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Operationalizing *Maqāṣid al-Sharī'ah* for Sustainable MSME Development: A Comparative Study of Fresh Maggot Farming and Pellet Feed Diversification in Indonesia

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ABSTRACT

This study analyzes the financial performance and sustainability implications of fresh maggot farming and diversification into animal feed pellets among micro-scale enterprises in Mojokerto, Indonesia. The study addresses the limited integration of *maqāṣid al-sharī'ah* in agribusiness sustainability analysis by linking Islamic sustainability dimensions with measurable business indicators. A qualitative case study approach was employed through in-depth interviews, observation, financial documentation, and comparative financial analysis. Business performance was assessed using Return on Investment (ROI), Revenue-Cost Ratio, and payback period, while sustainability was evaluated through maqāṣid-based indicators: *hifz al-mal* (profitability stability), *hifz al-bi'ah* (waste reduction), and *maslahah* (stakeholder benefit). The findings reveal that fresh maggot farming generates higher ROI because of lower operational costs, whereas pellet diversification provides greater nominal profit, product durability, and long-term income stability. The study contributes to Islamic economics literature by operationalizing *maqāṣid al-sharī'ah* into measurable sustainability indicators for MSME-based agribusiness development and sustainable business decision-making.

Keywords: maggot farming; product diversification; maqāṣid al-sharī'ah; business sustainability.

INTRODUCTION

The animal feed industry is a strategic sector to support the sustainability of the livestock sector and the country's food security.[1] Over the past few years, innovation in animal feed has continued, one of which is the use of larvae (Hermetia illucens) as an alternative protein source.[2] Black soldier fly (BSF)

[1] Anne Deguerry et al., "From the Heart of the Animal Feed Industry: A Southeast Asian Perspective on Insects for Feed in Asia," *Animal Frontiers* 13, no. 4 (2023): 41–49.

[2] Ibrar Ahmed et al., "A Review of Black Soldier Fly (Hermetia Illucens) as a Potential Alternative Protein Source in Broiler Diets," *Annals of Animal Science* 23, no. 4 (2023): 939–949.

larvae are not only known for their high nutritional value, but also their ability to recycle organic waste.[3] Fresh larvae are usually used as bird and fish food, but by diversifying the product into pellets, the potential added value of this product is believed to be greater.[4]

Previous studies on black soldier fly (BSF) cultivation have primarily focused on technical production efficiency,[5] nutritional composition,[6] and economic profitability of maggot-based feed products.[7] Several studies also discuss product diversification strategies in insect-based agribusiness and the role of circular economy practices in sustainable waste management.[8]

However, existing studies remain limited in three important aspects. First, most studies emphasize technical and financial performance while paying limited attention to broader business sustainability dimensions, particularly at the MSME level. Second, research on maggot-based agribusiness rarely integrates Islamic economic perspectives into sustainability analysis. Third, studies within Islamic economics often discuss concepts such as *barakah*, *maslahah*, and *maqāṣid al-sharī'ah* in normative or conceptual terms without operationalizing them into measurable business sustainability indicators.

As a result, there is still limited empirical understanding of how *maqāṣid al-sharī'ah* principles can be translated into practical indicators for evaluating economic resilience, environmental sustainability, and stakeholder welfare in MSME-based agribusiness. novelTherefore, this study addresses these gaps by developing a maqāṣid-based sustainability framework that operationalizes *hifz al-mal*, *hifz al-bi'ah*, and *maslahah* into measurable business sustainability dimensions. This study also provides empirical evidence by comparing fresh maggot cultivation and pellet diversification models among MSMEs in Mojokerto Regency.

In this framework, *hifz al-mal* is operationalized through profitability stability and return on investment (ROI), *hifz al-bi'ah* through organic waste reduction and circular production practices, while *maslahah* is reflected in stakeholder benefits such as affordable animal feed supply, income opportunities for micro-entrepreneurs, and community economic impact. By operationalizing maqāṣid dimensions into measurable business outcomes, this study attempts to

[3] Nur Fardilla Amrul et al., "A Review of Organic Waste Treatment Using Black Soldier Fly (Hermetia Illucens)," *Sustainability* 14, no. 8 (2022): 4565.

[4] R Noviadi et al., "Impact of Maggot Black Soldier Fly (Hermetia Illucens) Flour Supplementation in Broiler Chickens," *Adv. Anim. Vet. Sci* 11, no. 4 (2023): 606–613.

[5] Nguyen Phuc Cam Tu et al., "Effect of Astaxanthin and Spirulina Levels in Black Soldier Fly Larvae Meal-Based Diets on Growth Performance and Skin Pigmentation in Discus Fish, Symphysodon Sp.," *Aquaculture* 553 (2022): 738048.

[6] Margawinata Suryakusuma, "A System Dynamics Approach for Organic Waste Management in Traditional Market" (Universitas Islam Indonesia, 2024).

[7] K V Mutuku et al., "Determinants of Profitability of Black Soldier Fly Farming Enterprise in Kenya," *Journal of Insects as Food and Feed* 8, no. 6 (2022): 693–700.

[8] Marta Buccaro et al., "Techno-Economic Assessment of Aps-Based Poultry Feed Production with a Circular Biorefinery Process," *Sustainability* 15, no. 3 (2023): 2195.

move beyond normative discussions of "barakah" toward an empirical Islamic business sustainability framework.

This study attempts to answer two main questions: (1) How does the financial performance of fresh maggot cultivation compare with maggot diversification into animal feed pellets among MSMEs in Mojokerto? (2) How can *maqāṣid al-sharī'ah* dimensions—particularly *hifz al-mal*, *hifz al-bi'ah*, and *maslahah*—be operationalized to evaluate business sustainability in maggot-based agribusiness? (3) To what extent does product diversification contribute to economic, environmental, and social sustainability from an Islamic economics perspective?

The novelty of this study lies in the operationalization of *maqāṣid al-sharī'ah* into measurable sustainability indicators within MSME-based maggot agribusiness. Unlike previous studies that primarily examine maggot cultivation from technical or profitability perspectives, this study operationalizes Islamic economic principles into measurable sustainability dimensions, namely *hifz al-mal* (profitability stability), *hifz al-bi'ah* (environmental sustainability through waste reduction), and *maslahah* (stakeholder welfare benefits). In addition, this study provides empirical evidence from micro-scale maggot enterprises in Indonesia, a context that remains underexplored in existing literature on insect-based circular agribusiness and Islamic economics.

The method used in this study is a qualitative approach with a case study method on maggot farming business actors and pellet producers in Mojokerto Regency. Data collection was carried out through in-depth interviews, observations, and secondary data analysis related to production costs, selling prices, and profit margins of both business models. In addition, this study uses Return on Investment (ROI) analysis and a sharia economic approach to measure the blessing of profit, including aspects of justice, welfare, and business sustainability.

This study contributes to Islamic economics literature in three ways. First, it develops an operational *maqāṣid al-sharī'ah* framework that translates Islamic economic principles into measurable business sustainability indicators. Second, it extends MSME agribusiness research by comparing financial and sustainability outcomes between fresh maggot cultivation and pellet diversification models. Third, it offers practical implications for sustainable MSME development by integrating profitability, environmental management, and stakeholder welfare within a maqāṣid-oriented business framework.

METHODS

This study uses a qualitative approach with a case study design to analyze the comparative benefits and blessings in diversifying maggot products into animal feed pellets. This approach was chosen to explore in depth the dynamics of the business process, from fresh maggot cultivation to the product diversification stage, and to understand how sharia economic principles are applied in this business practice.

This research design focuses on a comparative study between two business models, namely fresh maggot cultivation and product diversification

into animal feed pellets. This study not only assesses financial benefits through the calculation of Return on Investment (ROI), but also reviews aspects of business blessings according to sharia economic principles, such as *maslahah* (benefit), justice, and business sustainability. Thus, this study is expected to provide scientific contributions that are not only economically relevant but also meaningful in spiritual and social contexts.

The subjects of this study were micro-entrepreneurs of maggot cultivation and producers of animal feed pellets in Mojokerto Regency. The criteria for research subjects are based on entrepreneurs who have carried out continuous maggot cultivation and those who have developed their businesses to the stage of product diversification into pellets. The data collection process was carried out through several methods, namely in-depth interviews, participatory observation, and documentation. In-depth interviews were conducted with business actors to obtain data on production costs, selling prices, profit margins, and their views on aspects of business blessings from a sharia economic perspective. In addition, participatory observation was carried out by directly following the fresh maggot production process and the diversification process into pellets to understand the production flow, operational management, and challenges faced by business actors. Secondary data was also collected through documentation, such as business financial records, production reports, and literature related to product diversification and sharia economics.

Four MSME actors were selected because they represented different operational scales and diversification experiences relevant to the study objectives.

Table 1. Respondent profile

No	Pseudonim Name	Age	Subdistrict
1	Yoga	36	Mojosari
2	Slamet	30	Pungging
3	Bambang	29	Mojosari
4	Fandi	31	Kutorejo

The collected data were analyzed through several stages. The first stage is data reduction, where irrelevant data is filtered to ensure that the focus of the study is maintained. The next stage is the presentation of data in the form of descriptive narratives and comparative tables, which make it easier for researchers to see the differences between fresh maggot cultivation and product diversification into pellets. Furthermore, a comparative analysis was carried out using the ROI method Revenue-Cost Ratio (R/C Ratio), and Payback Period.
ROI was calculated using the following formula:

$$\text{ROI} = \frac{Net\ Profit}{Total\ Investment\ Cost} \text{ x } 100$$

The R/C Ratio was calculated as:

$$\text{R/C Racio} = \frac{Total\ Revenue}{Total\ Cost} \text{ x } 100$$

To ensure data reliability, this study applied triangulation techniques by comparing interview findings, direct field observations, and financial documentation records obtained from business actors. Interview data were cross-checked with production records and operational observations to improve consistency and credibility.

This study also conducted a maqāṣid-based sustainability analysis using the *maslahah* and *maqāṣid al-sharī'ah* approaches, namely by assessing the extent to which this business model provides broad benefits to the community, upholds justice in the distribution of profits, and supports business sustainability interpreted through the *maqāṣid al-sharī'ah* framework.

Through this approach, this study is expected to provide a clear picture of a business model that is not only financially profitable but also brings sustainability from a sharia economic perspective. The findings of this study are expected to be a reference for business actors, academics, and policy makers in developing maggot-based businesses while still paying attention to the principles of sustainable maqāṣid-oriented business and sharia values.

RESULT AND DISCUSSION

This study discusses in depth three main aspects in the diversification of maggot products into animal feed pellets: Fresh Maggot Cultivation, Diversification into Animal Feed Pellets, and Economic Comparison of the two business models. Each aspect is analyzed using a sharia economic approach to understand not only financial benefits but also the sustainable maqāṣid-oriented business in the perspective of *maslahah* and *maqāṣid al-sharī'ah*.

Maggot Cultivation Productions Process

The maggot cultivation production process consists of three main stages, namely the seeding process, breeding, and harvesting.[9] Each of these stages has an important role in ensuring the quality and quantity of maggots produced according to production targets and remains in line with the principles of sharia economics.

The breeding process begins with the preparation of adult Black Soldier Fly (BSF) broodstock to lay eggs.[10] Adult flies are placed in a special cage equipped with mosquito nets to prevent flies from escaping.[11] and protect eggs from predators such as chickens, birds, and rats. The temperature and humidity in the nursery area are maintained optimally by spraying water periodically three times a day.[12] The media for laying eggs in the form of dry banana leaves

[9] T Muraro et al., "Mating and Oviposition of a Breeding Strain of Black Soldier Fly Hermetia Illucens (Diptera: Stratiomyidae): Polygynandry and Multiple Egg-Laying," *Journal of Insects as Food and Feed* 10, no. 8 (2024): 1423–1435.

[10] Juste Vital Vodounnou et al., "Feeding Optimization of Water Hyacinth (Eichhornia Crassipes) Leaves as Rearing Substrate for the Production of Black Soldier Fly (Hermetia Illucens) Larvae," *Waste and Biomass Valorization* 15, no. 6 (2024): 3569–3578.

[11] Arianna Cattaneo et al., "A First Step Towards Black Soldier Fly Larvae (Diptera: Stratiomyidae) Welfare by Considering Dietary Regimes (Part I)," *Insects* 15, no. 10 (2024): 817.

[12] Manuela Rebora et al., "Sexual Dimorphism in the Structural Colours of the Wings of the Black Soldier Fly (BSF) Hermetia Illucens (Diptera: Stratiomyidae)," *Scientific Reports* 14, no. 1 (2024): 19655.

is provided to provide a sense of security for female flies in storing their eggs.[13] After the eggs are produced, the eggs are transferred to the hatching tank for the next breeding stage.

The breeding process starts from eggs to maggots or larvae. Eggs that have hatched are transferred to a breeding tank made of cement to ensure the durability and cleanliness of the container.[14] The feed media used is organic waste that has been ground and fermented as initial nutrition for maggot eggs. During the breeding process which lasts about 14 days, the media is kept moist by gradually adding organic waste five times during the cycle. Optimal media conditions will improve the quality of the maggots produced, supporting the concept of *hifz al-mal* (preservation of wealth) in sharia economics because it utilizes cheap and environmentally friendly raw materials.[15]

The harvesting process is carried out after the maggots reach a harvestable weight, around 160 to 200 mg per larva,[16] usually around three weeks from the start of breeding.[17] "*At this stage, the maggots are separated from their breeding media, then placed in a bucket for the distribution process. The harvest from 1 gram of eggs can reach 1 to 4 kg of maggots. The remaining cultivation results, such as kasgot (compost from the remaining breeding media), are further managed or reused in the next cultivation cycle*".[18] Each stage of production is designed to maximize benefits (*maslahah*)[19] and maintain sustainability (*hifz al-bi'ah*),[20] so that maggot cultivation becomes an alternative business that is financially profitable while having a positive impact on the environment and society.

[13] Priscilla Addo et al., "Bioconversion of Municipal Organic Solid Waste in to Compost Using Black Soldier Fly (Hermetia Illucens)," *International Journal of Recycling of Organic Waste in Agriculture* 11, no. 4 (2022).

[14] Finbarr G Horgan et al., "Spent Coffee Grounds Applied as a Top-Dressing or Incorporated into the Soil Can Improve Plant Growth While Reducing Slug Herbivory," *Agriculture* 13, no. 2 (2023): 257.

[15] Muhammad Yousuf Abdul Hamid Al-Munshi, "Islamic Ethics on Environmental Sustainability versus Economic Development: Dam Construction as an Applied Case Study" (Hamad Bin Khalifa University (Qatar), 2021).

[16] Tao Liu et al., "Black Soldier Fly Larvae for Organic Manure Recycling and Its Potential for a Circular Bioeconomy: A Review," *Science of the Total Environment* 833 (2022): 155122.

[17] Hilda Anderberg, "BSF-Colony Management Efficiency at a Large Scale Fly Larvae Composting Company in Kenya–a Field Study," 2023.

[18] Yoga, Interwiew.

[19] Darmalaksana, "The Need for Social Theology to Strengthen the Social Functions of Islamic Banking in Indonesia."

[20] Zohora Azmin Shompa, Mohamed Aslam Akbar, and Hazwani Mohd Mohadis, "Harmonizing Maqasid Al-Shari'ah with Sustainable Waste Management Practices: A Conceptual Framework for Principles and Implementation," *International Journal of Islamic and Middle Eastern Finance and Management* 18, no. 1 (2025): 142–165.

Income from Maggot Cultivation Business

Income in maggot farming business is obtained from the difference between total maggot sales revenue and total production costs,[21] which consist of fixed costs and variable costs.[22] In the maggot BSF industry, fixed costs include initial investment for facilities and equipment, such as fly cages, bioponds, egg hatching basins, buckets, and pupa racks.[23] Total fixed costs reach IDR2,855,000, with a monthly depreciation cost of IDR49,303. This depreciation cost is calculated based on the economic life of the asset,[24] for example, a fly cage has a service life of 36 months with a depreciation cost of IDR6,388 per month and a biopond has a service life of 72 months with a depreciation cost of IDR 29,166 per month. This fixed cost calculation provides a realistic picture of long-term capital requirements to maintain business continuity.

Table 2. Fixed Cost Details of Maggot Farming

No	Fixed Cost Components	Quantity	Unit Price (Rp)	Total (Rp)	Economic Life	Depreciation/ Month (Rp)
1	Fly Cage (Net)	1 Unit	230,000	230,000	36 months	6,388
2	Cement Biopond	6 Units	350,000	2,100,000	72 months	29,166
3	Egg Hatching Basin	6 Pieces	30,000	180,000	36 months	5,000
4	Bucket	3 Pieces	45,000	135,000	36 months	3,750
5	Pupa Rack	1 Unit	210,000	210,000	36 months	5,833
Total Fixed Cost				**2,855,000**		**50,137**

Variable costs in maggot cultivation are costs that change according to production volume and operational needs.[25] In maggot cultivation, variable costs include tofu dregs, pellets, water, electricity and fuel for transport vehicles. 6 kg of tofu dregs are used as a medium for maggot growth at a cost of IDR 18,000 per cycle, while the use of 1 kg of liquid pellets adds to the cost by IDR 10,000.

[21] M Batool, A B Tabinda, and A Tahir, "Black Soldier Fly Larvae Feed Suitability for Chicken and Prospects for Economic Valuation and Viability Aspects," *Journal of Insects as Food and Feed* 1, no. aop (2024): 1–21.

[22] Sri Y K Hardini and Abel Gandhy, "Efficiency Of Feed Cost And Business Feasibility In Catfish Cultivation Using Black Soldier Larvae As Additional Feed," *Journal of the Austrian Society of Agricultural Economics* 17, no. 02 (2021): 303–312.

[23] Slamet, Interview.

[24] Ania Khodabakhshian and Hossein Toosi, "Residential Real Estate Valuation Framework Based on Life Cycle Cost by Building Information Modeling," *Journal of Architectural Engineering* 27, no. 3 (2021): 4021020.

[25] Matouš Machka and Theodor Beran, "Monitoring of Material and Energy Flows: Integration of MFCA System with an Open Input–Output Model Separating Variable and Fixed Costs," *Mobile Networks and Applications* (2024): 1–14.

Cultivation operations also require 2 liters of water per cycle at a cost of IDR 2,000 and 20 watts of electricity at a cost of IDR 30,000 per cycle, as well as 10 liters of vehicle fuel at a cost of IDR 100,000. The total variable cost reaches IDR 160,000 per cycle, indicating efficiency in the use of resources and raw materials.

Table 3. Variable Cost Details of Maggot Farming

No	Variable Cost Components	Quantity	Unit Price (Rp)	Total Cost (Rp)
1	Tofu Dregs	6 kg	3,000	18,000
2	Pellet	1 kg	10,000	10,000
3	Water	2 liters	1,000	2,000
4	Electricity	20 watts	1,500	30,000
5	Transportation	10 liters	10,000	100,000
Total Variable Cost				**160,000**

Maggot farming business income is calculated based on sales volume and the selling price of maggots per kilogram. Each production cycle at Meta Maggot BSF Farm which lasts for three weeks is able to produce around 15 kg of maggots for each biopond, so the total production from six bioponds is 90 kg. With a selling price of IDR 6,000 per kilogram, the total income from maggot sales reaches IDR 540,000 per cycle. After being combined with total fixed and variable costs of IDR 210,137 per cycle, this business generates a net profit of IDR 329,863 per cycle.

Table 4. Revenue Analysis of Maggot Farming

Description	Quantity	Unit	Price (Rp)	Value (Rp)
Revenue (TR)				
Maggot	90 kg	kg	6,000	540,000
Total Revenue (TR)				**540,000**
Fixed Costs (TC)				
Depreciation Cost				50,137
Variable Costs (VC)				
Tofu Dregs	6 kg	kg	3,000	18,000
Pellet	1 kg	kg	10,000	10,000
Water	2 liters	liter	1,000	2,000
Electricity	20 watts	watt	1,500	30,000
Fuel	10 liters	liter	10,000	100,000
Total Production Cost (TC)				**210,137**
Profit (π = TR - TC)				**329,863**
R/C Ratio (TR/TC)				**2.57**

The Revenue Cost (R/C) ratio reached 2.57 indicating that every additional unit of cost generates 2.57 units of revenue. The R/C ratio value of more than one indicates that the maggot cultivation business is a business that is not only economically profitable but also reflects maqāṣid-based business sustainability in the sharia economy, where a well-managed business is able to provide broader and more sustainable economic benefits for business actors and the surrounding community.

However, from the perspective of *maqāṣid al-sharī'ah*, business performance should not be evaluated solely based on profitability, but also on its contribution to social and environmental sustainability. Fresh maggot cultivation supports *hifz al-bi'ah* through the conversion of organic waste into productive feed resources, thereby contributing to waste reduction and environmentally sustainable agribusiness practices. This finding is consistent with Ghaithan et al., who argue that circular economy-based business models contribute to sustainability performance by generating environmental and social benefits for surrounding communities. In the context of *maqāṣid al-sharī'ah*, the maggot cultivation business not only promotes environmental preservation (*hifz al-bi'ah*) but also enhances community welfare (*maslahah*) through the provision of affordable animal feed and income opportunities for micro-entrepreneurs.

Diversification into Animal Feed Pellets

The process of diversifying maggots into animal feed pellets involves several important stages, namely raw material preparation, grinding, mixing, molding, and drying.[26] Each stage requires careful quality control to ensure that the final product meets high-quality animal feed standards while also aligning with *maqāṣid al-sharī'ah* principles related to product quality, stakeholder benefit (*maslahah*), and sustainable business practices. The first stage is the preparation of raw materials, where fresh maggots that have been harvested are cleaned first to remove any remaining breeding media.[27]

The second stage is mixing with other additional ingredients. Commonly used additional ingredients include corn flour, bran, vitamins, and minerals.[28] Mixing is ideally done in a mixer machine, but can also be done manually with a shovel to ensure all ingredients are evenly mixed.[29] The composition of the mixture is adjusted to the specific nutritional needs of certain livestock, such as poultry, fish, or reptile feed. The mixing of these ingredients must also follow the principle of thayyiban in Islamic economics, where every ingredient used must be original, nutritious, clean, quality, and safe for consumption by livestock.[30]

The third stage is pellet molding, where maggots that have been mixed with additional ingredients are put into a pelletizer machine. This machine will form it into small pellets with uniform sizes and shapes.[31] This molding process not only provides a physical form that is easy for livestock to consume but also

[26] D Deruytter et al., "The (Im) Possible Standardisation of Insect Feed Experiments: A BSF Case Study," *Journal of Insects as Food and Feed* 8, no. Supplement 1 (2022): S144-144.

[27] Rita Rostika et al., "A Comparison of the Drying Techniques for Maggot of the Black Soldier (Hermetia Illucens) as an Insect-Based Protein Source for the Feed of Juvenile Tilapia Fish (Oreochromis Niloticus)," *AACL Bioflux* 15, no. 3 (2022): 1492–1498.

[28] Hidayah Manan et al., "Recent Developments in Aquaculture–a Review," *Annals of Animal Science* 23, no. 3 (2023): 663–680.

[29] Bambang, Interwiew.

[30] Hawwa Abdul Mokti, Nor Azzah Kamri, and Mohd Abd Wahab Fatoni Mohd Balwi, "Tayyiban in Halal Food Production: A Systematic Literature Review," *Journal of Islamic Marketing* 15, no. 2 (2024): 397–417.

[31] Bambang, Interwiew.

increases efficiency in the feeding process.[32] The resulting pellets are then cut to the desired size, usually between 3-5 mm for fish feed and 5-10 mm for poultry feed.

The final stage is pellet drying, where the newly molded wet pellets are dried again to reduce their water content to below 10%[33] This drying can use a drying oven or sun drying method. Low water content is very important to extend the shelf life of the pellets and prevent the growth of mold and bacteria.[34] After drying, the pellets are packed in tightly closed containers and stored in a cool, dry place to maintain their quality until they are ready to be marketed.

The process of diversifying maggots into animal feed pellets not only enhances product value creation but also demonstrates maqāṣid-oriented business sustainability by supporting economic resilience, stakeholder welfare (*maslahah*), and sustainable resource utilization. By adding value to maggot products, this business is able to provide wider benefits (*maslahah*),[35] create economic stability for business actors, and support the concept of sustainability in the animal feed industry.[36]

Income from Maggot Diversification Business into Animal Feed Pellets

Income from the maggot diversification business into animal feed pellets is calculated based on the difference between the total revenue from pellet sales and the total production costs consisting of fixed costs and variable costs.[37] This diversification business requires a larger initial investment compared to fresh maggot cultivation because it requires additional equipment such as a grinding machine, mixer, and pelletizer.[38] However, because this diversification business is on a small scale, the fixed cost investment for the main equipment is only a pelletizer machine, a stirring shovel, and a media for drying pellets. The total fixed cost is estimated to reach IDR 4,600,000 with a monthly depreciation cost of around IDR 77,000.

[32] Wentao Li et al., "A Review on the Effects of Pretreatment and Process Parameters on Properties of Pellets," *Energies* 15, no. 19 (2022): 7303.

[33] Bambang, Interwiew.

[34] Neus Teixidó, Josep Usall, and Rosario Torres, "Insight into a Successful Development of Biocontrol Agents: Production, Formulation, Packaging, and Shelf Life as Key Aspects," *Horticulturae* 8, no. 4 (2022): 305.

[35] Muhammad Harfin Zuhdi and Mohamad Abdun Nasir, "Al-Mashlahah and Reinterpretation of Islamic Law in Contemporary Context," *Samarah: Jurnal Hukum Keluarga Dan Hukum Islam* 8, no. 3 (2024): 1818–1839.

[36] Rudy Caparros Megido et al., "A Worldwide Overview of the Status and Prospects of Edible Insect Production," *Entomologia Generalis* 44, no. 1 (2024).

[37] Batool, Tabinda, and Tahir, "Black Soldier Fly Larvae Feed Suitability for Chicken and Prospects for Economic Valuation and Viability Aspects."

[38] Fandi, Interview.

Table 5. Fixed Cost Details of Maggot Diversification into Pellet Business

No	Fixed Cost Components	Quantity	Unit Price (Rp)	Total (Rp)	Economic Life	Depreciation/ Month (Rp)
1	Pelletizer Machine	1 Unit	4,000,000	4,000,000	60 months	67,000
2	Mixing Shovel	1 Unit	100,000	100,000	60 months	1,700
3	Pellet Drying Media	20 Units	20,000	500,000	60 months	8,300
Total Fixed Cost			**4,600,000**			**77,000**

Variable costs in diversification efforts include the main raw materials (fresh maggots), additional materials (corn flour or bran), and daily operational costs. The composition of the pellets is 40% fresh maggots and 60% bran or CGC (Corn Gluten Cake). So to produce 225 kg of animal feed pellets, 90 kg of wet maggots are needed at a price of IDR 6,000 per kg and 135 kg of bran or CGC at a price of IDR 3,000 per kg, so the total cost of the main raw materials is IDR 540,000 and additional materials are IDR 405,000. In addition, the cost of fuel for the pelletizer machine is IDR 10,000 per cycle.

Table 6. Variable Cost Details of Maggot Diversification into Pellet Business

No	Variable Cost Components	Quantity	Unit Price (Rp)	Total Cost (Rp)
1	Maggot	90 kg	6,000	540,000
2	Additional Ingredients (Bran or CGC)	135 kg	3,000	405,000
3	Machine Fuel	1 liter	10,000	10,000
Total Variable Cost				955,000

Income from the maggot diversification business into pellets is obtained from the sale of final products in the form of pellets with an average selling price of IDR 10,000 per kilogram. With a production capacity of 50 kg per cycle, the total income generated reaches IDR 500,000 per cycle. After being combined with total fixed and variable costs of IDR 294,000 per cycle, this business is able to generate a net profit of around IDR 206,000 per cycle.

Table 7. Revenue Analysis of Maggot Diversification into Pellet Business

Description	Quantity	Unit	Price (Rp)	Value (Rp)
Revenue (TR)				
Pellet Feed	225 kg	kg	10,000	2,250,000
Total Revenue (TR)				**2,250,000**
Fixed Costs (TC)				
Equipment Depreciation				77,000
Variable Costs (VC)				
Fresh Maggot	90 kg	kg	6,000	540,000
Additional Ingredients (Bran or CGC)	135 kg	kg	3,000	405,000
Machine Fuel	1 liter	liter	10,000	10,000
Total Production Cost (TC)				**942,000**
Profit (π = TR - TC)				**1,308,000**
R/C Ratio (TR/TC)				**1.39**

The Revenue Cost (R/C) ratio reached 1.39, indicating that the business generates positive returns relative to production costs. From the perspective of *maqāṣid al-sharī'ah*, this finding suggests that maggot diversification into animal feed pellets supports sustainable business performance through economic resilience (*hifz al-mal*), stakeholder welfare (*maslahah*), and sustainable resource utilization.[39] By increasing the added value of the product, this effort provides broader benefits (*maslahah*) for farmers and the community, maintains business sustainability (*hifz al-mal*), and creates economic stability that supports justice (al-'adalah).

Economic Comparison: Profits and Blessings in Two Business Models

This comparison aims to provide a comprehensive overview of which business model is more profitable and sustainable, and interpreted through the principles of *maslahah* and *hifz al-mal* in Islamic economics.

Table 8. Economic Comparison of Fresh Maggot Farming vs. Diversification into Pellet Feed

Economic Aspect	Fresh Maggot Farming	Diversification into Pellet Feed
Fixed Cost per Cycle (Rp)	50,137	77,000
Variable Cost per Cycle (Rp)	160,000	955,000
Total Production Cost (Rp)	210,137	1,032,000
Selling Price per Kg (Rp)	6,000	10,000
Production per Cycle (kg)	90	225
Total Revenue (Rp)	540,000	2,250,000
Net Profit (Rp)	329,863	1,218,000
Return on Investment (ROI)	61.09%	58.13%
R/C Ratio	2.57	1.39
Payback Period	Longer (9 months)	Relatively faster (4 months)
Maqāṣid Sustainability Dimension	*hifz al-bi'ah* (waste reduction)	*hifz al-mal* & *maslahah* (value-added and income stability)

In terms of production costs, maggot cultivation has lower fixed and variable costs compared to product diversification into pellets. The fixed cost of fresh maggot cultivation is only IDR 50,137 per cycle, while product diversification requires IDR 77,000 per cycle. A significant difference is also seen in variable costs, where fresh maggot cultivation only requires IDR 160,000 per cycle, much lower than the variable cost for diversification into pellets which reaches IDR 955,000 per cycle. The higher costs of product diversification are due to the additional need for raw materials, additives, and the operation of animal feed processing machines. In terms of income and profit, fresh maggot

[39] Darmalaksana, "The Need for Social Theology to Strengthen the Social Functions of Islamic Banking in Indonesia."

cultivation is able to generate income of IDR 540,000 per cycle with a net profit of IDR 329,863. Meanwhile, product diversification into animal feed pellets provides higher income, namely IDR 2,250,000 per cycle with a net profit of around IDR 1,218,000. In addition to higher net profits, the product diversification business model offers higher selling price stability and longer product shelf life, making it safer from market price fluctuations. This suggests that value-added diversification may improve long-term income resilience despite requiring higher operational costs.

Return on Investment (ROI) analysis shows that the ROI per fresh maggot cultivation cycle is higher, but product diversification into pellets promises a faster return on investment. This is because the net profit of product diversification is greater than the net profit of fresh maggot cultivation. Fresh maggot cultivation is suitable for business actors with limited capital, and product diversification into pellets is suitable for business actors who want profits with a larger nominal value. In addition, product diversification into pellets has the potential for a more stable and sustainable ROI, supporting the concept of *hifz al-mal* in sharia economics which emphasizes the importance of maintaining business sustainability and creating broader economic benefits (*maslahah*).

From the perspective of *maqāṣid al-sharī'ah*, pellet diversification demonstrates stronger business sustainability because value-added processing increases income stability and enhances long-term economic resilience. This finding reflects the principle of *hifz al-mal*, which emphasizes the preservation and productive management of economic resources to ensure sustainable business continuity. Product diversification not only provides economic benefits to business actors but also contributes to the provision of high-quality animal feed for other farmers. Meanwhile, fresh maggot cultivation is more prominent in the aspect of *hifz al-bi'ah* or environmental maintenance because it directly helps reduce organic waste through the maggot bioconversion process. Overall, the economic comparison of these two business models shows that each has its own advantages. Fresh maggot cultivation is more suitable for businesses with small capital, low operational costs, and greater ROI per cycle. Meanwhile, product diversification into pellets is more ideal for businesses with a greater profit orientation, price stability, and wider market expansion opportunities. In the context of sharia economics, the choice of business model can be adjusted to the objectives of the business, whether it is more focused on environmental sustainability aspects or on strengthening economic stability with higher added value. This study contributes to MSME business decision-making by demonstrating that sustainable business strategies can integrate financial performance with *maqāṣid al-sharī'ah* dimensions, including economic resilience (*hifz al-mal*), environmental sustainability (*hifz al-bi'ah*), and stakeholder welfare (*maslahah*).

CONCLUSION

This study shows that both fresh maggot cultivation and product diversification into animal feed pellets provide significant economic potential for

MSME actors, although each business model offers different strategic advantages. Fresh maggot cultivation demonstrates lower production costs and higher short-term ROI, making it more suitable for small-scale entrepreneurs with limited capital. In contrast, diversification into animal feed pellets generates higher added value, stronger income stability, and broader market opportunities, thereby supporting long-term business sustainability.

From the perspective of *maqāṣid al-sharī'ah*, this study demonstrates that Islamic economic principles can be operationalized as measurable dimensions of business sustainability. The principle of *hifz al-mal* is reflected in profitability stability and long-term business resilience, *hifz al-bi'ah* is reflected in organic waste utilization and environmentally sustainable production practices, while *maslahah* is reflected in stakeholder benefits such as affordable feed supply and income opportunities for MSME actors.

The findings imply that Islamic economic approaches to MSME development should integrate financial performance with environmental and social sustainability dimensions. For policymakers, maggot-based circular agribusiness has the potential to become a strategic model for sustainable rural MSME development aligned with maqāṣid-oriented economic objectives.

Based on the results of the analysis, the recommendation for business actors is to start with fresh maggot cultivation to get quick initial capital, then gradually switch to product diversification into animal feed pellets to increase added value and business sustainability. In addition, in further research projects, it is recommended to explore more deeply the effect of the quality of additional raw materials in the pellet making process on the nutritional value of the final product, as well as conduct large-scale trials to assess the broader economic impact. Further research can also consider socio-economic aspects, such as empowering local communities through maggot cultivation training and pellet production, to strengthen the positive impact of this business in creating welfare and blessings for the surrounding community.

Author's Contribution

Dewi Kumalasari: Contribute to formulating research ideas, collecting data, processing data, and interpreting data
Alimatul Farida, Holilur Rahman: Contributing to writing systematics and researchmethods
Muhammad Ahmad Fulka Sa'dibih: Contributing to analyzing interpretation results
Beny Arihakam: Contributing to collecting data, compiling a literature review, and to language proofreading.

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Declaration of Competing Interest

The author declares that there is no conflict of interest.

Ethical Approval

Ethical approval No patient-identifying parts in this paper were used or known to the authors. Therefore, no ethical approval was requested.

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