

Management Innovation Strategy for Sustainable Coffee Agroforestry Development in Medono Village, Purworejo Regency

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Abstract. Despite growing interest in coffee-based agroforestry as a strategy for rural development, few studies have comprehensively examined socio-cultural conditions, community and stakeholder perceptions, and strategic factors supporting sustainable coffee agroforestry development within an integrated framework. This study aims to examine the socio-cultural profile supporting coffee agroforestry development in Medono Village, analyze community and stakeholder perceptions regarding its development, and formulate management innovation strategies for sustainable coffee agroforestry development. The novelty of this study lies in integrating socio-cultural analysis, stakeholder perception assessment, Importance–Performance Analysis (IPA), and SWOT analysis to formulate context-specific management innovation strategies for sustainable coffee agroforestry development at the village level. The research employed descriptive, qualitative, and quantitative approaches. Data were collected through questionnaires, observations, and in-depth interviews involving 72 respondents. The findings reveal that Medono Village possesses strong social cohesion, which serves as valuable social capital for coffee agroforestry development. The local economy is predominantly based on agricultural activities, while diverse natural resources, including plantations, forests, and mountainous landscapes, support the area. Community and stakeholder perceptions toward coffee agroforestry development were highly positive, with average scores indicating strong support for its development. The IPA results identified several improvement areas, particularly agroforestry support facilities and facility cleanliness, although no attribute was located in the main priority quadrant. SWOT analysis indicates that Medono Village has substantial strategic potential for sustainable coffee agroforestry development through integrated management strategies that optimize local resources, strengthen institutional collaboration, improve supporting facilities, and promote ecological and economic sustainability.

Keywords: Coffee Agroforestry; Management Innovation; Rural Development; Stakeholder Perception; SWOT

INTRODUCTION

The coffee plantation sector is a strategic subsector in agricultural development due to its significant contribution to rural economic growth, employment generation, and improvements in farmers' welfare. Indonesia is recognized as one of the world's largest coffee producers, with production growing consistently in recent years, driven by rising domestic and international demand for high-quality and specialty coffee. However, most coffee farming businesses in Indonesia are still managed by smallholder farmers who face various challenges, including limited managerial capacity, weak market access, inadequate post-harvest innovation, and low

adoption of modern production technologies (Feronika et al., 2024). These limitations reduce the competitiveness of local coffee products in an increasingly dynamic global market (International Coffee Organization, 2024; Food and Agriculture Organization, 2024).

In the context of modern agribusiness development, management innovation plays a critical role in strengthening farmers' institutional capacity. Management innovation encompasses not only improvements in cultivation techniques but also transformation in farmer organization governance, supply chain management, market information digitalization, and multi-stakeholder collaboration. Recent studies have demonstrated that successful coffee farmer empowerment depends largely on local institutions' ability to adapt to changing market demands, consumer preferences, and sustainability requirements (Klerkx et al., 2023; Borsellino et al., 2024; Van Tulder et al., 2021).

Medono Village is strategically important for local coffee agribusiness development due to its favorable agroecological conditions, including fertile soil, adequate rainfall, and a supportive highland ecosystem suitable for coffee cultivation. In addition to these biophysical advantages, the village possesses strong social capital, characterized by community solidarity, cooperation, and active participation of farmer groups in local economic activities. These social and environmental assets provide a strong foundation for implementing community-based management innovation strategies (Rosin et al., 2022).

Furthermore, Medono Village holds unique potential through the integration of local coffee production, agroforestry landscapes, and agro-tourism opportunities. This combination offers significant opportunities to generate additional economic value through business diversification, strengthening local coffee branding, and promoting community-based eco-tourism. Despite these advantages, several challenges remain, including weak institutional coordination, limited marketing innovation, low digital literacy among farmers, and insufficient collaboration among farmers, local government, academics, and business actors (Sartas et al., 2020; Syuker et al., 2023).

Research on management innovation strategies specifically designed to empower local coffee farmers in Medono Village remains limited, particularly studies integrating institutional, socio-economic, and sustainability perspectives. Such understanding is essential for developing effective and sustainable empowerment models tailored to local characteristics (Napitupulu et al., 2023).

Since Indonesia's independence in 1945, coffee has remained one of the country's most resilient plantation commodities, consistently contributing to rural livelihoods and export earnings despite fluctuations in global commodity prices and shifts toward alternative crops

such as vanilla and cloves. Indonesia remains among the world's largest coffee producers, with national production reaching more than 760 thousand tons in 2024, dominated by smallholder plantations that account for over 95% of total production (International Coffee Organization, 2024; Food and Agriculture Organization, 2024). In Central Java, coffee cultivation has significant potential for local economic development, particularly in the highlands of the Menoreh Mountains. Bener Sub-district, including Medono Village, is recognized as one of the primary coffee-producing areas in Purworejo Regency. The region's altitude, ranging from approximately 600 to 2,200 meters above sea level, favorable rainfall patterns, and fertile volcanic soils create ideal agroecological conditions for robusta coffee cultivation. Coffee from this area has gained increasing recognition for its distinctive flavor profile. It has been promoted as a flagship product of Central Java, with representation at international diplomatic events, reflecting its strategic branding potential (Wigboldus et al., 2021).

Beyond its economic value, coffee cultivation in Medono Village presents strong prospects for coffee-based agroforestry development. Recent studies indicate that agroforestry systems improve biodiversity conservation, enhance soil fertility, reduce erosion risks, and increase household income diversification (Klerkx et al., 2023; Borsellino et al., 2024). However, the sustainability of local coffee farming remains constrained by limited managerial innovation, weak institutional coordination, and insufficient mechanisms for farmer empowerment. These challenges highlight the need for effective management innovation strategies that strengthen local institutional capacity, improve stakeholder collaboration, and promote sustainable coffee agribusiness development. Therefore, this study aims to analyze management innovation strategies for sustainable coffee agroforestry development in Medono Village, Purworejo Regency. Specifically, this study examines socio-cultural and institutional conditions, analyzes community and stakeholder perceptions, and formulates strategic recommendations to support sustainable coffee agroforestry development.

METHODS

This study employed a mixed-method explanatory research design, integrating quantitative and qualitative approaches to analyze management innovation strategies for sustainable coffee agroforestry development in Medono Village. The quantitative component measured farmers' and stakeholders' perceptions of management innovation factors through structured questionnaires, while the qualitative component explored contextual insights through in-depth interviews and field observations. The combination of these approaches enabled both statistical interpretation and contextual understanding of local coffee agribusiness development

challenges. The study was conducted from January to April 2026, focusing on local coffee farming communities, farmer groups, village officials, agricultural extension officers, coffee traders, and related institutional stakeholders.

The study population consisted of: Local coffee farmers in Medono Village, Farmer group administrators, Village government representatives, Agricultural extension officers, Coffee marketing actors, and local agribusiness stakeholders. A purposive proportional sampling technique was used to ensure representation across stakeholder categories. Sample allocation:

Table 1. Sample Allocation

Respondent Category	Population	Sample
Coffee Farmers	185	52
Farmer Group Leaders	15	5
Village Officials	10	4
Extension Officers	8	3
Coffee Traders/Processors	17	5
Community Leaders	10	3
Total	245	72

The sample size was determined using Slovin's formula with a 10% margin of error (Equation 1):

$$n = \frac{N}{1+Ne^2} \dots\dots\dots (1)$$

Where: n = sample size; N = population size; e = margin of error. A Likert scale (1–5) was applied: 1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree

The questionnaire dimensions included: 1. Institutional innovation indicators: strength of farmer group governance, role clarity in organization, decision-making participation, leadership effectiveness, institutional transparency; 2. Production management innovation indicators: adoption of sustainable cultivation techniques, use of post-harvest technology, productivity improvement efforts, resource-efficiency practices, and product quality consistency. 3. Marketing innovation indicators: market information access, branding and packaging innovation, digital marketing adoption, market diversification, and customer relationship development. 4. Stakeholder collaboration indicators: government support intensity, academic partnership involvement, private-sector engagement, access to training programs, and networking effectiveness. 5. Farmer empowerment indicators: knowledge improvement, skill enhancement, economic independence, innovation and adaptability, confidence in business expansion. Validity test, construct validity used Pearson Product-Moment correlation in Equation 2:

$$r_{xy} = \frac{n\sum xy - (\sum x)(\sum y)}{\sqrt{[n\sum x^2 - (\sum x)^2][n\sum y^2 - (\sum y)^2]}} \dots\dots\dots (2)$$

Decision criteria: Valid if $r\text{-count} > r\text{-table}$ (0.232) at $\alpha = 0.05$, Reliability Test. Cronbach's Alpha formula (Equation 3), where criteria: $\alpha \geq 0.70$ is reliable:

$$\alpha = \frac{k}{k-1} \left(1 - \frac{\sum \sigma_i^2}{\sigma_t^2} \right) \dots\dots\dots (3)$$

IPA was used to evaluate strategic priorities. Calculate Mean cores: Importance: $\bar{Y} = \frac{\sum Y_i}{n}$
Performance: $\bar{X}$ = Cartesian Quadrants. Quadrant I: High importance – Low performance (Immediate improvement priority). Quadrant II: High importance – High performance (Maintain achievement). Quadrant III: Low importance – Low performance (Low strategic priority). Quadrant IV: Low importance – High performance (Possible resource over-allocation). SWOT was used to formulate management innovation strategies. Internal Factor Evaluation (IFE): Identify Strengths (strong social capital, coffee quality uniqueness, agroecological suitability) and Weaknesses (limited digital literacy, weak market access, limited managerial capacity). Weights assigned: 0.0–1.0, Ratings assigned: 1–4. External Factor Evaluation (EFE): Opportunities (growing specialty coffee market, agrotourism expansion, government agribusiness support); Threats (climate variability, price instability, competition from established coffee brands). Strategic Position Matrix with coordinates X = Strength- Weakness, Y = Opportunity- Threat. Interpretation: Quadrant I: Aggressive strategy, Quadrant II: Diversification, Quadrant III: Turnaround, Quadrant IV: Defensive strategy. Strategy formulation with four strategic alternatives: SO Strategy: Growth acceleration, WO Strategy: Capacity strengthening, ST Strategy: Market resilience development, WT Strategy: Institutional risk minimization (Mursyidah et al, 2026).

RESULT AND DISCUSSION

Analysis strategy for coffee agroforestry development in Medono Village based on the perceptions of coffee farmers in Purworejo Regency. The analysis of coffee farmers' perceptions of the performance of local coffee farmer management innovations in coffee plantations was conducted by calculating average scores. These results were obtained from the following variables: 1) Superior potential of agroforestry coffee plantations in Medono Village. 2) Residents' approval of agroforestry potential in Medono Village, 3) Condition of coffee agroforestry development facilities, 4) Condition of coffee agroforestry development infrastructure, 5) Cleanliness of coffee agroforestry development facilities, 6) Environmental

conditions of coffee agroforestry development, and 7) Accessibility of coffee agroforestry development in Medono Village (located close and easy to reach). The results of the score weighting in each table are based on the Ordinal scale scoring interval. The analysis strategy for Coffee Farmers' perceptions of the performance of local coffee farmer management innovations in Coffee Plantations in Medono Village is to calculate the average score across the seven variables.

The superior potential of coffee agroforestry development in Medono Village as an indicator of the performance of local coffee farmers' management innovations in the coffee plantations was assessed by respondents, including coffee farmers, government officials, and visitors. This superior potential, according to coffee farmers' perceptions, is shown in Table 2.

Table 2. Coffee Farmers' Perceptions of the Superior Potential of Medono Coffee Agroforestry

The Superior Potential of Coffee Agroforestry Development in Medono Village, Purworejo	Score	Sample Frequency	Percentage (%)	Score Weight
Very Low Agreement	1	0	-	-
Low Agreement	2	0	-	-
Moderate	3	0	-	-
High Agreement	4	0	-	-
Very High Agreement	5	72	100.00	5.00
Total		72	100	5.00

Source: Analysis Results (2026)

Based on Table 2, 100% of respondents strongly agreed that it has excellent potential, as perceived by coffee farmers. The frequency distribution and the weighted score calculation for coffee farmers' perceptions of the superior potential of coffee agroforestry development yielded a total score of 5.00. The scale range on the linear numeric scale falls within the very good category. Interviews with respondents indicated that coffee agroforestry development has great potential for government-led development.

Table 3. Coffee Farmers' Perceptions of Community Approval for the Potential of Coffee Plantation Agroforestry in Medono Village, Purworejo Regency

Residents' Approval for the Potential of Coffee Agroforestry Development	Score	Sample Frequency	Percentage (%)	Score Weight
Very Low Agreement	1	0	-	-
Low Agreement	2	0	-	-
Moderate	3	0	-	-
High Agreement	4	72	100.00	4.00
Very High Agreement	5	0	-	-
Total		72	100	4.00

Source: Analysis Results (2026)

Based on Table 3, the residents' approval of the potential of coffee agroforestry development in Medono Village. Coffee Farmers' Perceptions of the potential of coffee agroforestry development indicate that 100% of respondents agreed with its existence. The distribution and the score calculation of coffee farmers' perceptions yield a total score of 4.00. According to the linear numeric scale, the scale range falls into the good category.

Coffee Farmers' perceptions indicate that the condition of the coffee agroforestry development facilities in Medono Village is uncertain; 40.28% of respondents are concerned. The frequency distribution and the score calculation of coffee farmers' perceptions of the condition of the coffee agroforestry development facilities yield a total weighted score of 2.90. The scale range, according to the linear numerical scale, falls into the fairly good category, as calculated using the numerical scale range in the data analysis method. This concludes that the condition of the agroforestry facilities for the coffee plantation in Medono Village is not yet optimal. This finding is consistent with the study by Wienhold and Goulao (2023), which reported that farmers' perceptions of agroforestry systems are strongly influenced by the availability of supporting facilities, technical assistance, and institutional support, all of which determine the successful adoption and long-term sustainability of agroforestry practices. This is presented in Table 4.

Table 4. Coffee Farmers' Perceptions of the Condition of Coffee Agroforestry Development Facilities

Condition of Agroforestry Facilities for Coffee Plantations	Score	Sample Frequency	Percentage (%)	Score Weight
Very Low Agreement	1	0	-	-
Low Agreement	2	36	50.00	1.00
Moderate	3	7	9.72	0.29
High Agreement	4	29	40.28	1.61
Very High Agreement	5	0	-	-
Total		72	100	2.90

Source: Analysis Results (2026)

Condition of Coffee Agroforestry Development Infrastructure

The condition of the coffee agroforestry development infrastructure is shown in Table 5. Based on the research results, coffee farmers' perceptions of the condition of the coffee agroforestry development infrastructure indicated that 98.61% of respondents agreed that the infrastructure was in good condition. Furthermore, 1.39% of respondents disagreed with the condition of the infrastructure at the coffee agroforestry development site. The frequency distribution and the score calculation for coffee farmers' perceptions of the condition of the coffee agroforestry development infrastructure resulted in a total score of 3.97. According to

the linear numeric scale, the scale range falls within the good category. These findings indicate that the existing infrastructure adequately supports coffee agroforestry activities and reflects farmers' positive perceptions of the production environment. This finding is consistent with Wienhold and Goulao (2023), who reported that adequate infrastructure and institutional support positively influence farmers' perceptions and the sustainability of coffee agroforestry systems. Likewise, Djufry et al. (2022) emphasized that infrastructure plays a key role in supporting the adoption of sustainable coffee-farming practices.

Table 5. Coffee Farmers' Perceptions of the Condition of Coffee Agroforestry Development Infrastructure

Condition of Coffee Agroforestry Development Infrastructure	Score	Sample Frequency	Percentage (%)	Score Weight
Very Low Agreement	1	0	-	-
Low Agreement	2	1	1.39	0.03
Moderate	3	0	-	-
High Agreement	4	71	98.61	3.94
Very High Agreement	5	0	-	-
Total		72	100	3.97

Source: Analysis Results (2026)

Table 6. Coffee Farmers' Perceptions of the Cleanliness of Coffee Agroforestry Development Facilities

Cleanliness of Coffee Agroforestry Development Facilities	Score	Sample Frequency	Percentage (%)	Score Weight
Very Low Agreement	1	0	-	-
Low Agreement	2	29	40.28	0.81
Moderate	3	7	9.72	0.29
High Agreement	4	36	50.00	2.00
Very High Agreement	5	0	-	-
Total		72	100	3.10

Source: Analysis Results (2026)

Coffee Farmers' perceptions of the cleanliness of coffee agroforestry development facilities are shown in Table 6. Regarding the cleanliness of coffee agroforestry development facilities in Medono Village, 50% of respondents agreed that the facilities were very clean. Furthermore, 40.28% of respondents disagreed, and 9.72% were uncertain whether the cleanliness was good. Frequency distribution and score calculation for coffee farmers' perceptions of the cleanliness of coffee agroforestry development facilities yielded a total score of 3.10. According to the linear numeric scale, the scale range falls within the fair category. Field observations revealed many agroforestry sites that were dirty or poorly maintained. These findings indicate that regular maintenance of agroforestry facilities remains necessary to

improve the quality of the farming environment. Similar findings have been reported by Rowe et al. (2022), who emphasized that proper management practices are essential for improving the performance of coffee agroforestry systems, and by Prieto Martinez et al. (2024), who highlighted that good agronomic management, including maintaining plantation conditions, supports the sustainability and productivity of coffee farming.

Table 7. Coffee Farmers' Perceptions of the Environmental Conditions of Coffee Agroforestry Development

Environmental Conditions of Coffee Agroforestry Development	Score	Sample Frequency	Percentage (%)	Score Weight
Very Low Agreement	1	0	-	-
Low Agreement	2	0	-	-
Moderate	3	1	1.39	0.04
High Agreement	4	71	98.61	3.94
Very High Agreement	5	0	-	-
Total		72	100	3.98

Source: Analysis Results (2026)

Coffee Farmers' perceptions of the provision of environmental conditions for coffee agroforestry development are shown in Table 7. 98.61% of respondents agreed that the environmental conditions were very good and well-maintained. In comparison, 1.39% of respondents expressed doubts about the environmental conditions of coffee agroforestry development. The frequency distribution and the calculation of coffee farmers' perception scores regarding the environmental conditions of coffee agroforestry development yielded a total score of 3.98. According to the linear numeric scale, the scale range falls within the good category.

Accessibility of Coffee Agroforestry Development in Medono Village (Located Close and Easily Accessible)

Coffee Farmers' perceptions of the accessibility of coffee agroforestry development (located close and easily accessible) in Table 8 indicate that 58.33% of respondents agreed that agroforestry accessibility was very good, and 41.67% of respondents stated that accessibility was good. The frequency distribution and score calculation for Coffee Farmers' perceptions of the accessibility of coffee agroforestry development (its location is close and easily accessible) yielded a total score of 4.59. According to the linear numeric scale, the scale range falls into the very good category. This is evident because access to the coffee agroforestry development is very good and adequate.

Table 8. Public Perception of the Accessibility of Coffee Agroforestry in Medono Village, Purworejo Regency

Accessibility of the Coffee the coffee agroforestry development (Close and Easy to Reach)	Score	Sample Frequency	Percentage (%)	Score Weight
Very Low Agreement	1	0	-	-
Low Agreement	2	0	-	-
Moderate	3	0	-	-
High Agreement	4	30	41.67	1.67
Very High Agreement	5	42	58.33	2.92
Total		72	100	4.59

Source: Analysis Results (2026)

The performance of local coffee farmers' management innovation in the coffee plantation, as perceived by coffee farmers for each variable in this study, is presented in Table 9. The average score of Coffee Farmers' perceptions regarding the performance indicators of local coffee farmers' management innovation in the coffee plantation is 3.92. The linear numeric scale range falls into the good category. This indicates that the performance of local coffee farmers' management innovation in the coffee plantation remains good. However, serious government intervention is needed to improve the management innovation of local coffee farmers on existing coffee plantations. particularly the condition of agroforestry support facilities. The performance of local coffee farmers' management innovation on a numerical scale is still considered quite good.

According to Pejic-Bach & Dougru (2022), performance measurement can be done by comparing actual performance with expected results. Effectiveness focuses on the organization's goal of providing services, one measure of which is the level of coffee farmer satisfaction. Therefore, if coffee farmers are satisfied or feel that the results of local coffee farmer management innovations on coffee plantations meet their expectations, it means that management is running effectively. Considering the performance results, which most coffee farmers consider quite good, it is concluded that existing facilities and infrastructure need further improvement to improve service, equipment conditions, and cleanliness.

After the perception scores for each indicator were calculated, the overall performance of coffee agroforestry development in Medono Village was summarized. This summary was used to identify which aspects had strong performance and which aspects still required improvement. The performance indicators included superior agroforestry potential, community approval, facility conditions, infrastructure conditions, facility cleanliness, environmental conditions, and accessibility. The average performance scores for each indicator are presented in Table 9.

Table 9. Community Perception of Performance Indicators for Coffee Agroforestry Development in Medono Village

Research Variable	Average Score	Category
The superior potential of coffee plantation agrotourism	5.00	Very Good
Residents' approval of the potential for coffee plantation agrotourism in Medono Village	4.00	Good
Condition of coffee plantation agrotourism facilities	2.90	Neutral
Condition of coffee plantation agrotourism infrastructure	3.97	Good
Cleanliness of coffee plantation agrotourism facilities	3.10	Neutral
Environmental conditions of coffee plantation agrotourism	3.99	Good
Accessibility of the Coffee Plantation Agrotourism (located nearby and easy to reach)	4.48	Very Good
Average	3.92	Good

Source: Analysis Results (2026).

Table 9 shows that the overall average score for coffee agroforestry development performance was 3.92, placing it in the good category. The highest score was found in the superior potential of coffee agroforestry development, indicating that respondents recognized Medono Village as having strong potential for sustainable coffee agroforestry. Accessibility also received a very good score, suggesting that the location is relatively easy to reach and can support future development.

However, the condition and cleanliness of agroforestry facilities received lower scores than other indicators. These findings indicate that although coffee agroforestry development in Medono Village has strong potential, improvements are still needed in supporting facilities, maintenance, cleanliness, and service quality. Therefore, management innovation should focus not only on promoting the potential of coffee agroforestry but also on improving the quality of supporting facilities and environmental management.

IPA: Analysis of the Importance and Performance of Coffee Plantation Agrotourism in Medono Village, Purworejo Regency

Importance–Performance Analysis (IPA) was employed to identify strategic priorities for empowering local coffee farmers in Medono Village by comparing respondents' perceptions of the importance of various management innovation attributes with their actual performance. The IPA approach is widely used in agribusiness and rural development studies because it enables decision-makers to prioritize improvement efforts based on stakeholder expectations and existing performance levels. The average ratings of the strategy's importance and performance were obtained, as shown in Table 10.

Table 10. Calculation of Average Importance and Performance Influence Values
Analysis of Coffee Agroforestry Development Strategy

Research Variables / Indicators	Performance Level Assessment (X)	Importance Assessment (Y)	Compliance Level (%)	Performance Score	Importance Score
The superior potential of coffee agroforestry development	360	301	119.60	5.00	4.18
Residents' approval of the potential for agroforestry coffee plantations in Medono Village	288	289	99.65	4.00	4.01
Condition of facilities Agroforestry coffee plantation	209	288	72.57	2.90	4.00
Infrastructure conditions Agroforestry coffee plantations	286	288	99.31	3.97	4.00
Cleanliness of agroforestry facilities in coffee plantations	223	288	77.43	3.10	4.00
Environmental conditions Agroforestry coffee plantations	287	288	99.65	3.99	4.00
Accessibility of Agroforestry Coffee Plantation (located close by and easy to reach)	330	328	100.61	4.58	4.56
Amount			668.82	27.54	28.75
Grade Average			95.55	3.93	4.11

Source: Data Processing Results (2026)

Table 10 shows the level of respondents to the coffee agroforestry development analysis strategy in Medono Village, with an average suitability of 95.55%. This shows that the hopes and desires of respondents in this case should be paid attention to by the government or developers, especially regarding the condition of coffee agroforestry development facilities, where the level of suitability is the lowest, namely 72.57%; likewise, the cleanliness of coffee agroforestry development facilities in Medono Village must be maintained continuously, where the level of suitability reaches 77.43%. Furthermore, special attention is needed from the government or developers to the condition of coffee agroforestry development infrastructure, where the level of suitability is 99.31%; and also the need for community approval of the potential of coffee agroforestry development in Medono Village and the environmental conditions of coffee agroforestry development in Medono Village, which both reach 99.65%. The average scores for each research variable are shown in Table 10, namely, an average performance score of 3.93 and an average importance score of 4.11.

Based on Table 10, the average performance score of coffee agroforestry development in Medono Village was 3.93, while the average importance score was 4.11. These results indicate that respondents generally perceived coffee agroforestry development as important, but several aspects still require improvement in terms of performance. The lowest performance scores were observed for agroforestry facilities (2.90) and their cleanliness (3.10), indicating that these aspects require greater managerial attention. Meanwhile, accessibility received a very good score, indicating that the coffee agroforestry in Medono Village is relatively easy to reach and can support further development.

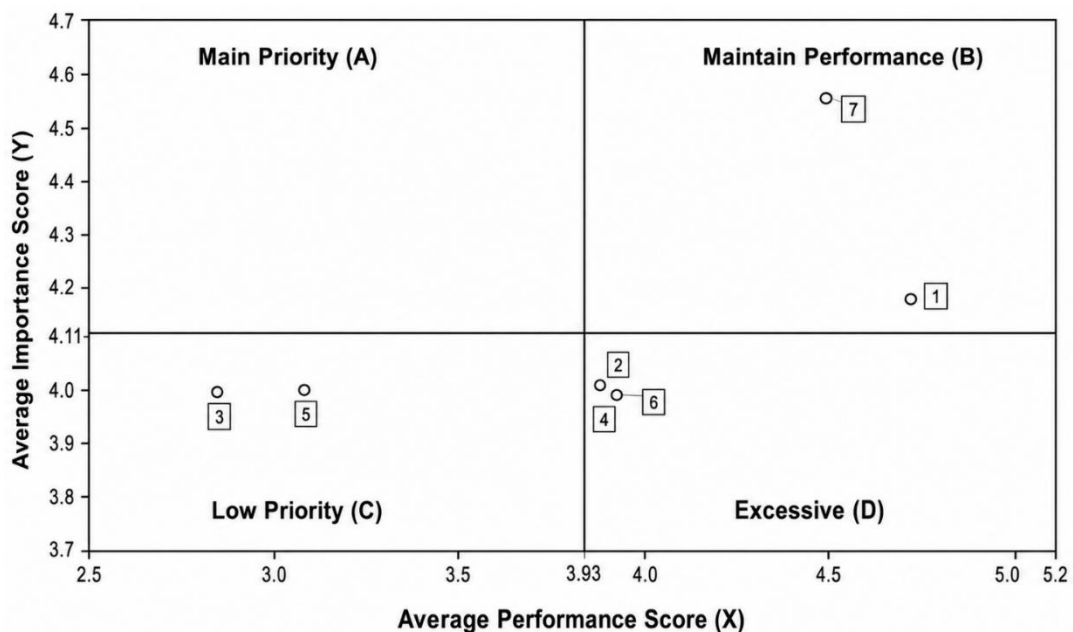


Figure 1. The Importance–Performance Analysis of Coffee Agroforestry Development

The Importance–Performance Analysis (IPA) matrix in Figure 1 was used to identify strategic priorities based on the relationship between importance and performance scores. IPA is commonly applied to evaluate service, management, and development priorities by identifying whether attributes require immediate improvement, maintenance, or gradual monitoring (Martilla & James, 1977). Quadrant A, or Main Priority, contains attributes that are considered important but still require performance improvement. Quadrant B, or Maintain Performance, contains attributes that are considered important and have shown good performance; therefore, they should be maintained. Quadrant C, or Low Priority, contains attributes with relatively lower importance and performance, while Quadrant D, or Excessive, indicates attributes whose performance is relatively high but whose importance is lower than that of other attributes.

The IPA results show that no attribute was located in Quadrant A, indicating that there were no attributes with high importance and low performance requiring immediate priority intervention. The superior potential of coffee agroforestry development and accessibility was located in Quadrant B, indicating that these attributes were considered important and performed relatively well. Therefore, they should be maintained as strategic strengths for sustainable coffee agroforestry development in Medono Village. This finding is consistent with studies showing that accessibility, local resource potential, and farmer support are important factors in strengthening the adoption and sustainability of coffee agroforestry systems (Wienhold & Goulao, 2023; Ulya et al., 2023).

Meanwhile, the condition and cleanliness of agroforestry facilities were located in Quadrant C. Although these attributes were not classified as immediate priorities based on the IPA quadrant, their relatively low performance scores indicate that gradual improvement is still needed. Facility improvement, cleanliness management, and environmental maintenance are important because sustainable coffee agroforestry depends not only on production potential but also on proper landscape management, farmer participation, and the ability to maintain ecological and economic functions over time (Garibaldi et al., 2024; Ulya et al., 2023).

Overall, the IPA results suggest that sustainable coffee agroforestry development in Medono Village should maintain its main strengths, particularly superior agroforestry potential and accessibility, while gradually improving facility conditions, cleanliness, infrastructure, community participation, and environmental management.

SWOT Analysis: Internal and External Environment of Agroforestry

SWOT analysis was used to identify the internal and external factors influencing sustainable coffee agroforestry development in Medono Village. The internal environment includes strengths and weaknesses related to management, production and operations, human resources, promotion, and facilities and infrastructure. Meanwhile, the external environment includes opportunities and threats related to technology, competition, socio-cultural conditions, climate variability, and market dynamics. In coffee agroforestry systems, these factors are closely related to farmer adoption, institutional support, landscape management, and farmers' capacity to adapt to environmental and market changes (Wienhold & Goulao, 2023; Garibaldi et al., 2024). Therefore, a SWOT analysis was used to formulate management innovation strategies to strengthen local resources, improve institutional coordination, and support sustainable coffee agroforestry development.

The SWOT analysis was conducted by classifying field findings, interview results, and respondent perceptions into internal and external strategic factors. Strengths were defined as internal factors that support coffee agroforestry development, while weaknesses were internal limitations that may hinder its implementation. Opportunities were external conditions that could support future development, whereas threats were external risks that may reduce sustainability and competitiveness. The results of the internal and external environmental analysis are discussed in the following sections.

Internal Environment Analysis

The internal environment of the coffee plantations in Medono Village is everything within the coffee plantation that influences the coffee plantation agribusiness. Management. In every organization, including corporations, good management is necessary to achieve the company's desired goals. States that social goals are factors related to the company's functional activities, including management, human resources, finance, production, marketing, and organization. Organizational structure is the arrangement and relationships among departments and positions within a company. Organizational structure explains the division of work activities and, to some extent, the relationships between functions and activities (Popescu & Vasile, 2015).

Production and Operations. Before the establishment of this agroforestry area, coffee plantations were the primary source of raw materials for market coffee production. The wet processing method is commonly called West Indies Bereiding (WIB), while the dry processing method is commonly called O.I.B (Ost Indies Bereiding). The main difference between the two methods is that in the dry method. The pulp, husk, and skin are removed after drying (coffee pods), while the wet method removes the pulp while the pods are still fresh from the plantation.

Over time, coffee plantations began to diversify, not only into coffee production but also into agroforestry to increase income.

Human Resources. Human resource planning involves systematically estimating the organization's future workforce demand and requirements to allocate labor more accurately. Planning is carried out annually by creating a concept that includes estimates of the number of workers, materials, and budget required. Several factors are considered in workforce planning, including: 1) Organizational. Coffee farmers consider internal factors, including the available budget, coffee production volume, and business expansion. The larger the coffee harvest. The greater the need for labor, but this, of course, depends on the available budget. 2) Labor Supply. The labor supply on coffee plantations is not always stable. Some workers leave or change professions. Coffee farmers also consider this when planning their human resources. 3) External Environmental Conditions. External environmental conditions, such as technological advances and population conditions. are also considered in human resource planning.

Promotion. The agroforestry coffee plantation in Medono Village is a tourist attraction offering various tour packages, including educational tours that introduce visitors to the various coffee plants. The Cup Test Package introduces the taste of coffee from the plantation, from export-grade to local-grade. The Coffee Walk Tour Package introduces the various types of coffee plants in Indonesia and provides a firsthand look at the production process.

Facilities and Infrastructure. To support smooth operations. The coffee plantation provides various facilities for visitors. These include its own plantation for educational purposes, a garden area, and gazebos for rest. The coffee plantation is currently continuing to develop its facilities and attractions, as well as improving existing facilities.

External Environment of Agroforestry

Technological Factors. Current technological developments are very modern, spanning information technology, transportation, and other fields. These developments will be very beneficial for coffee farmers in developing coffee plantation tourism, both in terms of promotional systems and the technology used. Currently, the agroforestry coffee plantation in Medono Village still uses simple technology, but new technologies are still needed to attract consumer interest.

Competitors. Tourist attractions near coffee plantations include Tondok Lake and Moat Lake. These attractions offer unique features. Competition includes some that offer strawberry plantation services and various types of horticulture, as well as attractive locations with cool natural surroundings and a variety of processed products.

Socio-Cultural. The agrotourism trend has gained popularity among coffee farmers in recent years, with many embracing agroforestry as an alternative destination for environmentally based nature tourism, where they can avoid buildings and worsening air pollution in urban areas. Here, coffee farmers can enjoy the fresh air and natural rural atmosphere. The beautiful view is a special attraction for foreign coffee farmers.

Internal Environmental Analysis

The internal environmental analysis of the agroforestry coffee plantation in Medono Village covers several important aspects, namely management, production and operations, human resources, promotion, and facilities and infrastructure. From a management perspective, the main strength lies in the implementation of field activities aligned with assigned tasks. However, the agroforestry coffee plantation in Medono Village does not yet have a formal organizational structure or a clear division of tasks supported by a well-defined organizational system. This condition also affects the planning process, which remains a weakness: the agroforestry has both short- and long-term plans, but the goals and targets to be achieved are still not clearly defined. This is mainly due to the absence of a formalized vision and mission that can serve as the main reference for managing the agroforestry coffee plantation.

In terms of production and operations, one of the main strengths of the agroforestry coffee plantation is its ability to produce export-quality Robusta coffee with a distinctive flavor, which also serves as a tourist attraction. The production of export-quality coffee is a unique attraction for visitors, who can enjoy tasting it and comparing it with other varieties. Nevertheless, this aspect also has a weakness: coffee is a seasonal crop and does not produce year-round. Since the agroforestry program relies on coffee plants as its main attraction, educational tourism activities are constrained when the plants are not producing coffee cherries, as visitors cannot directly experience coffee harvesting or picking on the plantation.

From a human resources perspective, the agroforestry coffee plantation benefits from the easy availability of labor due to its proximity to surrounding residential areas. Local coffee farmers have the potential to work in the plantation because they possess basic farming skills and experience relevant to coffee cultivation. However, the weakness in this aspect is the lack of experts or specialized personnel. Although labor needs are met by employing residents, some workers have limited experience with innovative management practices in local coffee farming and have relatively low levels of education, making them unlikely to meet the qualifications expected of expert or specialized staff.

In terms of promotion, the agroforestry coffee plantation has shown strength through various efforts to attract consumers. Coffee farmers have carried out promotional activities by

distributing brochures, conducting face-to-face meetings with local coffee farmers, and using online media to promote their products. Despite these efforts, the introduction and promotion of agroforestry remain suboptimal. The promotional activities have not been fully effective due to unattractive product packaging and the limited ability of the promotion team to introduce the South Lake Moat Coffee agroforestry development to the wider public. This is partly due to a lack of prior guidance, leading to ineffective consumer targeting. In addition, the promotion team has not yet conducted outreach to relevant agencies or institutions regarding the agroforestry program.

Facilities and infrastructure also represent an important component of the internal environment. A key strength of the South Lake Moat Coffee agroforestry development is the availability of supporting facilities, including rest areas in the form of gazebos that offer a variety of food products derived from the surrounding coffee farmers' gardens. However, this aspect still faces several weaknesses because the facilities and infrastructure are not yet optimal. Although the agroforestry area already provides various supporting facilities, its physical condition requires significant improvement. For example, the collection garden still needs further maintenance to become more attractive, and several existing facilities are not yet functioning properly. Similar findings were reported by Ulya et al. (2023), who highlighted that strengthening institutional management, stakeholder collaboration, and capacity building are essential for improving the sustainability of coffee agroforestry systems in Indonesia.

External Environmental Analysis

The external environmental analysis highlights technological factors, competitors, and socio-cultural conditions as the main elements influencing the development of agroforestry coffee plantations in Medono Village. In terms of technology, the development of new technologies in coffee production presents an important opportunity. Government support in providing modern coffee-processing technology is needed to improve and expand existing coffee production. On the other hand, a major threat lies in the continued use of outdated, simple technology in coffee production and cup testing. Some of the machines used are still inherited from the Dutch colonial era. They are prone to malfunctions or breakdowns, which hamper the coffee cup testing process and limit production efficiency.

From the competitor's perspective, the limited number of competitors in the agroforestry coffee plantation sector can be seen as an opportunity for further development. The agroforestry coffee plantation business in the South Lake Moat area has not yet developed optimally, leaving considerable room for growth if supported by greater government attention and intervention. However, competition also poses a threat, especially with the emergence of newly established

agroforestry businesses offering more attractive vegetable and fruit plantings in better-developed environments. These competitors have introduced more innovations and have created a more appealing agroforestry experience, which may reduce the competitiveness of coffee-based agrotourism in the South Lake Moat area.

Socio-cultural factors also provide both opportunities and threats for agroforestry development. One important opportunity is the growing trend of nature-based tourism, which makes agroforestry increasingly attractive, especially for urban coffee farmers and visitors seeking recreation, refreshment, and educational experiences not available in urban areas. In addition, the compatibility of agroforestry with the traditions of surrounding coffee farmers creates expansion opportunities, particularly by engaging local communities. However, socio-cultural and environmental threats remain significant. Unpredictable climate and weather conditions pose serious challenges to agroforestry activities, as climate uncertainty caused by global warming, deforestation, and landslides directly affects coffee production. Heavy rainfall and strong winds can cause coffee flowers to fall prematurely, thereby reducing yields. Another threat is the still-limited involvement of local coffee farmers in agroforestry development. Many local coffee farmers continue to view the coffee plantation solely as a private production area rather than as a tourism-based agroforestry destination, thereby limiting broader community participation in agroforestry development. These findings are consistent with Garibaldi et al. (2024), who emphasized that sustainable coffee agroforestry depends on farmers' ability to adapt to environmental and market changes.

Overall, the SWOT analysis indicates that coffee agroforestry development in Medono Village has strong internal potential and favorable external opportunities. The main strengths include agroecological suitability, distinctive coffee quality, community participation, local labor availability, and the potential integration of coffee production with agroforestry-based activities. These strengths are important because coffee agroforestry can provide not only economic benefits but also socio-cultural and ecosystem service benefits for smallholder farmers (Tilden et al., 2024). In addition, agroforestry development in Central Java has been shown to provide social, economic, and environmental benefits when supported by technology, social capital, and farmer participation (Prabawani et al., 2024).

However, several weaknesses and threats remain, particularly weak organizational structure, limited managerial capacity, inadequate facilities, limited promotion, outdated technology, climate variability, and competition from other agroforestry or tourism destinations. Climate variability is especially important because smallholder coffee farmers are highly exposed to climate-related risks, while agroforestry is widely recognized as one of the

major adaptation strategies in coffee farming systems (Kishaija et al., 2025). Therefore, management innovation should not only focus on expanding agroforestry activities but also on strengthening institutional capacity, improving facilities, enhancing farmer participation, and increasing adaptive capacity to environmental and market changes.

Based on these findings, the strategic direction for sustainable coffee agroforestry development in Medono Village should emphasize leveraging internal strengths to capture external opportunities while gradually addressing weaknesses and threats. This supports a growth-oriented strategy through institutional strengthening, facility improvement, product quality enhancement, market development, and stakeholder collaboration. Therefore, management innovation should focus on strengthening farmer organizations, improving coffee-based agroforestry facilities, expanding promotional activities, developing local coffee branding, and increasing collaboration among farmer groups, village government, extension officers, universities, and private-sector actors.

CONCLUSION

This study aimed to analyze management innovation strategies for sustainable coffee agroforestry development in Medono Village, Purworejo Regency. The findings show that Medono Village has considerable potential for coffee agroforestry development, supported by favorable agroecological conditions, strong social capital, local coffee production, community participation, and positive stakeholder perceptions. These conditions provide an important foundation for developing coffee agroforestry as a sustainable rural agribusiness model that integrates production, environmental management, local economic development, and community-based participation.

The Importance–Performance Analysis (IPA) results indicate that coffee agroforestry development in Medono Village is generally perceived as important by respondents, but several aspects still require improvement. The lowest performance scores were observed in the conditions of agroforestry facilities and their cleanliness, indicating that these aspects should be priority areas for management improvement. Meanwhile, accessibility received a very good score, showing that the location of coffee agroforestry in Medono Village is relatively easy to reach and can be maintained as a strategic advantage for future development.

The SWOT analysis shows that coffee agroforestry development in Medono Village has strong internal potential and favorable external opportunities. The main strengths include agroecological suitability, distinctive coffee quality, community participation, local labor availability, and the potential integration of coffee production with agroforestry-based

activities. However, several weaknesses and threats remain, including weak organizational structure, limited managerial capacity, inadequate facilities, limited promotion, outdated technology, climate variability, and competition from other agroforestry or tourism destinations. Therefore, the strategic direction should emphasize a growth-oriented approach, leveraging internal strengths to capture external opportunities while gradually addressing weaknesses and threats.

The practical implication of this study is that sustainable coffee agroforestry development in Medono Village should prioritize improvements in supporting facilities, cleanliness management, institutional strengthening, local coffee branding, promotional activities, and stakeholder collaboration. Local government, farmer groups, extension officers, universities, and private-sector actors should work together to improve infrastructure, strengthen farmer organization governance, enhance product quality, and develop coffee-based agroforestry activities that support ecological and economic sustainability.

This study contributes to the agribusiness and rural development literature by demonstrating that management innovation can serve as a strategic approach to support sustainable coffee agroforestry development. The integration of IPA and SWOT provides a useful framework for identifying improvement areas for improvement and formulating context-specific strategies. Future studies are recommended to include more detailed financial feasibility analyses, market analyses, and institutional performance assessments to strengthen the implementation model for sustainable coffee agroforestry development in rural areas.

Author Contribution

Isna Windani contributed to the conceptualization of the study, the design of the methodology, data collection, data curation, and the preparation of the original manuscript draft. Dyah Panuntun Utami conducted formal data analysis, validated the results, and contributed to manuscript revision and figure and table visualization. Istiko Agus Wicaksono developed the literature review and theoretical framework, provided academic supervision, and contributed to the critical revision of the manuscript. Uswatun Hasanah coordinated the research project, supervised the research process, finalized the manuscript, and handled correspondence with the journal. All authors reviewed and approved the final version of the manuscript and agreed to be accountable for the accuracy and integrity of the work.

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