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Behavioral change and socio-economic impact from charcoal producers to eco-friendly coffee farmers in Jatiarjo Village, Prigen, Pasuruan, Indonesia

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ABSTRACT

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Keyword

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Introduction: The transition from traditional charcoal production to sustainable coffee farming in Jatiarjo Village, Prigen, Pasuruan, Indonesia, highlights a critical effort to achieve environmental sustainability and improve socio-economic conditions. This study explores behavioral changes and socio-economic impacts while integrating eco-friendly agricultural practices, providing a model for similar transformations globally. **Methods:** A mixed-methods approach was used, combining quantitative data from local economic reports with qualitative insights from interviews and focus group discussions with farmers and stakeholders. SWOT analysis (using IFAS and EFAS frameworks) was employed to identify key strengths, weaknesses, opportunities, and threats shaping the transition. **Results:** Findings indicate that Jatiarjo Village benefits from internal strengths, such as fertile land, traditional agricultural knowledge, and strategic partnerships. These are complemented by external opportunities, including global demand for sustainable coffee and supportive government policies. Quantitative analysis shows significant increases in household income and biodiversity, while qualitative data highlight enhanced community resilience and environmental stewardship. However, barriers like inadequate infrastructure, dependence on external funding, and climate risks persist. Literature supports these findings, emphasizing the importance of community engagement, institutional support, and capacity building in achieving sustainable rural development. **Conclusion:** Jatiarjo Village's transition showcases how rural communities can align environmental and economic goals through eco-friendly coffee farming. By addressing socio-economic challenges and leveraging community strengths, this initiative provides actionable insights for scaling sustainable agricultural practices globally. Future research should focus on quantifying long-term socio-economic impacts and exploring adaptive strategies to mitigate climate and market risks.

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INTRODUCTION

Jatiarjo Village, located in the Prigen Subdistrict, Pasuruan, Indonesia, is nestled at the foot of Mount Arjuno, known for its serene natural landscape and cool climate. The village is primarily inhabited by Madurese and Javanese ethnic groups, with most residents practicing Islam. Economically, the community relies heavily on the surrounding natural resources, especially the forest, for their livelihoods. Limited land ownership and constrained agricultural opportunities present significant economic challenges for the predominantly agricultural population. This reliance on agriculture for sustenance, coupled with restricted land access, has hindered economic development, exacerbated by the slow pace of socio-economic growth in rural areas (Nurkomala, 2018; Mirajiani, 2022).

Historically, charcoal production has served as one of the primary economic activities in Jatiarjo. This activity, however, has had substantial environmental consequences, including deforestation and air quality degradation, which disrupt the ecological balance of the surrounding forest. The process of charcoal production involves extensive logging, diminishing the forest's capacity to act as a carbon sink and exacerbating greenhouse gas emissions. Additionally, deforestation reduces the forest's ability to store water during the rainy season, increasing the risk of landslides and floods. With environmental degradation contributing directly to adverse climate impacts, forest-dependent communities face intensified vulnerability (Ujiandri *et al.*, 2023).

In response to these environmental and economic pressures, Jatiarjo has begun transitioning from charcoal production to sustainable coffee farming. This shift is driven by a desire for more stable and ecologically viable income sources, along with a growing demand for sustainable coffee in global markets. Eco-friendly coffee farming not only offers economic potential for the village but also supports conservation efforts essential for maintaining the

environmental resilience of the forest (Arai *et al.*, 2023). This initiative is anticipated to provide the community with a sustainable economic base while fostering environmental stewardship, thus aligning economic objectives with ecological preservation.

The environmental issues stemming from charcoal production in Jatiarjo are complex and far-reaching. Deforestation resulting from logging disrupts the forest ecosystem and contributes to biodiversity loss, while the burning process releases pollutants that degrade air quality, impacting both environmental and public health (Hido *et al.*, 2023; Sedano *et al.*, 2020). This environmental strain, coupled with socio-economic challenges such as income instability, poverty, and limited access to education and healthcare, has created significant obstacles for the local community. The charcoal-dependent economy has left residents exposed to market fluctuations and environmental degradation, which perpetuates socio-economic hardship (Nurkomala, 2018).

The urgent need for sustainable solutions in Jatiarjo is underscored by the impact of these interlinked environmental and socio-economic challenges. Sustainable coffee farming presents a viable alternative, offering opportunities to stabilize local incomes and protect natural resources. By shifting to eco-friendly agriculture, the community aims to reduce reliance on environmentally harmful practices and cultivate economic resilience. Sustainable coffee farming, therefore, serves as a promising avenue for environmental and economic sustainability, enabling the community to harness natural resources without compromising ecological integrity (Kour *et al.*, 2020; Yadav *et al.*, 2020).

Previous studies have highlighted the potential benefits of transitioning to sustainable agricultural practices in rural communities, emphasizing the important role of nature conservation in improving economic well-being and environmental sustainability. Wibisono *et al.* (2020) highlighted that conservation through coffee cultivation can not only increase biodiversity but also provide more stable and sustainable income opportunities for rural communities. This is due to the ability of coffee plants to grow on environmentally friendly land, as well as their ability to adapt to various existing climate conditions, thus strengthening local food security and the economy. In this context, the transition to sustainable coffee farming can serve as a bridge between the economic needs of communities and nature conservation efforts.

Furthermore, Rodić & Wilson (2017) research revealed that the shift towards environmentally friendly sustainable economic practices requires strong institutional support, from the government, non-governmental organizations, and financial institutions. In addition, capacity building among community members is an important key to ensuring the successful implementation of sustainable agricultural practices. Approaches involving training, skills development, and extension on environmentally friendly agricultural techniques can help improve farmers' understanding of the importance of wiser natural resource management. Thus, this transition will not only improve economic welfare but also actively involve the community in preserving the environment, creating a balance between economic benefits and natural resource conservation.

Based on the research that has been conducted, there is still a research gap in comprehensively understanding the transition process from environmentally damaging charcoal production activities to sustainable, environmentally friendly coffee farming in Jatiarjo Village. Although previous studies have highlighted the environmental impacts of deforestation and the economic benefits of coffee farming, this study broadens the scope by exploring changes in community behavior, local community involvement, and capacity-building strategies that have not been discussed in depth. In addition, there are not many studies that integrate community-based SWOT analysis with quantitative and qualitative data to evaluate socio-economic transformation and its impact on environmental sustainability. Therefore, this study seeks to fill this gap by offering a holistic approach that can be a model for other communities facing similar challenges.

Building on the above, this study aims to evaluate the behavioral changes and socio-economic impacts resulting from Jatiarjo's shift from charcoal production to sustainable coffee farming. By examining this transition, the research seeks to provide insights into a model of sustainable agricultural transformation that not only enhances economic well-being but also prioritizes environmental conservation.

METHODS

Research type

This study employs a SWOT analysis approach, integrating IFAS (Internal Factor Analysis Summary) and EFAS (External Factor Analysis Summary), to evaluate the behavioral changes and socio-economic impacts associated with the livelihood shift in Jatiarjo, from charcoal production to eco-friendly coffee farming (Khatri *et al.*, 2023; Yadav *et al.*, 2020). The SWOT analysis framework, which consists of identifying Strengths, Weaknesses, Opportunities, and Threats, was selected to map internal and external factors affecting this transition and to develop strategies that promote economic and environmental sustainability in the village.

Data collection

Primary data were collected through in-depth interviews with coffee farmers, former charcoal producers, and local stakeholders. Focus group discussions were conducted to explore community perceptions of this transition, including challenges faced and expectations regarding sustainable coffee cultivation. Field observations provided firsthand insights into the socio-economic and environmental context of the village. Secondary data included local economic reports, government policies, and documents from the Forest Village Community Institution (Lembaga Masyarakat Desa Hutan, LMDH), which supports coffee farming initiatives in Jatiarjo.

SWOT analysis process with IFAS and EFAS

In the context of Pasuruan Regency, especially in Jatiarjo Village, Prigen District, the transition from charcoal production to coffee cultivation has become a focal point. This study aims to explore the socio-economic management strategies of this transition, focusing on how new agricultural practices can provide better economic benefits while maintaining environmental sustainability. Such a transition poses complex challenges, including natural resource management, increasing farmer income, and environmental sustainability. Therefore, this study adopts a holistic approach using the SWOT (Strengths, Weaknesses, Opportunities, Threats) method to analyze and plan strategic actions that accommodate economic growth and ecological preservation in Jatiarjo.

In the analysis, the IFAS (Internal Factor Analysis Summary) framework is used to assess internal strengths (S) and weaknesses (W) that affect the transition process (Tumuyu, 2023). Strengths include the village's internal resources, such as natural assets conducive to coffee farming, and the community's generational agricultural knowledge. Conversely, Weaknesses encompass limitations in coffee processing and distribution infrastructure and a high dependency on external funding, which could impact the community's resilience in sustaining coffee farming without continual support. These internal factors are quantified and rated within the IFAS to provide a comprehensive summary of internal conditions.

The EFAS (External Factor Analysis Summary) framework is applied to evaluate external factors, comprising Opportunities (O) and Threats (T) (Tumuyu, 2023). Opportunities include rising market demand for sustainable coffee products, supportive government policies, and the potential for developing conservation-based eco-tourism. However, Threats such as climate change, global coffee price fluctuations, and potential social resistance to adopting new agricultural practices are also evaluated. By scoring and weighting these factors, the EFAS analysis provides a structured summary of external conditions impacting the community's transition (Nzunda & Manyanda, 2023; Poscher & San, 2022).

Data analysis

The collected qualitative data were analyzed using thematic analysis to identify behavioral patterns and community perceptions that support or inhibit the transition. Quantitative survey data were also analyzed to measure the prevalence of these perceptions and identify challenges encountered throughout the process. The combined results of the SWOT, IFAS, and EFAS analyses were synthesized to formulate strategies that enhance community capacity, improve income, and ensure environmental sustainability through eco-friendly coffee farming practices.

RESULT AND DISCUSSION

Jatiarjo transition to eco-friendly coffee farming

Jatiarjo Village, located in the Prigen Subdistrict, Pasuruan Regency, East Java, Indonesia, provides a compelling example of how a community can transition from exploitative natural resource use to sustainable and environmentally friendly practices. This transformation is vividly illustrated through the development of, an initiative that not only promotes tourism but also environmental conservation.

Kampung Kopi Arjuno offers a unique educational platform for the cultivation and production processes of local robusta coffee, which grows on the slopes of Mount Arjuno. Visitors are involved in everything from the picking to the processing of coffee, culminating in tasting sessions that introduce them to the unique flavor profile of this coffee. This experience not only heightens environmental awareness but also helps preserve local traditions.

Additionally, Jatiarjo promotes natural tourism through attractions like *Jendela Langit*, *Puthuk Elang*, jeep tracks, and camping grounds, utilizing the village's natural beauty to support ecological sustainability and conservation efforts. The infrastructure in the village is designed to support tourism, with amenities including parking areas, ATMs, cafeterias, and Wi-Fi, ensuring visitors can enjoy their experience seamlessly. This shows the village's effort in integrating modern conveniences with traditional experiences.

Jatiarjo's inclusion in the top 300 of the *Anugerah Desa Wisata Indonesia* (ADWI) in 2024 is a testament to the ongoing efforts to develop sustainable and inclusive tourism (Kemenparekraf, 2024). This recognition reflects not only

the success in creating an appealing destination but also in strengthening the local economy and empowering the community.

The journey towards sustainability faced challenges, starting with the local economy's dependence on deforestation, which caused environmental degradation. A significant change occurred in 2010 with coffee cultivation training, and by 2013, villagers began producing coffee. This initiative led to the establishment of Kampung Kopi in 2016, helping to reverse the negative effects of previous practices and improve residents' quality of life.

Another ecological challenge involves forest fires in the Mount Arjuno and Welirang areas, often linked to local charcoal production activities. These fires threaten the forest's existence, the lives of its flora and fauna, and the quality of life of surrounding communities, highlighting the need for more effective and responsible forest management strategies.

The steps taken by the Jatiarjo community exemplify how sustainable and inclusive approaches to natural resource management can positively transform a community's economic and environmental conditions. With proper education, training, and support, responsible and sustainable economic practices can be developed, offering valuable lessons for other regions in Indonesia in the discourse on sustainable tourism (Zakaria, 2024).

Results of SWOT analysis with IFAS and EFAS

Internal Factor Analysis Summary (IFAS) is a strategic management tool used to evaluate the internal environment by identifying its strengths (S) and weaknesses (W). This analysis helps to understand their internal capabilities and limitations, which is essential for strategic planning and decision making. By conducting an IFAS, companies can develop strategies that capitalize on their strengths and address their weaknesses, leading to improved performance and a stronger competitive position in the market.

External Factor Analysis Summary (EFAS) is a strategic management tool used to assess the external environment by identifying opportunities (O) and threats (T). This analysis helps organizations understand the external factors that may impact their operations, enabling them to capitalize on emerging opportunities and mitigate potential threats. By conducting an EFAS, companies can develop strategies that leverage favorable external conditions and protect against risks, ultimately positioning themselves for long-term success in a competitive market.

Strengths (S)

Jatiarjo Village possesses robust natural resources which are exceptionally conducive to coffee cultivation. The fertile soil and suitable climate of the forest areas around Sapen, Kelurahan Ledug, and their vicinities, foster the growth of high-quality coffee. Many coffee farmers in the area inherit profound knowledge and traditional practices in coffee cultivation, refined over generations. These include seed selection, planting techniques, and effective soil management (Wibisono *et al.*, 2020; Zhumronie, 2018).

Further bolstering these strengths are conservation programs and infrastructural developments, such as the creation of endemic plant laboratories and local bird breeding enclosures, which enhance both the quality of coffee and the sustainability of practices. Strategic partnerships and funding, particularly with PT. Tirta Investama Pandaan, provides essential financial and logistical support, facilitating effective community empowerment and conservation initiatives (Wibisono *et al.*, 2017). These efforts are complemented by substantial infrastructure development in water conservation and educational facilities, such as biopores and reservoirs, which aid in soil and water conservation in forested areas.

Weaknesses (W)

Despite these strengths, several weaknesses persist. Basic infrastructure for processing and distributing coffee around the plantations remains inadequate, hindering the efficiency of transporting and marketing the coffee products. There is limited access to modern agricultural technology, which could enhance productivity and efficiency, despite the deep-rooted traditional knowledge (Nugroho & Hermanto, 2023).

The development programs are highly dependent on external funding from PT. Tirta Investama poses sustainability risks if these funds dwindle or cease without finding alternative sources (Wibisono *et al.*, 2022). Additionally, the existing infrastructure still limits access to broader markets and adequate processing facilities, affecting the farmers' ability to fully capitalize on the coffee's potential. This dependency on a single funding source and limited market access highlights significant vulnerabilities in sustaining long-term growth and empowerment.

Table 1 summarizes the internal strengths and weaknesses of Jatiarjo Village that influence the transition from charcoal production to sustainable coffee farming. Key strengths include strategic partnerships and CSR funding with a score of 0.72, inherited agricultural knowledge with a score of 0.64, and strong community empowerment with a score of 0.56. These factors support sustainable growth and village resilience. Strategic partnerships and CSR funding provide the financial support and resources needed to develop environmentally friendly coffee farming practices. Inherited agricultural knowledge allows the community to utilize traditional techniques that have proven effective,

while strong community empowerment ensures active participation and collaboration at every stage of the transition. With a total strength score of 3.87, Jatiarjo Village has a solid foundation to make this transition, which is expected to improve the economic and environmental well-being of the local community.

Weaknesses primarily involve limitations in infrastructure and technology, such as a lack of processing and distribution facilities (score: 0.30) and dependency on a single funding source (score: 0.30). These weaknesses, with a subtotal score of 2.18, reveal challenges that could hinder scalability and market reach.

The combined IFAS score of 6.05 suggests that Jatiarjo Village's internal conditions are favorable overall, though infrastructure and funding dependencies must be addressed to optimize the sustainability of eco-friendly coffee farming.

Opportunities (O)

The global market's growing preference for sustainable products presents a valuable opportunity for Jatiarjo's coffee farmers to position their coffee as a premium, environmentally friendly product. This trend not only aligns with consumer demands for sustainable practices but also opens avenues for higher economic returns.

Governmental and non-governmental support programs offer training, resources, and financial assistance, enhancing farmers' abilities to adopt more productive and sustainable practices. The potential for developing the area into a conservation education destination offers an alternative income stream through the development of infrastructure like laboratories and breeding enclosures.

Moreover, the integration of ecotourism and environmental education facilities such as biopores and water reservoirs can further promote conservation-based tourism. This not only boosts local income but also educates the public about sustainability. Enhanced coffee production quality through conservation programs could also open access to lucrative local and international premium coffee markets.

Diversification through ecotourism, leveraging facilities like biodiversity parks, enhances farmer incomes by attracting tourists and researchers interested in conservation and biodiversity education. The development of agroforestry products, combining coffee plants with other species, offers economic resilience and ecological benefits, improving farmers' sustainability (Nugroho *et al.*, 2019a).

Threats (T)

Climate change can affect rainfall patterns and increase temperatures, which impacts coffee yields and quality, as coffee is highly dependent on stable weather conditions (Legesse, 2019). Additionally, fluctuations in the global coffee market lead to unstable incomes for farmers, making long-term planning difficult. This uncertainty is further exacerbated by changes in international coffee prices, which are influenced by climate, trade policies, and consumer demand (Oko-Isu *et al.*, 2019). Therefore, effective adaptation and mitigation strategies are needed to help coffee farmers face these challenges and ensure the sustainability of coffee production in the future.

Natural disasters such as landslides and floods can damage infrastructure and disrupt coffee production and conservation, negatively impacting farmers' incomes (Ruiz-Meza, 2015). In addition, land degradation and decreased soil fertility can reduce crop yields (Hossain *et al.*, 2020). On the other hand, social resistance to changes in traditional practices can slow the adoption of innovations needed to cope with climate change and natural disasters (Heidenreich *et al.*, 2015). Therefore, it is important to involve local communities in the planning and implementation of adaptation programs, as well as provide adequate education and support to facilitate effective adoption of new practices.

Legal and policy uncertainties related to land use and conservation may affect the sustainability of these projects, creating unpredictability for coffee farmers. Global economic uncertainties, such as those brought by pandemics, impede economic activities, distribution, and social interactions essential for coffee production continuity.

Finally, limited access to modern agricultural technology and market information can leave farmers at a competitive disadvantage, impacting productivity and innovation. Environmental degradation and resource depletion could diminish agricultural productivity, threatening the long-term sustainability of coffee farming (Nugroho, *et al.*, 2019b).

The table 2 outlines the external factors impacting Jatiarjo Village's transition to eco-friendly coffee farming, highlighting significant Opportunities and Threats. Among the Opportunities, key factors include training and resource support (score: 0.56), strong potential for ecotourism development (score: 0.48), and infrastructure supporting ecotourism and agroforestry (scores: 0.48 each). The total score for opportunities is 4.93, indicating substantial external support for economic growth and sustainable agricultural practices.

Climate change, extreme weather (score: 0.30), market price fluctuations (score: 0.24), social resistance to change (score: 0.36), and uncertainties in law and policy (score: 0.30) pose threats to coffee farming, with a subtotal threat score of 2.21. Despite these challenges, Jatiarjo Village benefits from a favorable external environment (EFAS score:

7.14), offering opportunities for sustainable market growth and ecotourism. However, proactive strategies are needed to address climate and market risks for the long-term success of eco-friendly coffee farming.

Table 1. Internal-strategic factor analysis summary (IFAS)

Internal strategic factors (Strengths)	Weight	Rating	Score (Weight x Rating)
Supporting natural resources	0.08	6	0.48
Heritage of local traditions and knowledge	0.08	8	0.64
Conservation and infrastructure programs	0.07	5	0.35
Strategic partnerships and funding with csr	0.09	8	0.72
Increased land cover and biodiversity	0.07	6	0.42
Development of conservation infrastructure	0.07	4	0.28
Technical support and education	0.07	6	0.42
Community empowerment	0.08	7	0.56
Sub total strengths	0.61		3.87
Internal strategic factors (weaknesses)			
Lack of processing and distribution infrastructure	0.06	5	0.30
Limited access to modern agricultural technology	0.06	4	0.24
Limitations in basic infrastructure	0.04	5	0.20
Limited market access	0.06	6	0.36
Dependency on a single funding source	0.05	6	0.30
Limitations in processing and marketing infrastructure	0.04	4	0.16
Dependency on external support	0.03	4	0.12
Lack of infrastructure to support ecotourism	0.06	5	0.30
Limitations in infrastructure and technology	0.04	5	0.20
Sub total weaknesses	0.39		2.18
Total strengths and weaknesses	1		6.05

Table 2. External-strategic factor analysis summary (EFAS)

External strategic factors (Opportunities)	Weight	Rating	Score (Weight x Rating)
Global market for sustainable products	0.06	6	0.36
Training and resource support	0.07	8	0.56
Development of conservation education tourism	0.05	5	0.25
Ecotourism and environmental education	0.05	8	0.40
Access to premium markets	0.04	6	0.24
Economic diversification through ecotourism	0.06	4	0.24
Penetration of premium markets	0.05	6	0.30
Potential for ecotourism development	0.05	7	0.35
Access to broader markets	0.05	6	0.30
Infrastructure and opportunities for ecotourism	0.06	8	0.48
Environmental awareness and education	0.05	5	0.25
Development of agroforestry products	0.06	8	0.48
Collaboration and community empowerment	0.06	7	0.42
Sub total opportunities	0.71		4.93
External strategic factors (threats)			
Climate change and extreme weather patterns	0.04	5	0.30
Coffee market price fluctuations	0.03	4	0.24
Unexpected natural disasters	0.04	5	0.20
Social resistance to change	0.05	6	0.36
Uncertainty in law and government policy	0.04	6	0.30
Pandemics and global economic uncertainty	0.03	4	0.12
Limited access to technology and information	0.04	6	0.24
Environmental degradation and resource depletion	0.03	5	0.25
Competition with other agricultural commodities	0.04	5	0.20
Sub total threats	0.29		2.21
Total opportunities and threats	1		7.14

IFAS and EFAS quadrant matrix

Based on the scores obtained from the tables above, the total IFAS score is 6.05, and the total EFAS score is 7.14. These scores can be plotted on the following IFAS and EFAS Quadrant Matrix:

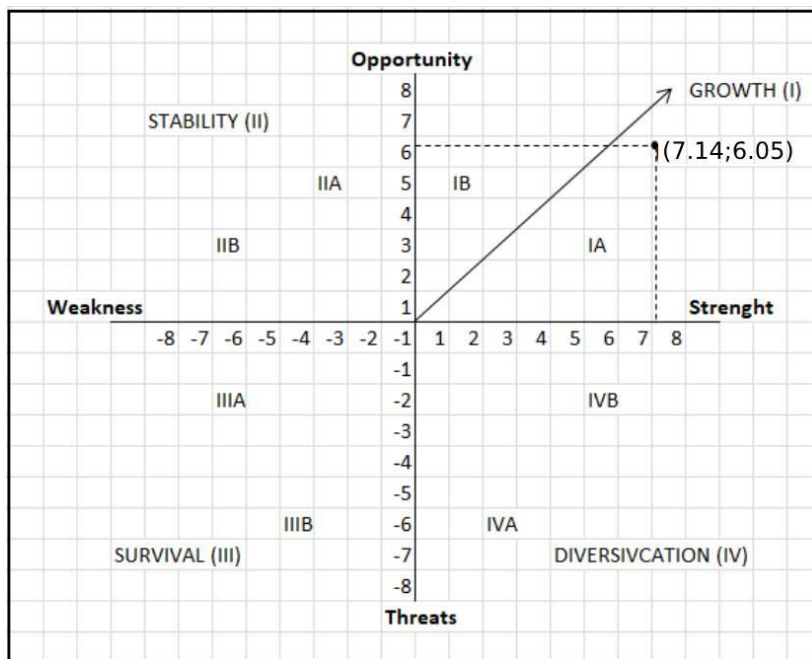


Figure 1. IFAS and EFAS quadrant matrix

The IFAS and EFAS quadrant matrices are strategic analysis tools used to evaluate internal and external factors affecting an organization or community (Figure 1). The horizontal axis represents internal factors, with strengths on the right side and weaknesses on the left side. The vertical axis represents external factors, with opportunities at the top and threats at the bottom. The combination of these factors produces four strategic quadrants, indicating potential strategic directions: Growth, Stability, Survival, and Diversification. In the figure, the strategic coordinates (7.14; 6.05) are in Quadrant I (Growth).

This position indicates that the organization or community is in an ideal situation to focus on growth by utilizing internal strengths and available external opportunities. Strategies that can be taken include business expansion, new product development, technology enhancement, and increased cooperation networks to achieve greater results. Under these conditions, continuous development efforts and innovation are the key to success in maintaining positive and stable growth.

Table 3. IFAS and EFAS quadrant matrix

Quadrant	IFAS (internal factors)	EFAS (external factors)
IA	High strengths	High opportunities
IB	High strengths	Low threats
IIA	Low weaknesses	High opportunities
IIB	Low weaknesses	Low threats

In this matrix:

- ✓ Quadrant IA is where both strengths and opportunities are high.
- ✓ Quadrant IB is where strengths are high and threats are low.
- ✓ Quadrant IIA is where weaknesses are low and opportunities are high.
- ✓ Quadrant IIB is where both weaknesses and threats are low.

Given the scores:

- ✓ IFAS score of 6.05 indicates that Jatiarjo Village has a robust internal strength.
- ✓ EFAS score of 7.14 suggests that the external environment provides significant opportunities.

Given the scores, the IFAS score of 6.05 reflects Jatiarjo Village’s substantial internal strengths, including strong natural resources, agricultural knowledge, and community empowerment, which collectively support the transition to eco-friendly coffee farming. The EFAS score of 7.14 highlights a favorable external environment with ample opportunities, such as market demand for sustainable products, support for ecotourism, and access to premium markets (Table 3). According to Selvan *et al.* (2023), leveraging internal capabilities and responding to external opportunities are key factors in the sustainable agricultural transition.

As a result, Jatiarjo Village is positioned in Quadrant IA of the IFAS and EFAS Quadrant Matrix. This positioning indicates that the village is in an advantageous situation to leverage its internal strengths to capitalize on external opportunities. The high scores in both internal strengths and external opportunities suggest that Jatiarjo Village

should pursue aggressive growth strategies and proactive initiatives to enhance its development in sustainable coffee farming. This strategic direction will make the most of the current favorable conditions by focusing on expanding market reach, enhancing production capabilities, and further developing eco-tourism and conservation education initiatives (Zhuang *et al.*, 2011).

Based on the presentation of the data above, the integration of qualitative and quantitative findings in this study provides a comprehensive understanding of Jatiarjo Village's transition to eco-friendly coffee farming. Insights from qualitative interviews and observations highlight the community's adaptive strategies and traditional knowledge, while quantitative data from surveys and economic reports offer measurable evidence of the socio-economic benefits and environmental improvements (Le *et al.*, 2021). Qualitative data depicting farmers' experiences and challenges are supported by quantitative data showing increased income and biodiversity. This approach validates behavioral changes and socio-economic impacts, offering a strong framework for strategic planning and policy development (Contreras-Medina *et al.*, 2024). This combination of methods demonstrates how local initiatives can address sustainability challenges, providing valuable lessons for other communities aiming to transition to sustainable agricultural practices.

CONCLUSION

The transformation in Jatiarjo Village from charcoal production to eco-friendly coffee farming marks a significant socio-economic and environmental shift. By leveraging strong internal resources, such as traditional agricultural knowledge and fertile land, alongside external opportunities like global demand for sustainable products and supportive government initiatives, the community has demonstrated its resilience and adaptability. This study highlights the importance of integrating local knowledge and strategic partnerships in achieving sustainable rural transformation. It contributes to the literature by providing a case study on the application of SWOT analysis in agricultural transitions, offering insights into the dynamics of behavioral change and socio-economic impact

REFERENCES

- Arai, Y., Hundera, K., & Yoshikura, T. (2023). Challenges in conserving forest ecosystems through coffee certification: a case study from southwestern Ethiopia. *Frontiers in Environmental Science*, *11*, 1193242. <https://doi.org/10.3389/fenvs.2023.1193242>
- Contreras-Medina, D. I., Contreras-Medina, L. M., & Cerroblanco-Vázquez, V. (2024). Sustainable Agriculture Management: Environmental, Economic and Social Conjunctures for Coffee Sector in Guerrero, via Traditional Knowledge Management. *Sustainability*, *16*(16), 6864. <https://doi.org/10.3390/su16166864>
- Heidenreich, S., & Kraemer, T. (2016). Inovasi—ditakdirkan untuk gagal? Menyelidiki strategi untuk mengatasi resistensi inovasi pasif. *Jurnal Manajemen Inovasi Produk*, *33*(3), 277-297. Hido, A., Teka, A., & Alemayehu, A. (2023a). Analysis of charcoal producers' perceptions of its production, forest degradation, and governance in Wolaita, Southern Ethiopia's dry Afromontane forests. *International Journal of Forestry Research*, *2023*(1), 3352702. <https://doi.org/10.1155/2023/3352702>
- Hido, A., Teka, A., & Alemayehu, A. (2023a). Analysis of charcoal producers' perceptions of its production, forest degradation, and governance in Wolaita, Southern Ethiopia's dry Afromontane forests. *International Journal of Forestry Research*, *2023*(1), 3352702. <https://doi.org/10.1155/2023/3352702>
- Hossain, A., Krupnik, T. J., Timsina, J., Mahboob, M. G., Chaki, A. K., Farooq, M., ... & Hasanuzzaman, M. (2020). Agricultural land degradation: processes and problems undermining future food security. In *Environment, climate, plant and vegetation growth* (pp. 17-61). Cham: Springer International Publishing.
- Kemendagri. (2024). *Desa wisata Jatiarjo*. Jejaring Desa Wisata: Kementerian Pariwisata Dan Ekonomi Kreatif. <https://jadesta.kemendagri.go.id/desa/jatiarjo>
- Khatri, S., Bhusal, T. N., Kafle, S., Kafle, A., Joshi, Y. R., & Pandey, K. R. (2023). Value chain analysis of arabica coffee (*Coffea arabica L.*) in Arghakhanchi district of Nepal. *Cogent Food & Agriculture*, *9*(1), 2247173. <https://doi.org/10.1080/23311932.2023.2247173>
- Kour, D., Rana, K. L., Yadav, A. N., Yadav, N., Kumar, M., Kumar, V., Vyas, P., Dhaliwal, H. S., & Saxena, A. K. (2020). Microbial biofertilizers: Bioresources and eco-friendly technologies for agricultural and environmental sustainability. *Biocatalysis and Agricultural Biotechnology*, *23*, 101487. <https://doi.org/10.1016/j.bcab.2019.101487>
- Le, Q. V., Cowal, S., Jovanovic, G., & Le, D. T. (2021). A study of regenerative farming practices and sustainable coffee of ethnic minorities farmers in the central highlands of Vietnam. *Frontiers in Sustainable Food Systems*, *5*, 712733. <https://doi.org/10.3389/fsufs.2021.712733>
- Lee, C., Lee, K., & Pennings, J. M. (2001). Internal capabilities, external networks, and performance: a study on technology-based ventures. *Strategic management journal*, *22*(6-7), 615-640. <https://doi.org/10.1002/smj.181>

- Legesse, A. (2019). Climate change effect on coffee yield and quality: A Review. *International Journal of Forestry and Horticulture (IJFH)*, 5, 1-9. <http://dx.doi.org/10.20431/2454-9487.0504001>
- Mirajiani, M. (2022). Farmers' rationality and skill preparedness to answer the challenges of industrial revolution 4.0 towards society 5.0: a case study in Serang. *Komunitas*, 14(2), 193-206. <https://doi.org/10.15294/komunitas.v14i2.35801>
- Tumuyu, S. S., & Marthalia, L. (2023). Strategy on circular economy transition: A case study of agrocompany in Indonesia. *Journal of Infrastructure, Policy and Development*, 8(1), 3021. <https://doi.org/10.24294/jipd.v8i1.3021>
- Nugroho, M., & Hermanto, Y. B. (2023). Community empowerment participation in forest revegetation: An analysis study on the slope communities of Mount Arjuna, Indonesia. *Soeropati: Journal of Community Service*, 6(1), 4225. <https://doi.org/10.35891/js.v6i1.4225>
- Nugroho, M., Riniwati, H., & Afandhi, A. (2019a). Model of community empowerment of springs preservation in Arjuna mountains. *IOP Conference Series: Earth and Environmental Science*, 239(1), 12044. <https://doi.org/10.1088/1755-1315/239/1/012044>
- Nugroho, M., Soemarno, S., Riniwati, H., & Afandhi, A. (2019b). Forest revegetation to preventive springs degradation in Arjuna Mount, East Java, Indonesia. <https://doi.org/10.20944/preprints201908.0277.v1>
- Nurkomala, S. A. (2018). *Dampak industrialisasi pabrik terhadap masyarakat Desa Mekarsari Kecamatan Cicurug Kabupaten Sukabumi (Studi kasus PT. Aqua Golden Mississippi Mekarsari)* [Undergraduate thesis, FITK UIN Syarif Hidayatullah Jakarta].
- Nzunda, E. F., & Manyanda, B. J. (2023). A SWOT analysis of community-based forest management policy as a basis for REDD+ in Tanzania. *GSC Advanced Research and Reviews*, 15(3), 22–27. <https://doi.org/10.30574/gscarr.2023.15.3.0157>
- Oko-Isu, A., Chukwu, A. U., Ofoegbu, G. N., Igberi, C. O., Ololo, K. O., Agbanike, T. F., ... & Iyaniwura, A. A. (2019). Coffee output reaction to climate change and commodity price volatility: The Nigeria experience. *Sustainability*, 11(13), 3503. <https://doi.org/10.3390/su11133503>
- Poscher, B., & San, S. M. (2022). Forest cover dynamics and community forest management in the Himalayan and dry zone region of Myanmar: A SWOT analysis. In *Handbook of Himalayan ecosystems and sustainability, Volume 1* (pp. 317–340). CRC Press.
- Rodić, L., & Wilson, D. C. (2017). Resolving governance issues to achieve priority sustainable development goals related to solid waste management in developing countries. *Sustainability*, 9(3), 1-18. <https://doi.org/10.3390/su9030404>
- Ruiz-Meza, L. E. (2015). Adaptive capacity of small-scale coffee farmers to climate change impacts in the Soconusco region of Chiapas, Mexico. *Climate and Development*, 7(2), 100-109. <https://doi.org/10.1080/17565529.2014.900472>
- Sedano, F., Lisboa, S., Duncanson, L., Ribeiro, N., Siteo, A., Sahajpal, R., Hurtt, G., & Tucker, C. (2020). Monitoring intra- and inter-annual dynamics of forest degradation from charcoal production in Southern Africa with Sentinel-2 imagery. *International Journal of Applied Earth Observation and Geoinformation*, 92, 102184. <https://doi.org/10.1016/j.jag.2020.102184>
- Selvan, T., Panmei, L., Murasing, K. K., Guleria, V., Ramesh, K. R., Bhardwaj, D. R., ... & Deshmukh, H. K. (2023). Circular economy in agriculture: unleashing the potential of integrated organic farming for food security and sustainable development. *Frontiers in Sustainable Food Systems*, 7, 1170380. <https://doi.org/10.3389/fsufs.2023.1170380>
- Ujiandri, L., Selvia, S. I., & Rachmadi, A. (2023). Desiminasi rehabilitasi hutan dan lahan secara vegetatif dalam upaya konservasi tanah di Desa Rembitan Kecamatan Pujut Kabupaten Lombok Tengah. *Jurnal SIAR Ilmuwan Tani*, 4(1), 131–135. <https://doi.org/10.29303/jsit.v4i1.100>
- Wibisono, M., Aji, F. R., Fathurrohman, A., & Nugroho, E. D. (2022). The assistance of Pesanggem in the Prevention of Coffee Pests through Vegetable Pesticides Coffee from Amethyst Mountain (*Brugmansia Suaveolens* Bercht. & J. Presl) at Taman Kehati Sapen Nusantara Mount Arjuno Pasuruan. *Soeropati: Journal of Community Service*, 4(2), 171-179. <https://doi.org/10.35891/js.v4i2.3422>
- Wibisono, M., Aji, F. R., Yusuf, D., Kasiman, & Fathurrohman, A. (2017). Ngeramut Wareh Sapen: Implementasi program konservasi dan keanekaragaman hayati. *Engagement: Jurnal Pengabdian Masyarakat*, 1(1), 111–124. <https://doi.org/10.52166/engagement.v1i1.10>
- Wibisono, M., Santoso, B., Aji, F. R., Yusuf, D., & Rudianto, S. (2020). Pendampingan komunitas petani kopi di Desa Jatiarjo Kecamatan Prigen Kabupaten Pasuruan. *Soeropati: Journal of Community Service*, 3(1), 58-65. <https://doi.org/10.35891/js.v3i1.2717>
- Yadav, A. N., Mishra, S., Kour, D., Yadav, N., & Kumar, A. (Eds.). (2020). *Agriculturally important fungi for sustainable agriculture* (Vol. 1). Cham: Springer.
- Zakaria, J. (2024). Sustainable tourism as an economic development model in evaluation and prospects of priority tourism destination development policy in Indonesia. *Jurnal Manajemen Pelayanan Publik*, 8(2), 474–489. <https://doi.org/10.24198/jmpp.v8i2.54183>

- Zhuang, H., Lassoie, J. P., & Wolf, S. A. (2011). Ecotourism development in China: prospects for expanded roles for non-governmental organisations. *Journal of Ecotourism*, 10(1), 46-63. <https://doi.org/10.1080/14724041003686813>
- Zhumronie, A. R. (2018). *Pemberdayaan masyarakat petani menggunakan pendekatan appreciative inquiry di Desa Jatiarjo Kecamatan Prigen Kabupaten Pasuruan (Studi pada program pendidikan agrobisnis desa inovatif komunitas Averroes)* [Thesis]. Malang: Universitas Brawijaya.