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Financial Feasibility and Sensitivity of Banana Chips Agroindustry in South Sulawesi

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ABSTRACT

The purpose of this study was to assess the financial feasibility and sensitivity of the banana chips agroindustry at Mappadeceng MSME in Bone Regency, South Sulawesi. The research was conducted in June 2024 using a case study approach based on primary and secondary data. Financial feasibility was analyzed using Net Present Value (NPV), Internal Rate of Return (IRR), Gross Benefit-Cost Ratio (B/C), Net Benefit-Cost Ratio (Net B/C), and Payback Period (PP), followed by sensitivity analysis under adverse business scenarios. The results show that the enterprise is financially feasible, with an NPV of IDR 178,750,000, IRR of 37%, Gross B/C of 1.21, Net B/C of 2.85, and a Payback Period of 6 years and 8 months. The IRR exceeds the prevailing bank interest rate of 10%, indicating strong investment attractiveness. Sensitivity analysis reveals that the business remains feasible under a 15% decrease in sales volume and a 20% increase in raw material prices. However, a 10% reduction in selling price causes the IRR to fall below the benchmark and the B/C ratio to drop below 1, indicating financial vulnerability to price competition. These findings demonstrate that the banana chips agroindustry has solid financial potential but requires effective pricing strategies to maintain long-term sustainability.

Keywords: agroindustry, banana chips, financial feasibility, MSMEs, sensitivity

INTRODUCTION

The agro-industrial sector is critical to developing the local economy, particularly in empowering value-added agricultural products like bananas, which are a major commodity in South Sulawesi. According to Statistics Indonesia (BPS 2024), Bone Regency produces about 42,000 tons of bananas per year, making it one of the top banana-producing districts in eastern Indonesia. However, the added value of this commodity is still modest due to the dominance of fresh product sales. The growth of household-scale agroindustry, notably banana chip production, is one strategic strategy for increasing this value. The agro-industrial sector has several challenges as it develops micro, small, and medium-sized enterprises (MSMEs), including high initial investment requirements, raw material price changes, and market uncertainty. Rosminah *et al.* (2024) found that food-based MSMEs are extremely subject to changes in input prices and shifts in consumer demand. As a result, a thorough financial feasibility study, supplemented by a sensitivity analysis, is required for more accurate and risk-aware investment decision-making.

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Academically, this research is unique in two ways. First, it concentrates on banana chip processing in rural areas, which has received little attention in scholarly literature. Second, the sensitivity analysis approach considers not only revenue decreases and increases in input costs, but also unsold product rates as a proxy for market risk. Exzan *et al*. (2024) and Feni *et al.* (2024) did similar studies on additional processed food products, demonstrating the importance of this technique in sustainable MSME business planning. Global references also support this methodological framework. According to Polukhin and Panarina (2022), financial risk management in the agroindustry must consider sustainability and social responsibility to ensure the resilience of small-scale firms. Furthermore, Adeyonu *et al*. (2022) found that entrepreneurial competencies in agribusiness are strongly linked to household welfare level and the ability to endure economic shocks in emerging nations.

The primary goal of this study was to assess the financial viability and sensitivity of banana chip production at Mappadeceng MSME in Bone Regency, South Sulawesi. This study used a case study approach and standard investment indicators such as net present value (NPV), internal rate of return (IRR), gross benefit−cost ratio (Gross B/C), net benefit−cost ratio (Net B/C), and payback period (PP) to provide a comprehensive overview of the enterprise's long-term sustainability. Practically, this study provides empirical evidence on the financial performance and risk resilience of the banana chips agroindustry, serving as a useful reference for MSME entrepreneurs, local

governments, and development agencies in developing effective policies for long-term agro-industrial growth.

METHODS

Site and Business Profile

The study was carried out in June 2024 in Mappadeceng MSME, which is in Panyili Village, Barebbo District, Bone Regency, South Sulawesi. This place is well-known as a center for banana growing and agroindustry in the region. Data gathering took two weeks and included direct field observation, structured interviews with owners and employees, and financial document analysis. The company being studied specializes in making banana chips from locally obtained *kepok* bananas.

The findings would be described in two major sections: (1) a review of the business profile and financial indicators, such as NPV, IRR, B/C ratio, and PP; and (2) a sensitivity analysis under various risk scenarios, such as sales volume reduction, raw material price increase, and selling price decrease. These evaluations were intended to assess the enterprise's economic viability and ability to withstand potential market volatility.

RESULTS AND DISCUSSION

Table 1 provides a thorough business profile of Mappadeceng MSME. The table is divided into two main columns: the first column outlines key business description (such as labor, raw material usage, manufacturing capacity, and cost structure), and the second column gives specific quantitative or descriptive data for each aspect. The enterprise employs five people, including two permanent employees and three seasonal laborers, receiving approximately 600 kg of *kepok* bananas per week from adjacent farming communities in Barebbo and Cina villages. The daily production capacity was 150 to 180 packs of banana chips, each weighing 200 g. The monthly operational expenditure comprised variable expenses of IDR 4.2 million and fixed costs of IDR 1.8 million, for a total monthly revenue of IDR 8.5 million and net income of around IDR 2.5 million.

The financial study demonstrates that Mappadeceng MSME works efficiently and with very constant cost structures. The profit margin, however low, suggests that the business can sustain operations and provide revenue for the owner and employees. The proximity to banana-producing areas lowers transportation expenses while ensuring consistent raw material supply. To improve profitability and resilience, the company should adopt value-added tactics such as product innovation, branding, and expanded market distribution—particularly in reaction to market price fluctuations and consumer preference adjustments. Such approaches are congruent with the best practices in rural agroindustry development identified by Adeyonu *et al*. (2022) and Polukhin and Panarina (2022).

Financial Feasibility Analysis

Financial feasibility analysis is critical for determining if an agriculture venture is commercially viable and sustainable in the long run. In the case of Mappadeceng MSME, a domestic banana chip producer, the study was used to evaluate the efficiency and profitability of present investments and operations. This study used five widely accepted financial indicators: NPV, IRR, B/C, Net B/C, and PP to assess the business's financial stability. These indicators are commonly employed in small-scale agro-industry assessments to aid decision-making in the face of restricted finance and market uncertainty (Feni *et al*. 2024; Exzan *et al*. 2024). According to Feni *et al*. (2024), financial measures such as NPV, IRR, and Net B/C are commonly used to evaluate the viability of small-scale food companies, particularly in rural areas. Similarly, Exzan *et al*. (2024) stressed that MSMEs in processed food production have financial viability when IRR values exceed local bank interest rates and the Net B/C ratio is above 1.0. The findings are congruent with the findings of this study, which suggest that the banana chips agroindustry at Mappadeceng MSME remains profitable and investment viable under identical conditions. Furthermore, studies by Vilani *et al*. (2024) and Polukhin and Panarina (2022) found that financial sustainability in MSMEs is dependent not only

Table 1 Business profile of Mappadeceng MSME, Bone Regency

Profile aspect	Description
Business name	Mappadeceng MSME
Address	Panyili Village, Barebbo District, Bone Regency, South Sulawesi
Number of workers	5 (2 permanent, 3 temporary)
Raw material	Local kepok bananas, approx. 600 kg/week
Raw material source	Farmers in Barebbo and Cina villages
Production capacity	150–180 packs/day (200 g/pack)
Monthly variable costs	IDR 4,200,000 (ingredients, packaging, wages for temporary labor)
Monthly fixed costs	IDR 1,800,000 (rent, electricity, depreciation)
Monthly revenue	IDR 8,500,000
Monthly net income	IDR 2,500,000

on profitability indicators, but also on resilience to market and input price fluctuations, which supports the sensitivity analysis approach used in this study.

The financial figures (Table 2) show that Mappadeceng MSME is financially viable. Table 2 is organized into columns that show the type of financial indicator, the calculated value for each indicator, and the relevant feasibility criterion, allowing for a straightforward comparison of computed results and investment benchmarks. With NPV of IDR 178,750,000, the company provides substantial returns above and beyond the initial capital investment. The IRR of 37% is significantly higher than the 10% benchmark, suggesting strong profitability. Furthermore, the Gross B/C and Net B/C ratios, at 1.21 and 2.85, respectively, highlight the company's cost-effectiveness and financial strength. The PP of 6 years and 8 months confirms the ability of MSME to recover its investment efficiently.

According to Figure 1, which depicts the income and cost trends during the 10-year project duration, total revenue constantly surpasses total cost, with a growing disparity noted in the later years of operation. Revenue peaked at IDR 1.9 billion in year 10, indicating great business development potential, despite a brief downturn in year 4 to 6. In contrast, costs remained essentially steady, with only minor increases in the final year due to scaling activities. The expanding disparity between revenue and cost in years 9 and 10 indicates greater profitability and possible investment readiness. This tendency contributes to the MSME's long-term viability through effective cost control and market-responsive production techniques (Ribeiro *et al.* 2024; Feni *et al*. 2024).

Table 3 indicates that, while Mappadeceng MSME remains financially viable despite dropping sales and rising input costs, a 10% reduction in selling price reduces IRR to less than 10% and B/C to less than 1. Table 3 is divided into columns reflecting each risk scenario, the resulting NPV, IRR, and B/C values, and the feasibility status, allowing for a clear assessment of company sensitivity in poor conditions. This demonstrates that pricing consistency is the most important aspect in achieving financial sustainability. The risk of input price fluctuations, particularly for raw materials, emphasizes the need for flexible

Table 2 Financial feasibility indicators of Mappadeceng MSME

Indicator	Value	Decision criterion
Net present value (NPV)	IDR 178,750,000	NPV > 0
Internal rate of return (IRR)	37%	IRR > 10%
Gross benefit-cost ratio (Gross B/C)	1.21	B/C > 1
Net benefit-cost ratio (Net B/C)	2.85	Net B/C > 1
Payback period (PP)	6 years 8 months	PP < project duration

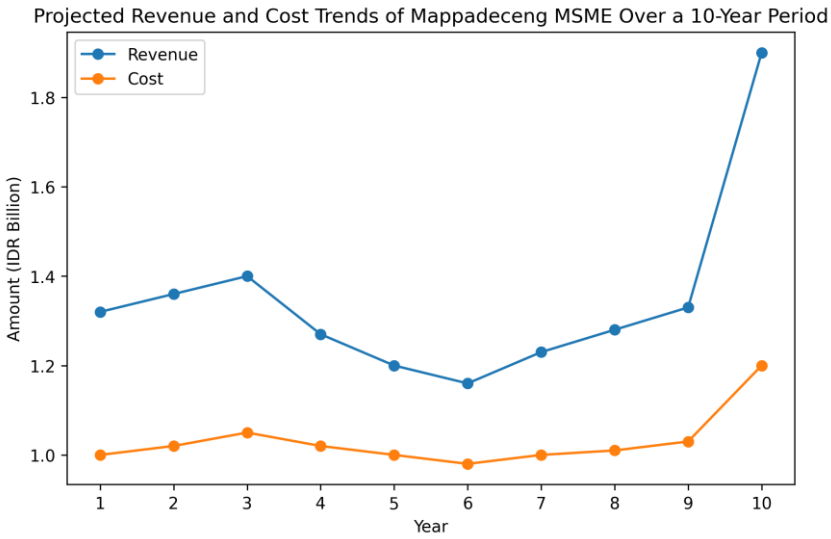

Figure 1 Revenue and cost trends of Mappadeceng MSME over a 10-year period.

Table 3 Sensitivity analysis results of Mappadeceng MSME

Scenario	NPV (IDR)	IRR (%)	B/C ratio
15% decrease in sales volume	12,000,000	18.2	1.18
20% increase in raw material prices	9,500,000	12.3	1.05
10% reduction in selling price	4,800,000	9.4	0.92

procurement strategies and cost management systems (Haras *et al*. 2023). Price volatility in MSMEs can erode narrow margins and lead to investment failure if not addressed through efficient supply chain architecture (Mustafa *et al*. 2024). Furthermore, financial flexibility through rural financial services, as proposed by Mwalupaso *et al*. (2025), can buffer shocks in sales drop and production costs, highlighting the importance of diversified financing.

CONCLUSION

This study concludes that the banana chips agroindustry at Mappadeceng MSME in Bone Regency is both financially viable and resilient to minor economic volatility. The study reveals an NPV of IDR 178,750,000, an IRR of 37%, Gross B/C of 1.21, Net B/C of 2.85, and PP of 6 years and 8 months, all exceeding the minimal investment conditions.

Sensitivity analysis shows that the business remains feasible under a 15% drop in sales and a 20% increase in raw material prices. However, a 10% decrease in product prices leads to financial infeasibility because the IRR falls below the benchmark and the B/C ratio drops below 1.

These findings indicate that price stability is a crucial factor in maintaining the long-term financial sustainability of the enterprise. These data suggest that Mappadeceng MSME is not only financially stable, but also capable of sustaining long-term operations in facing market uncertainty.

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