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Analysis of Agrotourism Potential as an Alternative Economic Development in Kawinda To'i, Tambora

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Abstract
Agrotourism is increasingly recognized as a strategic approach to fostering rural economic growth, particularly in areas endowed with strong ecological and social potential. This study aims to analyze the potential of agrotourism as an alternative rural economic development strategy in Kawinda To'i, Tambora, by evaluating internal and external factors and formulating appropriate development strategies. A descriptive quantitative method was employed, using purposive sampling, with 30 respondents. Data were collected through questionnaires, observations, and interviews, and analyzed using the Internal Factor Evaluation (IFE) and External Factor Evaluation (EFE) matrices. The results show that the IFE score of 2.27 and the EFE score of 2.34 place Kawinda To'i in Quadrant V of the IE Matrix, indicating a Grow-and-Build strategy. These findings suggest that ecological strengths and market opportunities outweigh existing weaknesses and threats, highlighting agrotourism's potential as a driver of village-level economic development. Scientifically, this study demonstrates that the IFE–EFE analytical framework is an effective and applicable tool for assessing the readiness and strategic direction of locally-based agrotourism development, thereby contributing to the methodological enrichment of rural tourism planning studies in developing regionS.

Keywords: agrotourism; rural economy; Tambora; Kawinda To'i; sustainable development

INTRODUCTION

Agriculture plays a crucial role in maintaining food security and the welfare of rural communities in Indonesia; however, agricultural modernization based on external inputs has increased ecological pressure and reduced the efficiency of production systems. As the demand for sustainable food systems continues to grow, various environmentally friendly approaches have been developed to balance productivity and sustainability. Global trends also indicate that agrarian villages have significant potential to create alternative economic sectors by leveraging local ecological and cultural resources for educational and nature-based tourism activities (Benedek et al., 2023; Vermila & Jamalludin, 2023).

The integrated agroecosystem approach is considered a model that can improve energy efficiency while maximizing the use of local resources by integrating crops, livestock, and other agricultural components. This system not only strengthens production resilience but also creates opportunities for community livelihood diversification, including agrotourism that combines agricultural activities with environmentally based educational attractions (Kurniati et al., 2025). Agrotourism development is particularly relevant for rural areas as it can increase economic value, extend the agricultural value chain, and provide tourism experiences aligned with ecological sustainability (Salsabila et al., 2019).

Despite diverse natural resources and agricultural commodities, many agrarian villages face challenges, including limited tourism infrastructure, low managerial capacity, and the absence of village-level institutions focused on agrotourism development. This condition is also evident in Kawinda To'i Village, which, despite possessing fertile volcanic soils, leading agricultural commodities, and a strategic position as a gateway to Mount Tambora National Park, has not yet optimally utilized these advantages. This situation highlights a gap between existing potential and actual utilization, underscoring the need for a systematic analysis of internal and external factors to formulate appropriate agrotourism development strategies, which constitutes the novelty of this study (Sawerah, 2022).

The urgency of this research lies in the need for strategic planning based on local potential to ensure that agrotourism development in Kawinda To'i can enhance community economic welfare without compromising ecological sustainability. Furthermore, a comprehensive analysis is required to ensure that strengthening the agrotourism sector addresses challenges related to human resource capacity, infrastructure, and the evolving dynamics of the nature-based tourism market. Therefore, this study aims to analyze agrotourism potential using the IFE, EFE, and SWOT approaches to generate development

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strategies that are effective, adaptive, and contextually appropriate for village conditions.

MATERIALS AND METHODS

Time and location

This study was conducted from May to October 2025 in Kawinda To'i Village, Tambora Subdistrict, Bima Regency, West Nusa Tenggara, Indonesia. The study site was purposively selected for its volcanic agroecosystem characteristics, the diversity of local agricultural commodities, and its direct access to the Mount Tambora conservation area, all of which are highly relevant to agrotourism development. Field activities included observing agricultural landscapes, identifying tourism potential, and verifying socioeconomic data for communities.

Research design

This research employed a descriptive quantitative design supported by qualitative analysis. The descriptive approach was used to empirically depict the potential of agrotourism, internal and external conditions, and community characteristics. Qualitative data were obtained through in-depth interviews and field observations to strengthen the interpretation of quantitative findings. According to Sugiyono (2021), a mixed descriptive approach is practical for objectively understanding social phenomena while providing contextual explanations. Potential analysis was conducted using the Internal Factor Evaluation (IFE) and External Factor Evaluation (EFE) matrices, and development strategies were formulated through SWOT analysis, following standard strategic analysis frameworks (Rangkuti, 2017).

Population and sampling

The study population comprised farmers, livestock breeders, residents, tourism stakeholders, and practitioners in Kawinda To'i Village. Samples were selected using purposive sampling, targeting respondents directly involved in or knowledgeable about agrotourism development. Purposive sampling is commonly used in social research that requires informants aligned with specific research objectives (Creswell, 2018). The sample consisted of 25 farmers, 10 livestock breeders, and five key informants, including village government officials, community leaders, agricultural extension officers, and tourism managers. The research variables included: (1) internal potential of the area (commodities, land, human resources, and cultural assets), (2) external factors (opportunities and threats), and (3) community readiness for agrotourism development.

Data were collected through structured questionnaires, semi-structured interviews, field observations, and documentation. The instruments used included observation sheets, Likert-scale questionnaire instruments, GPS devices, digital cameras, and standard field stationery.

Research procedures

*Preparation Stage***.** The preparation stage included problem identification, literature review, instrument development, and coordination with the village government.

Data Collection and Analysis Stage. Data collection in this study employed Likert-scale questionnaires, observation sheets, GPS devices, and digital cameras to document field conditions. This approach follows observational instrument frameworks commonly used in agroecosystem and rural area studies, as recommended by Ghazali et al. (2018), and is particularly relevant to agrotourism research (Sawerah, 2022). The collected data were analyzed using the IFE–EFE matrices by calculating weights, ratings, and total scores, adopting quantitative evaluation approaches widely used in integrated agricultural strategy studies (Kurniati et al., 2025).

Subsequently, the results of internal and external factor assessments were used to formulate a SWOT analysis, yielding SO, WO, ST, and WT strategies, as commonly applied in local resource-based agrotourism development studies (Budiasa, 2015; Suwarsito, 2022). Data processing was conducted using Microsoft Excel software for score calculations and IBM SPSS Statistics for reliability testing using Cronbach's Alpha. At the same time, the visualization of relationships among strategic factors was conducted using XMind. Data validation was carried out through interview triangulation and field verification of findings, in line with agroecosystem system analysis approaches that emphasize data consistency and accuracy (Thao et al., 2020; Guzmán & Molina, 2015).

Data Analysis

The analysis of internal and external factors was conducted using the Internal Factor Evaluation (IFE) and External Factor Evaluation (EFE) matrices. Each factor was assigned a weight and a rating, and the total score was calculated using the following formula:

$$\text{Total Score} = \sum(Weight_i \times Rating_i)$$

This quantitative weighting-based approach is consistent with strategic evaluation methods applied in studies on integrated agricultural systems and regional sustainability (Kurniati et al., 2025). The calculation process was performed in Microsoft Excel, while data consistency and questionnaire reliability were assessed using IBM SPSS Statistics, specifically through Cronbach's Alpha reliability analysis. The use of statistical software is recommended in agroecosystem and energy-efficiency research, as demonstrated by Guzmán and Molina (2015).

The IFE–EFE scores were subsequently mapped into the SWOT matrix to identify the relationships among strengths, weaknesses, opportunities, and threats. SWOT analysis provides a foundation for formulating SO, WO, ST, and WT strategies in accordance with strategic research frameworks applied in rural tourism and agrotourism development (Budiasa, 2015; Suwarsito, 2022). Strategy

formulation was conducted using a matching approach and visualized in Microsoft Excel and XMind to map the relationships among agrotourism development variables systematically. This integrative approach is consistent with the concept of rural economic diversification through agrotourism, as described by Sawerah (2022).

Instrument validation was conducted through reliability testing using Cronbach's Alpha with the assistance of SPSS to ensure the consistency of respondents' answers. In addition, triangulation was applied through in-depth interviews with key informants and verification of findings using field data. This triangulative approach aligns with standard practices in rural and agroecosystem research to strengthen data credibility (Thao et al., 2020; Suwarsito, 2022).

Quantitative data were analyzed using the IFE and EFE matrices to determine the total scores of internal and external factors. Each factor was assigned a weight (0.0–1.0), a rating (1–4), and a total score following calculation methods widely applied in strategic tourism and regional development studies (Rangkuti, 2017). The resulting IFE–EFE scores were subsequently mapped into a strategic matrix to determine the area's position and the direction of development recommendations.

SWOT analysis was employed to formulate development strategies by integrating strengths (S), weaknesses (W), opportunities (O), and threats (T). Qualitative data from interviews were analyzed using thematic analysis techniques to interpret community perspectives, expectations, and actual constraints encountered.Validasi instrumen dilakukan melalui uji reliabilitas menggunakan Cronbach's Alpha dengan bantuan SPSS untuk memastikan konsistensi jawaban responden. Selain itu, triangulasi dilakukan melalui wawancara mendalam dengan informan kunci dan verifikasi temuan menggunakan data lapangan. Pendekatan triangulatif ini sesuai dengan praktik umum penelitian pedesaan dan sistem agroekosistem untuk memperkuat kredibilitas data (Thao et al., 2020; Suwarsito, 2022). All data were then synthesized to generate priority strategies for agrotourism development based on local potential.

RESULT AND DISCUSSION

Result

Internal Agrotourism Potential of Kawinda To'i (IFE Analysis)

The results of the IFE matrix analysis indicate considerable variation between the strengths and weaknesses of agrotourism potential in Kawinda To'i Village. The factors with the highest scores were the availability of fertile agricultural land and the natural and historical attractiveness of Mount Tambora, which obtained scores of 0.40 and 0.36, respectively. These values highlight the dominance of ecological strengths as the fundamental capital for agrotourism development.

In contrast, the lowest scores were associated with the absence of a formal village tourism institution and low human resource capacity, at 0.14 and 0.16, respectively. These results indicate that institutional aspects and management quality remain the primary constraints. The disparity in scores suggests that although the village possesses superior natural resources, managerial readiness, and institutional support, these have not yet been optimized to develop agrotourism sustainably.

Overall, the internal factor analysis demonstrates that Kawinda To'i has strong potential for agrotourism development. Several aspects were identified as having strategic weight, including the availability of extensive agricultural land, the fertility of volcanic soils, the diversity of local commodities such as maize, coffee, and forest honey, and strong socio-cultural support from the local community. The results of the IFE matrix calculation are presented in Table 1.

Table 1. Internal Factor Evaluation (IFE) Matrix of Kawinda To'i

Internal Factors	Weight	Rating	Score
Availability of fertile agricultural land	0.10	4	0.40
Diversity of local commodities	0.08	4	0.32
Socio-cultural support	0.07	3	0.21
Natural and historical attractiveness of Mount Tambora	0.09	4	0.36
Collaboration with Mount Tambora National Park Authority (BTNT)	0.06	3	0.18
Limited tourism infrastructure	0.09	2	0.18
Low human resource capacity	0.08	2	0.16
Limited tourism promotion	0.08	2	0.16
Absence of a village tourism institution	0.07	2	0.14
Limited spatial and socio-economic data	0.08	2	0.16
Total	1.00	–	2.27

The IFE results yielded a total score of 2.27, indicating that internal strengths remain dominant, although structural weaknesses still need to be addressed. Overall, the IFE analysis suggests that Kawinda To'i possesses considerable internal strengths that are not yet matched by adequate institutional readiness and infrastructure support. The implications of these findings highlight the need to prioritize interventions focused on human resource capacity building, the establishment of a tourism-oriented village-owned enterprise (BUMDes), and

the development of digital promotion platforms before implementing agrotourism development strategies comprehensively. Accordingly, the IFE results serve as a preliminary foundation for formulating SO and WO strategies in the subsequent SWOT analysis stage.

Opportunities and Threats in Agrotourism Development (EFE Analysis)

The results of the EFE analysis indicate that external factors provide substantial opportunities for the development of agrotourism in Kawinda To'i Village. The highest scores were associated with government policy support and the growing trend of nature-based and educational tourism, which recorded scores of 0.40 and 0.36, respectively. These high-scoring factors suggest that both market demand and policy direction strongly support the development of agriculture-based tourism villages.

In contrast, the lowest-scoring threats were the risk of crop failure and the impacts of climate change, each scoring 0.14, indicating that environmental uncertainty remains a constraint that must be anticipated. The variation in these scores demonstrates that although external opportunities are relatively strong, ecological challenges may hinder sustainability if they are not adequately integrated into agrotourism development strategies.

External factors were analyzed using the EFE matrix, encompassing government policy support, post-pandemic trends in educational tourism, the regional tourist market, and threats such as competition among tourism destinations in West Nusa Tenggara and climate change risks.

Table 2. External Factor Evaluation (EFE) Matrix of Kawinda To'i

External Factors	Weight	Rating	Score
Government policy support	0.10	4	0.40
Nature-based and educational tourism trends	0.09	4	0.36
Regional tourist market	0.08	3	0.24
Agriculture–tourism integration	0.08	4	0.32
Potential support from CSR programs/NGOs	0.08	3	0.24
Competition among tourism destinations in West Nusa Tenggara	0.08	2	0.16
Risk of crop failure	0.07	2	0.14
Impacts of climate change	0.07	2	0.14
Low digital literacy	0.07	2	0.14
Environmental degradation	0.08	2	0.16
Total	1.00	–	2.34

The total EFE score of 2.34 indicates that government policy support and the growing trend in nature-based tourism are significant drivers of agrotourism development in Kawinda To'i Village. The high scores of these factors reflect the alignment between village development directions and post-pandemic tourism market demand, which, according to Vermila and Jamalludin (2023), has shown increasing interest in educational tourism and outdoor nature-based activities. The integration of agriculture and tourism also received a relatively high score, indicating strong potential for implementing agrotourism models, as demonstrated by Comolli et al. (2025), who found that integrative agroforestry systems simultaneously provide economic and conservation benefits. From a theoretical perspective, these findings reinforce the concept of sustainable tourism village development based on natural and social potential.

The most significant external threats stem from crop failure and climate change, both of which received low scores, highlighting ecological vulnerabilities that may disrupt the continuity of tourism activities. This condition is consistent with the findings of Thao et al. (2020), who emphasized that agricultural regions with high dependence on climate conditions require risk-mitigation systems to maintain economic stability. Regional tourism destination competition also presents a notable challenge, particularly because many tourism villages in West Nusa Tenggara already possess stronger branding. Compared with the study by Chairunnisa et al. (2024), villages that successfully developed agrotourism benefited from strong support for digital literacy, whereas Kawinda To'i still recorded low scores on this factor. This suggests that despite substantial opportunities, the village's readiness to respond to the dynamics of the digital tourism market remains limited.

Overall, the EFE analysis indicates that external opportunities for agrotourism development in Kawinda To'i outweigh the existing threats. However, comparisons with previous studies suggest that the village needs to enhance its adaptive capacity to climate change and improve digital literacy to compete with other tourism destinations. The implications of these findings underscore the importance of opportunity-based strategies, including strengthening collaboration with government institutions, capitalizing on nature-based tourism trends, and integrating ecological risk mitigation into tourism product development. In addition, improving the digitalization of tourism promotion is a strategic step toward expanding the tourist market.

Strategic Position of Kawinda To'i in the SWOT Matrix

The integration of the IFE and EFE results positions Kawinda To'i in the S–O strategy quadrant (growth-oriented strategy), which emphasizes leveraging internal strengths to capitalize on external opportunities.

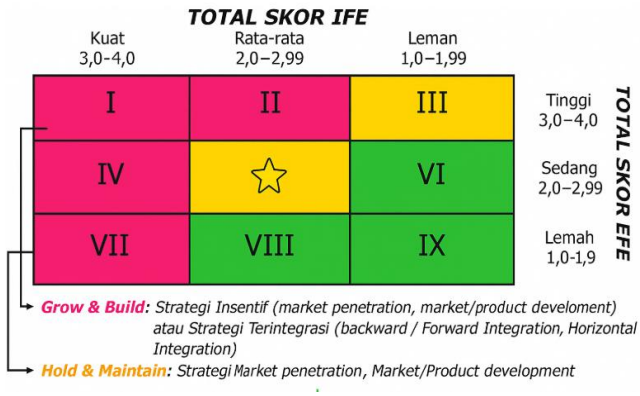

Figure 1. Strategic Position of Kawinda To'i in the SWOT Matrix

IE Matrix Total Score and Strategic Position of Kawinda To'i

This figure illustrates the Internal–External (IE) Matrix, which comprises nine quadrants based on IFE and EFE scores. The ⋆ marker in Quadrant V represents the strategic position of Kawinda To'i, derived from an IFE score of 2.27 and an EFE score of 2.34, placing the village within the Grow and Build strategy category. This position indicates that internal strengths are sufficiently supportive and external opportunities are widely available for agrotourism development. Accordingly, the recommended strategies include market penetration, product development, and the integration of destination management practices.

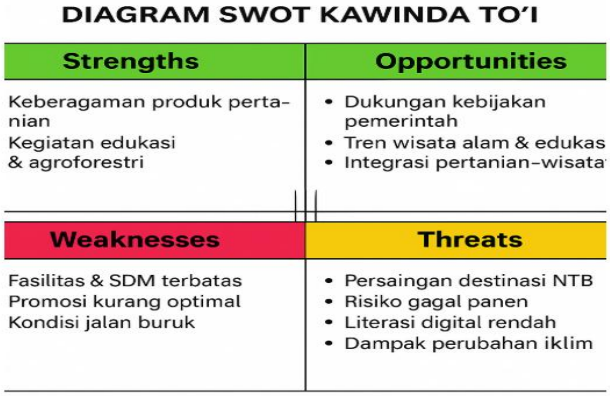

Figure 2. Diagram SWOT Kawinda Toi'i

The X-axis represents the Internal Factor Evaluation (IFE) score of 2.27, which reflects the village's internal strengths and weaknesses in agrotourism development. The Y-axis represents the External Factor Evaluation (EFE) score of 2.34, illustrating the external opportunities and threats that influence the sustainability of development in Kawinda To'i. This figure confirms that Kawinda To'i's strategic position lies within a proactive development quadrant, where internal strengths are sufficiently strong and external opportunities are widely available. In this position, the village demonstrates strong potential to implement a Grow and Build strategy, including strengthening community capacity, diversifying agrotourism offerings, and developing tourism products that leverage local competitive advantages.

The SWOT diagram was used to illustrate the strategic position of Kawinda To'i Village by identifying internal and external factors influencing agrotourism development. This analysis enables researchers to understand the relationships among strengths, weaknesses, opportunities, and threats, thereby allowing strategies to be formulated in a more focused and well-argued manner. This approach is widely applied in rural tourism development studies because it effectively integrates ecological, social, and economic aspects in a comprehensive framework (Suwarsito, 2022).

1. **Strengths (S)**

The strengths component of the SWOT diagram includes the diversity of agricultural products, the potential for educational activities and agroforestry-based experiences, and strong local cultural support that encourages community involvement. The diversity of local commodities, such as maize, coffee, and forest honey, enhances the attractiveness of agrotourism by offering educational tourism experiences rooted in agricultural activities. These findings are consistent with the study by Sawerah (2022), which emphasizes that diversification of agricultural products increases the attractiveness and economic value of tourism villages. Furthermore, community social capital contributes to the sustainability of agrotourism management, as highlighted by Suwarsito (2022), who underlines the critical role of social capital in village-based ecotourism development.

2. **Weaknesses (W)**

The weaknesses identified in the SWOT diagram include limited tourism facilities, low human resource capacity, suboptimal digital promotion, and inadequate road infrastructure. These weaknesses indicate that the village's management readiness has not yet fully aligned with its ecological potential. This finding is consistent with Chairunnisa et al. (2024), who emphasize that the success of agrotourism destinations is strongly influenced by infrastructure readiness and digital management capacity. In addition, limited digital literacy among local communities constrains promotional reach, as discussed by Vermila and Jamalludin (2023) regarding digitalization challenges in post-pandemic tourism villages.

3. **Opportunities (O)**

The external opportunities identified in the SWOT diagram include government policy support for tourism villages, the increasing trend of nature-based and educational tourism, and the potential for agriculture–tourism integration. Policy support provides a strong institutional foundation for agrotourism development, while the growing trend of nature-based tourism reflects a shift in tourist preferences toward educational and sustainability-oriented experiences (Vermila & Jamalludin, 2023). The potential for agriculture–tourism integration is further reinforced by the findings of Comolli et al. (2025), which demonstrate that agroforestry and integrated farming

systems can generate economic benefits while simultaneously conserving ecosystems.

4. **Threats (T)**

The external threats identified in the SWOT diagram include competition with other tourism destinations in West Nusa Tenggara, the risk of crop failure, low digital literacy, and the impacts of climate change. The vulnerability of agriculture to climate variability constitutes a significant threat, as it may disrupt productivity and the continuity of agriculture-based tourism attractions. This finding aligns with Thao et al. (2020), who emphasize that agricultural systems highly dependent on weather conditions require mitigation strategies to maintain production stability. Moreover, limited digital literacy among local communities restricts destination promotion and affects competitiveness, in contrast to tourism villages that have optimally leveraged digital technologies (Chairunnisa et al., 2024).

Conclusion of the SWOT Diagram Description and Strategic Implications

Overall, the SWOT diagram indicates that Kawinda To'i possesses significant ecological and social strengths, along with external opportunities that strongly support agrotourism development. Nevertheless, weaknesses in management capacity and ecological threats need to be addressed through strategies focused on human resource development, strengthening village tourism institutions, and adapting to climate change. The strategic implications of these findings highlight the need to develop an agrotourism model that integrates the advantages of local commodities with risk mitigation approaches and digital transformation, enabling the village to compete as a sustainable tourism destination.

Discussion

Strategic Significance of Internal Strengths for Development

The findings indicate that the primary strengths of Kawinda To'i lie in the fertility of its volcanic soils and the diversity of agricultural commodities, such as maize, coffee, and forest honey, which form a strong foundation for education-oriented agrotourism development. The high score attributed to the natural attractiveness and historical value of Mount Tambora further strengthens the village's position as a unique nature-based tourism destination. This result is consistent with Comolli et al. (2025), who emphasize that natural landscapes and ecosystem services constitute core components of sustainable rural tourism development.

In addition, strong cultural support from the local community reflects the presence of social capital that can enhance the sustainability of agrotourism initiatives, as also reported by Suwarsito (2022). Thus, internal factors demonstrate a solid ecological and social foundation for the development of agriculture-based tourism villages. The growing interest among tourists in nature-based activities is further supported by ecological awareness of environmental quality and the dynamics of biological communities, which underpin the attractiveness of educational tourism experiences. Arhonditsis et al. (2003) argue that healthy ecosystem assessments can serve as strong indicators for the development of sustainable environment-based tourism.

Ecological advantages, such as fertile volcanic soils and a diverse range of commodities, represent fundamental capital for agrotourism development. These findings align with Budiasa's (2015) study, which highlights that commodity diversification enhances the variety of educational tourism attractions. Furthermore, cultural support from local communities strengthens social sustainability, as emphasized by Suwarsito (2022).

Development Challenges: Infrastructure, Human Resources, and Institutions

The identified weaknesses, such as limited tourism infrastructure and low human resource capacity, are consistent with the findings of Zulharman and Prayadi (2018), who emphasize the critical role of basic facilities in ensuring visitor comfort. Insufficient digital promotion also emerges as a significant constraint. This condition aligns with Sirait & Noviani (2018), who argue that digital branding plays a decisive role in determining the visibility of emerging tourism destinations.

Furthermore, the low scores on human resource capacity and tourism infrastructure, and the absence of formal village tourism institutions, indicate a gap between ecological potential and institutional readiness. This finding is in line with Chairunnisa et al. (2024), who identified infrastructure availability and managerial competence as key determinants of agrotourism success in Indonesia. Limited digital promotion and inadequate spatial data further restrict access to destination information, similar to the observations of Vermila and Jamalludin (2023) regarding low digital literacy in post-pandemic tourism villages. Therefore, despite strong ecological and social potential, these structural weaknesses may hinder development if not addressed through capacity-building, institutional-strengthening, and digital-marketing strategies.

Overall, the results suggest that Kawinda To'i is currently in a "high-potential but not yet ready" phase. Consequently, development strategies should prioritize strengthening institutional capacity and destination management before expanding tourism attractions.

External Opportunities and Tourism Market Dynamics

Significant opportunities, including government policy support for tourism villages and the growing demand for nature-based tourism in the post-pandemic period, have enhanced the agrotourism potential of the Tambora area. Vermila and Jamalludin (2023) demonstrate that educational tourism represents a continuously growing trend. The potential integration of agriculture and tourism, such as maize harvesting tours, coffee experiences, or forest honey-based activities, aligns with contemporary agrotourism concepts that emphasize farmers' income diversification (Sawerah, 2022).

SWOT Integration as a Basis for Strategy Formulation

SWOT-based strategies emphasize strengthening local institutions such as village-owned enterprises (BUMDes), enhancing collaboration with the Mount Tambora National Park Authority, improving community capacity in tourism services, and implementing sustainable digital promotion. These strategies support the concept of sustainable ecotourism proposed by Rahman (2020), which is collaborative, community-based, and ecologically oriented.

CONCLUSION

This study demonstrates that Kawinda To'i Village possesses strong agrotourism potential as an alternative strategy for rural economic development. An IFE score of 2.27 and an EFE score of 2.34 place the village in Quadrant V of the IE Matrix, indicating a Grow and Build strategy. This position reflects that ecological strengths and market opportunities are more dominant than existing weaknesses and threats. Therefore, agrotourism development in Kawinda To'i is feasible and should be pursued through tourism product diversification, community capacity strengthening, and the enhancement of village tourism institutions to support sustainable economic development.

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