEs

MSMEs in Suka Makmur Village, Binjai District, Langkat Regency, developed the cultivation of Hongkong caterpillars (Tenebrio molitor) as an alternative to animal feed and a source of household income. It was first crossed during the COVID-19 pandemic. The business is run on a small scale in a house with a space of 2×3 to 3×4 meters, enough for a small production scale. Using alternative feeds such as waste tofu, bran, and banana peels to reduce costs and support environmental sustainability (Yolanda & Hasanah, 2024). This shows the creativity of MSME actors in utilizing local resources (Ruslim, 2025).

> *"Feed ingredients such as bran and tofu waste are always available here, so farmers rarely face shortages. Even banana peels can be used as additional feed" (interview)*

This business started in 2022 and will grow rapidly in 2024 with an initial capital of IDR 1,500,000 and produce 65–75 kg per harvest cycle (1.5–2 months). Marketing is carried out through agents at a price of Rp 70,000/kg and retail direct sales (Rp 10,000/ounce). Financial management is characterized by the reinvestment of profits for asset and operational development, supported by financial discipline and the adoption of digital technology such as online order forms.

Financial management includes the reinvestment of profits for working capital, cultivation racks, seed stocks, and modern equipment, with accumulated assets exceeding Rp 1,500,000. Financial discipline, motivation, and experience drive innovation and marketing expansion, which improves the long-term sustainability and resilience of MSMEs (Suleman & Thalib, 2024).

> *"I started small, but every profit I make, I put back into the business otherwise the results will be lost and nothing will grow" (interview)*

The analysis of triangulated interviews further confirms that the success of a business in this sector is determined by start-up capital, a combination of technical learning, adaptive marketing strategies, and disciplined financial governance. These integrated factors support operational efficiency, productivity, and competitiveness at the village level. digital assistance (Farisi et al, 2022). Online order form application) also increases digital literacy and order effectiveness for MSMEs. Thus, the cultivation of Hongkong caterpillars in Suka Makmur Village shows potential as a strategic model for strengthening a sustainable rural economy, driven by local innovation, digital adoption, and effective financial governance (Rahman et al., 2024).

Caterpillar Production Patterns in Hong Kong

This section analyzes the partnership mechanism and production process that forms the structure of the Hong Kong caterpillar cultivation business in Suka Makmur Village. Based on field findings and Law No. 9 of 1995, the partnership system applied follows a core-plasma pattern, where the agent acts as the core that controls the supply chain, while the cultivator acts as the plasma that provides labor and production space. This asymmetric pattern creates dependencies, especially when it comes to pricing, market access, and decision-making.
Interview data confirms that agents function as a supplier of seeds, feed, and medicines as well as a single buyer who controls prices and distribution. As revealed by one of the cultivators

> *"From the beginning, we learned everything from the agents, including seed supply and technical training. But once we harvest, all the products have to be sold back to him," (Interview)*

These partnerships are built on a reciprocal basis, where agents provide technical training and access to raw materials, while cultivators rely entirely on agents for business continuity.

Table 1. Structure of Plasma Core Partnership between and Cultivator

Business Aspects	Control by Agent (Core)	Control by Cultivator (Plasma)
Planning & Strategy	Determine production volume, selling price, and business development direction.	Carry out technical and operational tasks
Capital	Providing seeds and medicines through the non-cash debt system	Supply start-up capital and business space
Technology & Production	Provide training, protocols, and input	Perform daily maintenance and production activities
Marketing	Control the entire distribution network and become a single buyer	Not having direct access to the market; Leave all harvests to the agent.
Management & HR	Provide assistance and supervision.	Operating daily labor and operational activities

Source: Data Processed, 2025

Table 2. Analysis of the Weaknesses of the Current Partnership System

Structural Weaknesses	Impact on Cultivators	Implications for Business Sustainability
Unequal Profit Distribution	Cultivators lack knowledge of market prices and reasonable margins	High susceptibility to price manipulation
Low Independence	High dependence on agents for production and marketing inputs	Limiting the capacity for business innovation and adaptation in the long term.
Weak bargaining position	Unable to negotiate contract prices and terms	Reinforcing economic asymmetry and imbalances
Innovation Barriers	Limited access to new knowledge and technology beyond what the agent provides.	Business productivity and efficiency tend to be stagnant.

Source: Data Processed, 2025

The production process is carried out with the assistance of agents, starting from the provision of seeds to maintenance that follows feeding protocols (bran, tofu porridge), environmental regulation, and pest control. The maintenance cycle lasts 35–40 days with a high success rate. Each plasma uses 3–5 kg of seeds per cycle in a 2×3–3×4 meter home cultivation room, with a capacity of 10 indoor racks (50 trays) and 4 outdoor racks to accommodate all life phases of caterpillars. The average production reaches 65–75 kg per cycle and can increase to 90 kg under ideal conditions. An assessment of the partnership pattern reveals structural weaknesses as presented in Table 2.

These findings are in line with research that reveals that asymmetric partnerships have the potential to lead to unequal profit distribution and limit farmers' responses to market opportunities. The limitations of business management and high dependence on agents are factors that hinder the development of Hongkong caterpillar cultivation MSMEs in Suka Makmur Village, as well as the basis for the need to formulate the right development strategy (Revelation et al., 2024).

Solution-Based Development Strategy

Based on existing structural constraints, the development of Hong Kong caterpillar MSMEs in Suka Makmur Village requires a progressive strategy that focuses on capacity building, market diversification, and institutional strengthening. Product diversification is a strategic need to reduce dependence on a single market, for example through the development of protein flour, ready-to-use feed, or ornamental fish feed that has been proven to be economically viable and compatible with aquaculture systems. The effectiveness of this diversification needs to be supported by digital marketing (Sari, 2023). Branding, and e-commerce integration to increase competitiveness (Saputri & Nata, 2024).

Strengthening human resource capacity through programs supported by associations and government agencies is also important in increasing the competitiveness of MSMEs. In addition, access to external financing is necessary for increased production and automation. The development of MSMEs also requires multistakeholder collaboration involving local governments, business associations, and educational institutions to provide direction and sustainable innovation (Ginting et al., 2019).

The success of the strategy depends on the sustainability of the program through periodic monitoring and evaluation to remain relevant to market dynamics. Thus, the development of MSMEs requires integration between internal capacity building, external support, and adaptive growth strategies to increase people's income and create a resilient and competitive MSME model (Hilmiyah et al., 2022).

SWOT Analysis of the Development of Hong Kong Caterpillar MSMEs

To map the internal and external conditions that affect the cultivation business of Hong Kong caterpillars in Suka Makmur Village, this study uses SWOT analysis.

Table 3. SWOT Analysis of Hong Kong Caterpillar Cultivation MSMEs

Component	Key Findings
Strength (S)	a. Low barrier to entry due to simple cultivation techniques. b. Stable demand from hobby, poultry, and aquaculture markets. c. The availability of local feed sources such as tofu waste, bran, and banana peels. d. The existence of reinvestment behavior among cultivators supports the gradual accumulation of assets. e. Relatively Favorable Selling Price.
Weakness (W)	a. High reliance on a single agent controlling prices, market access, and supply chains. b. Limited financial literacy, including bookkeeping and cost structure analysis. c. Lack of independent branding, digital marketing, and direct customer networking. d. Absence of standard production protocols and documentation. e. The scale of production is still micro.
Opportunity (O)	a. Increasing market interest in alternative protein sources and organic feeds. b. Increase the relevance of digital marketing platforms for specialty agricultural products. c. Potential support from local governments, MSME programs, and agricultural agencies. d. The possibility of diversifying products such as protein foods, fertilizers, and ready-to-use feeds. e. Potential for the formation of new partnerships.
Threat (T)	a. Price volatility is influenced by the dominance of intermediaries. b. Competition from large-scale producers outside the region. c. Limited awareness and acceptance among conventional farmers. d. Potential feed price instability and seasonal supply variations. e. The risk of mass death due to environmental factors.

Source: Data Processed, 2025

SWOT-Based Strategic Implications

The interpretation of the SWOT results shows the need to shift the current business structure from dependency-based operations towards the development of greater economic independence, resilience, and value. Three strategic paths emerged (Mawadtry, 2021)

a. SO (Power-Opportunity Alignment) Strategy: Use the advantages of existing local resources and sustainable market demand to expand production capacity and diversify product forms.
b. WO (Weakness–Opportunity Alignment) Strategy: Addressing skills and managerial gaps by implementing training programs, digital marketing adoption, business financial recording systems, and institutional strengthening through community groups or cooperatives.
c. ST (Strength–Threat Alignment) strategy: Optimizes reinvestment culture and operational consistency to increase productivity, enabling cultivators to maintain competitiveness against external market pressures.
d. WT (Mitigation-Threat Risk) strategy: Reduce reliance on a single agent through gradual market expansion, renegotiation of partnerships, diversification of buyers, and strengthening of locally-based collaboration networks (Nugraha et al., 2018).

Overall, this SWOT implication confirms that although Hong Kong's caterpillar cultivation business has good economic prospects, long-term sustainability can only be achieved if internal weaknesses are corrected, business independence is enhanced, and the capacity of MSME actors is strengthened through a planned and integrated strategy.

Economic Impact on Business Actors and Society

The economic impact of Hong Kong caterpillar cultivation in Suka Makmur Village is significant in increasing household income. From the four active business actors, an average production of 65-75 kg per cycle is sold to agents at a price of IDR 70,000/kg, generating a gross income of IDR 4,550,000–IDR 5,250,000. If sold at retail (Rp 10,000/ounce), the potential revenue can reach Rp 6,500,000–Rp 7,500,000 per cycle. Additional economic value is obtained from the use of caterpillar manure waste into organic fertilizers, which supports the circular economy concept (Budi et al., 2021).

This effort provides income stabilization for actors who previously depended on irregular jobs. One cultivator explained:

> *"Before cultivating, my income depended on irregular work. Now, every harvest brings a stable income, even though the price still follows the agent," (Interview)*

This shows that micro enterprises not only create new incomes, but also strengthen household financial resilience and asset formation. At the community level, this business opens up jobs albeit limited, with four workers still handling sorting, feed, harvesting, and post-harvest. This work suppresses unemployment and provides a steady income for households that previously depended on informal work, which is used for basic needs, food security, children's education, and debt reduction, thereby strengthening local purchasing power (Dwirainaningsih, 2024).

Another economic impact is the formation of a reciprocal value chain, with most feed inputs such as tofu pulp and banana peels sourced from household sellers and suppliers. According to the interviewed supplier:

> *"Almost all feed ingredients come from the village itself, so the business continues to circulate money here," (Interview)*

This mutually beneficial exchange shows that people's well-being and business performance are interdependent, forming an economic system with community-centered development principles. Caterpillar manure processed into organic fertilizer creates additional income while providing affordable inputs for farmers. This reduces reliance on chemical fertilizers, encourages sustainable agriculture, and maintains long-term soil health. This synergy shows that micro businesses can generate economic and ecological value at the same time.

In addition to financial benefits, actors began to open branch production locations and expand cooperation with individuals and community groups. This pattern supports capacity transfer, strengthens social capital, and facilitates horizontal learning, which Irawan (2018) called as a driver of rural entrepreneurship growth. Overall, these findings suggest that Hong Kong caterpillar cultivation is not only a source of income, but also a catalyst for strengthening rural economies. This venture combines economic value, environmental sustainability, and community participation, making it a model of inclusive MSMEs based on local resources and knowledge and a reference for the transformation of a profitable and sustainable rural economy.

CONCLUSION

Hongkong caterpillar cultivation in Suka Makmur Village is classified as a micro MSME that is able to develop through a local partnership pattern, although it still depends on core agents and faces limitations in market transparency and business management. Partnership mapping and weakness identification show the need to strengthen the capacity of business actors, improve the registration system, and diversify products so that the structure of trade relations is more balanced. Development strategies that include increasing digital literacy, product innovation, and institutional strengthening have proven to be relevant to encourage business actors to get out of structural dependency while supporting the direction of business development. Economically, data on four active plasmas shows production of 65-75 kg per cycle with a selling price of IDR 70,000/kg providing stable income, strengthened by the use of aquaculture waste as organic fertilizer that creates added value. The involvement of six local workers and the participation of the community as feed suppliers form an inclusive economic ecosystem, where business benefits flow to the main actors and surrounding households. These findings show that Hong Kong caterpillar cultivation has the potential to become a model for rural MSMEs that are sustainable, adaptive, and able to improve community welfare through local innovation and circular economy practices.

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