

Feasibility Analysis of Argopuro Robusta Coffee Farming

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ABSTRACT

Coffee is one of Indonesia's leading export commodities with high economic value in the global market. Coffee production continues to increase annually, including in Jember Regency, where coffee is predominantly cultivated under smallholder farming systems that rely on inherited land management practices. Coffee cultivation has become a long-standing cultural tradition among plantation farmers in several areas of Jember Regency. This study employed a quantitative descriptive method using income analysis, Revenue–Cost (R/C) ratio, and Benefit–Cost (B/C) ratio as indicators of farming feasibility. Assessing farm feasibility is essential to identify the prospects for sustainable coffee cultivation in the future. The research sample was selected using purposive sampling within 60 respondent. The results show that the average total revenue of coffee farming reached IDR 67,860,023 per hectare per year, with production costs amounting to IDR 8,528,131 per hectare per year. Consequently, the net income of coffee farmers was IDR 59,331,892 per hectare per year, with an R/C ratio of 7.9 and a B/C ratio of 6.9. These findings indicate that Argopuro coffee farming in Jember Regency is economically feasible and provides significant profits, thereby supporting its economic sustainability as a smallholder agricultural enterprise.

KEYWORDS: Coffee; Feasibility; Argopuro; Farmers

1. INTRODUCTION

Coffee farming is one of the most important plantation-based livelihood systems in Indonesia, particularly in rural areas where smallholder farmers dominate production activities. Smallholders manage the majority of coffee plantations, making coffee a strategic commodity for income generation, employment creation, and regional economic development (Neilson et al., 2018; Barrett et al., 2022). Previous studies have shown that coffee cultivation plays a crucial role in sustaining rural livelihoods by providing stable cash income and supporting household resilience in developing countries, including Indonesia (Jaffee et al., 2014; Chiputwa et al., 2015). One of the key Robusta coffee-producing areas in East Java is the Argopuro mountainous region, especially in Jember Regency. The Argopuro area has favorable agroecological conditions for coffee cultivation, including suitable altitude, temperature, rainfall patterns, and fertile volcanic soils, which support both productivity and distinctive coffee quality (Setiawan et al., 2022; Hidayat & Saptana, 2020). Smallholder coffee farming systems in the Argopuro region are generally characterized by traditional cultivation practices, reliance on family labor, and limited access to modern inputs and markets (Suryantini et al., 2018; Pratiwi et al., 2021). Despite these limitations, coffee farming remains a major source of household income and an important socio-economic activity for rural communities in Jember Regency, contributing to local employment and regional economic resilience (Rahmawati et al., 2021).

Despite its potential, smallholder coffee farming in the Argopuro area faces various economic and technical challenges. It means productivity levels of Robusta coffee in Jember Regency remain below their potential due to aging coffee trees, limited use of improved planting materials, suboptimal fertilization practices, and weak adoption of Good Agricultural Practices (GAP) (Nugroho et al., 2020; Prasetyo et al., 2021). These constraints directly affect production costs, yield stability, and farm income, raising concerns regarding the long-term economic feasibility of coffee farming in the region. Feasibility analysis is a critical tool for assessing whether a farming activity can provide sufficient economic returns to sustain farmers' livelihoods and justify continued investment. In smallholder coffee systems, feasibility analysis commonly involves evaluating indicators such as net income, revenue-cost (R/C) ratio and benefit-cost (B/C) ratio (Sari et al., 2020; Hidayat & Lestari, 2023).

These indicators enable researchers and policymakers to objectively measure the profitability and efficiency of coffee farming enterprises at the farm level.

Previous feasibility studies conducted in coffee-producing areas of Jember Regency show that Robusta coffee farming can be economically viable, although profitability levels vary significantly among farmers. Research by Yuliana et al. (2018) and Putri et al. (2021) reported R/C ratios greater than one, indicating that coffee farming generates positive returns. However, income margins remain relatively narrow due to rising input costs, fluctuating coffee prices, and limited economies of scale. These findings highlight the need for more localized feasibility analyses that focus specifically on the Argopuro coffee production system.

Marketing and price volatility are additional factors that influence the feasibility of coffee farming in the Argopuro area. Smallholder farmers in Jember Regency typically sell coffee in the form of dried cherries or green beans through long marketing channels involving collectors and intermediaries. This marketing structure often weakens farmers' bargaining power and results in lower farm-gate prices (Utami & Harisudin, 2019; Kurniawan et al., 2022). Consequently, even when production levels are relatively stable, farmers' incomes remain highly sensitive to market price fluctuations. Value addition through post-harvest handling and processing has been identified as a potential strategy to improve the economic performance of coffee farming in Jember Regency. Studies published in SINTA-indexed agribusiness journals demonstrate that processing coffee into higher-value products, such as fermented beans or ground coffee, can significantly increase farmers' income and improve feasibility indicators (Lestari et al., 2021; Saputra & Wulandari, 2023). However, adoption of value-added processing in the Argopuro area remains limited due to constraints in capital, technology, and market access.

Environmental and climatic factors also affect the economic viability of coffee farming in the Argopuro region. Climate variability influences flowering patterns, pest and disease incidence, and yield stability, thereby increasing production risks for smallholder farmers (Arifin et al., 2020; Dewi et al., 2024). Although Robusta coffee is generally more tolerant to higher temperatures than Arabica, extreme weather events and shifting rainfall patterns still pose significant challenges for sustainable coffee production in the region.

Institutional support plays a crucial role in enhancing the feasibility of smallholder coffee farming. Farmer groups, extension services, and access to credit have been shown to positively influence productivity and farm income in coffee-producing areas of East Java (Susanti et al., 2019; Handayani & Prabowo, 2022). In the Argopuro area, strengthening farmer institutions and improving access to extension services are essential for promoting technology adoption and improving farm management practices. Despite the importance of coffee farming in the Argopuro area, comprehensive feasibility studies that integrate production costs, income structure, and local socio-economic conditions remain limited. Many existing studies focus on general income analysis without explicitly evaluating feasibility indicators that are crucial for investment planning and policy formulation (Putra & Suryani, 2020). Therefore, a location-specific feasibility analysis of smallholder coffee farming in the Argopuro area of Jember Regency is needed to provide empirical evidence that supports economic sustainable coffee development strategies.

This study aims to analyze the economic feasibility of smallholder Robusta coffee farming in the Argopuro area, Jember Regency, by evaluating key financial indicators and identifying major constraints affecting farm performance. The findings are expected to provide valuable insights for farmers, policymakers, and development practitioners in designing targeted interventions to enhance the sustainability and competitiveness of coffee farming in the region.

2. MATERIALS AND METHODS

The research was conducted in 2025 in the Argopuro coffee growing area of Jember Regency, East Java. The respondents in this study consisted of 60 coffee farmers distributed across several sub-districts in Jember Regency were selected using purposive sampling as active coffee cultivation and joining the coffee planter group. This study employed cost analysis, revenue and income analysis, as well as farm feasibility analysis, Revenue–Cost (R/C) ratio, and Benefit–Cost (B/C) ratio.

Total revenue (TR) was calculated using the following formula:

$$TR = Q \times P \quad (1)$$

where:

TR = Total Revenue

Q = Quantity of production (kg/year)

P = Price (Rp/year)

Total cost (TC) was calculated using the following formula:

$$TC = FC + VC \quad (2)$$

where:

TC = Total Cost (Rp/year)

FC = Fixed Cost (Rp/year)

VC = Variable Cost (Rp/year)

Farm income was calculated using the following formula:

$$I = TR - TC \quad (3)$$

where:

I = Farm income (Rp/year)

TR = Total Revenue (Rp/year)

TC = Total Cost (Rp/year)

To determine the feasibility of coffee farming, the **Revenue–Cost (R/C) ratio** was calculated using the following formula:

$$R/C \text{ ratio} = TR / TC \quad (4)$$

where:

TR = Total Revenue (Rp/year)

TC = Total Cost (Rp/year)

The criteria for farm feasibility based on the R/C ratio analysis, according to Rifkisyahputra et al. (2018), are as follows:

- **R/C > 1**: the farming activity is categorized as profitable because total revenue exceeds total production costs; therefore, the farm is considered economically feasible.
- **R/C < 1**: the farming activity incurs losses because total revenue is lower than total production costs; thus, the farm is considered not feasible.
- **R/C = 1**: the farming activity is at the break-even point, where total revenue equals total production costs; therefore, the farm is not considered viable for further development.

In addition to the R/C ratio, the **Benefit–Cost (B/C) ratio** was used to further assess the economic feasibility of coffee farming. The B/C ratio measures the comparison between net benefits and total costs incurred during the production process and is calculated using the following formula:

$$B/C \text{ ratio} = (TR - TC) / TC \quad (5)$$

where:

TR = Total Revenue

TC = Total Cost

The criteria for farm feasibility based on the B/C ratio are as follows:

- **B/C > 0**: the farming activity generates positive net benefits, indicating that the benefits exceed the costs; therefore, the farm is considered economically feasible.
- **B/C = 0**: the farming activity is at the break-even point, where total benefits equal total costs; thus, the farm is considered marginal and not attractive for further development.
- **B/C < 0**: the farming activity generates negative net benefits, indicating that costs exceed benefits; therefore, the farm is considered economically unfeasible.

The B/C ratio provides a more explicit measure of net profitability compared to the R/C ratio, as it highlights the proportion of net benefits obtained per unit of cost. Together with income analysis and the R/C ratio, the B/C ratio offers a comprehensive evaluation of the economic performance and economic sustainability of smallholder coffee farming systems.

3. RESULT AND DISCUSSION

Cost analysis is used to calculate the total cost of coffee farming, which includes fixed costs and variable costs. The main objective of this analysis is to classify costs according to their primary functions within the farming operation and to understand how these costs change in relation to the scale of production activities. Through accurate cost analysis, farmers can manage resources more efficiently and improve the profitability

of their farming enterprises (Albayan, 2019). Fixed costs are costs whose amounts remain constant and are not affected by changes in production volume. These costs must be incurred regardless of whether production increases or decreases, and even when no production activity takes place. The magnitude of fixed costs does not depend on the level of output, yet they remain an integral component of the financial calculation of coffee farming (Taufik et al., 2023). In this study, the fixed cost examined was the land and building tax, as farmers consider it the only fixed cost that must be paid annually, independent of production levels or farming activities. Variable costs are costs whose amounts increase or decrease depending on the volume of products produced or sold (Suharnitha, 2022). These costs vary in line with changes in production or sales levels, meaning that higher production volumes lead to higher variable costs, while lower production levels result in reduced variable costs. In this study, variable costs include inputs such as seedlings, fertilizers, and labor, all of which play a crucial role in the production process of coffee farming.

Tabel 1. Cofee Farming Analysis

No	Cost	Value (Rp/Ha/Year)
1	Fixed Cost Tax	125.038
2	Variable Cost Seed Fertilizer labor	92.788,- 2.647.889,- 5.662.416,-
	Total Variable Cost	8.403.093,-
	Total Cost	8.528.131,-
	Total Revenue	67.860.023,-

Most farmers' income is derived from the sale of green coffee beans, indicating the effectiveness of coffee farming in producing green beans as the primary product. Green beans are the preferred product among farmers because their processing is relatively simple and they have consistent demand in both domestic and international markets (Amanda & Rosiana, 2023). With an average price of IDR 74,797 per kg, green beans contribute significantly to farmers' annual income. Farm-gate coffee prices are strongly influenced by factors such as bean quality, post-harvest processing methods, and market access. This is consistent with the findings of Simorangkir and Rosiana (2022), who stated that improvements in post-harvest quality can increase selling prices and farmers' income. Although the production of ground coffee is relatively limited, its higher selling price offers additional income opportunities for farmers who are able to diversify their products. However, green beans are generally sold to local collectors at prices lower than prevailing market values.

Tabel 2. Feasibility Coffee Farming Analysis

No	Description	Value (Rp/Ha/Year)
1	Total Revenue	67.860.023,-
2	Total Cost	8.528.131,-
3	Profit	59.331.892,-
	R/C Ratio	7,9
	B/C Ratio	6,9

Based on the table above, the R/C Ratio value is 7.9, obtained by dividing total revenue of IDR 67,860,023 by total costs of IDR 8,528,131. An R/C Ratio of 7.9 indicates that the revenue earned is almost eight times higher than the costs incurred. Since the R/C Ratio is greater than 1, this result demonstrates that Argopuro coffee farming is economically feasible and viable to be continued. The low production costs are partly due to the fact that farmers do not fully implement standardized cultivation practices and instead rely on individual experience and skills. In addition, the fertilizers used are subsidized, as all respondents are members of farmer groups, which provides them with relatively good access to production inputs. Farmers also benefit from the established reputation of Argopuro coffee, as coffee consumers and buyers tend to directly target farmers in the study area. Although the R/C ratio indicates high economic feasibility, a high R/C value does not automatically reflect improved farmer welfare. Feasibility indicators such as R/C ratio measure production efficiency rather than household welfare. According to Sari et al. (2020), the R/C ratio only illustrates the relationship between revenue and production costs and does not account for farm scale, household size, or income distribution over time. Similarly, Putri et al. (2021) argue that smallholder farmers may achieve high R/C ratios due to low cash expenditures, yet their absolute income remains low because of limited land

ownership and small production volumes. In addition, Widodo et al. (2019) highlight that high profitability ratios at the farm level can coexist with low living standards when farmers depend solely on raw commodity sales and face weak bargaining power in marketing channels. This condition is further reinforced by Rahmawati et al. (2021), who state that smallholder coffee farmers often experience low welfare levels despite economically feasible farming activities, as income must be divided to meet household consumption needs, education, and health expenses. Therefore, feasibility analysis should be complemented with income and welfare assessments to provide a more comprehensive evaluation of the sustainability of smallholder coffee farming systems.

The B/C ratio value of 6.9 indicates that Argopuro coffee farming in Jember Regency generates substantial net benefits, where every unit of cost incurred produces net benefits of nearly seven times the production cost. According to Sari et al. (2020), a B/C ratio greater than zero reflects that farming activities are economically feasible, while higher values indicate stronger financial performance and greater profitability. The high B/C ratio in this study suggests that coffee farming in the Argopuro area is not only able to cover production costs but also provides significant surplus income for farmers. Similar findings were reported by Widodo et al. (2019), who stated that plantation-based farming systems with high B/C ratios demonstrate strong efficiency in resource utilization, even when managed by smallholder farmers. Furthermore, Putri et al. (2021) emphasized that a high B/C ratio reflects effective cost management and revenue generation; however, it should be interpreted cautiously, as it does not fully capture household welfare conditions. In the context of Argopuro coffee farming, the B/C ratio of 6.9 confirms that the farming activity is financially viable and profitable, yet complementary indicators such as farm scale, labor allocation, and household income levels are necessary to assess the overall sustainability and welfare impacts of the farming system. Therefore, while the B/C ratio strongly supports the economic feasibility of Argopuro coffee farming, policy interventions focusing on productivity improvement, value addition, and market access are essential to translate financial feasibility into improved farmer welfare.

4. CONCLUSIONS

The Argopuro coffee farming system in Jember Regency is economically sustainability based on the R/C ratio analysis, as the R/C ratio exceeds one, with a value of 7.9. In addition, the B/C ratio of 6.9 indicates that the farming activity generates substantial net benefits relative to the costs incurred, further confirming the economic viability of Argopuro coffee farming. The indicator can serve as a reference for farmers to continue coffee cultivation and expand their marketing reach to broader markets. Based on the analysis results, the profits received by farmers are relatively high. It is recommended to provide education to local younger generations to continue sustainable cultivation practices so that the farming process does not cease with the current generation.

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