

ECOTOURISM-BASED SUSTAINABLE TOURISM DEVELOPMENT STRATEGY IN SIKKA REGENCY

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Abstract: This study aims to formulate an ecotourism-based sustainable tourism development strategy in Sikka Regency using SWOT analysis and Internal-External (IE) Matrix. The results show that the main strengths lie in biodiversity, preservation of local culture, and community participation, while weaknesses include limited infrastructure, low human resource capacity, and lack of promotion. External factors show opportunities in the form of global trends in sustainable tourism, NGO support, and digitalization of promotion, but also threats of mass tourism and environmental degradation. The analysis places Sikka Regency in Quadrant I of the SWOT (aggressive growth strategy) and Cell 6 of the IE Matrix (limited consolidation strategy). From these results, SO-based priority strategies were formulated, namely the development of cultural and nature-based thematic tourism, cooperation with NGOs and educational institutions in training and conservation, promotion of sustainable tourism through digitalization, and optimization of strategic locations to make Sikka a model of sustainable tourism in eastern Indonesia.

Keywords: Strategy, Development, Sustainable Tourism, Ecotourism

1. Introduction

Tourism has an important role in economic development because it is able to create jobs, increase community income, and encourage regional investment (Ismowati *et al.*, 2022). Law of the Republic of Indonesia Number 10 of 2009 concerning Tourism explains that tourism is travel for recreation, self-development, or studying tourist attractions within a certain period of time, while tourism includes multidimensional activities involving economic, social, cultural, and environmental aspects. However, if not managed properly, tourism can also have negative impacts, such as environmental damage, changes in animal behavior, and shifts in local cultural values (Haryanto, 2014).

In response to these challenges, the concept of sustainable tourism emerged, which originated from the ideas of WCED (1987) and was adopted by UNWTO, emphasizing the balance between economic benefits, environmental preservation, and community empowerment (Tamrin *et al.*, 2021). The application of this concept is seen in ecotourism, which is an environmentally sound tourism activity that prioritizes conservation, education, and empowerment of local communities (Kusumaningrum *et al.*, 2023). This is emphasized through the Regulation of the Minister of Home Affairs Number 33 of 2009 concerning Guidelines for Ecotourism Development in the Region and Regional Regulation of East Nusa Tenggara Province Number 9 of 2019, which places ecotourism as an economic driver as well as a means of preserving nature and culture.

East Nusa Tenggara (NTT) has great potential for sustainable ecotourism development due to its natural beauty, cultural richness, and unique flora and fauna. Ecotourism development in

NTT is aligned with local economic, social and cultural values, so as to improve community welfare without compromising environmental sustainability through strengthening local businesses such as handicrafts, culinary specialties, and environmentally friendly accommodation. One area with outstanding potential is Sikka Regency on Flores Island, which offers natural, cultural and historical tourism destinations, including marine tourism with beautiful beaches and preserved coral reefs. In addition, Sikka's ikat weaving tradition and traditional ceremonies enrich its tourism appeal, making it an example of a region that is able to develop tourism while maintaining its cultural identity and providing long-term economic benefits.

Sikka Regency has great tourism potential through its natural beauty, cultural wealth and biodiversity, but has not been managed sustainably and does not involve local communities, resulting in uneven economic benefits and limited infrastructure development. In addition, the promotion strategy is not yet optimal and the lack of investment makes the tourism potential has not been maximized, so ecotourism-based development policies and community empowerment are needed so that the tourism sector can develop sustainably.

This condition is reflected in the 2018-2023 Strategic Plan of the Sikka Regency Tourism and Culture Office, which shows that the achievement of cultural development and heritage preservation is still low.

Table 1. Tourism Sector Issues, Indicators and Achievements in Sikka Regency

Nu	Problem	Indicator	End achievement of strategic plan
1	Lack of developed cultural wealth	Arts & culture festival Revitalization & inventory of cultural works	23.52% of target 50% of target
2	Not optimal preservation of cultural heritage	Maintenance of cultural heritage with APBD/honor of caretakers	66.33% of target

Source: Strategic plan of Sikka district tourism and culture office 2024-2026

In addition to the problems described in the Strategic plan, the data on tourist arrivals also reflects the weakness of the tourism strategy. The Covid-19 pandemic had drastically reduced the number of tourists in 2020, before gradually recovering. However, the average length of stay of tourists is still relatively low, which shows that the attractiveness of tourist attractions has not been maximized.

Table 2. Length of Stay and Number of Tourist Visits in Sikka Regency

Year	Average Length of Stay (Days)	Foreign tourists	Domestic travelers	Amount
2019	2.5	9,205	34,963	44,168
2020	1.27	578	20,408	20,986
2021	1.49	124	25,809	25,933
2022	1.82	1,329	34,712	36,041
2023	1.94	4,568	39,244	43,812
2024	1.88	4,601	37,260	41,861

Source: Sikka district tourism and culture office 2025

Based on an interview with the Head of the Tourism and Culture Office, tourist interest in ecotourism and local culture is actually increasing. However, the low variety of attractions, limited access to leading destinations, and ineffective promotion are still the main obstacles. Therefore, a more comprehensive ecotourism-based tourism development strategy is needed, so that Sikka Regency is able to optimize its great potential while providing sustainable economic, social and cultural benefits.

The Sikka District Government followed up on the Minister of Home Affairs Regulation No. 33 Year 2009 on Ecotourism Development by preparing the 2018-2023 Strategic Plan which contains a Strategic Environmental Assessment (KLHS). This study highlights issues such as waste, garbage, drainage, as well as disaster risk and infrastructure damage. KLHS aims to make tourism development sustainable, pay attention to the carrying capacity of the area, and prevent negative environmental and socio-economic impacts by maintaining ecological balance and destination capacity.

Various studies reveal major challenges in tourism development in Sikka Regency, despite the region's abundant tourism potential. Evenince and De Gerald (2021) in their research on "Development Strategy for Environmentally Sound Tourism Objects" at Wair Nokerua tourist attraction found that although this destination attracts many visitors due to its historical, religious, and natural beauty values, its management is far from adequate. The facilities available are very limited, the existing bamboo chairs are broken, there are no trash bins available, and there are no food stalls. These conditions make tourists uncomfortable and indicate the need for serious improvements to increase the attractiveness of the destination.

Research by Gado and Gare (2022) on accessibility to Koka Beach highlighted the issues of expensive entrance fees, poor road conditions, and unfriendly behavior of managers towards visitors. Although there are facilities such as seating, lodging, and boats, the rental fees are considered high and not proportional to the quality of service. The lack of basic facilities such as toilets and parking also worsens the tourist experience. This is in line with the findings of Apelabi *et al.* (2019), which showed low community participation in mangrove ecotourism management in Magelo Hamlet. Lack of understanding, coordination between parties, and lack of community education and training are the main obstacles in the development of the ecotourism area.

Based on these findings, it can be concluded that tourism development in Sikka Regency is not yet sustainable. The main problems of weak management, poor infrastructure, and low environmental conservation have a direct impact on the decline in tourist interest. Therefore, an ecotourism-based tourism development strategy that emphasizes nature conservation, local culture, and community involvement is needed. With improved infrastructure, improved service quality, and breakthroughs from local governments, the tourism sector has great potential to become a driving force for the local economy while improving the welfare of the surrounding community.

The purpose of this research is to analyze internal and external conditions affecting ecotourism-based tourism development in Sikka Regency, identify driving and inhibiting factors, and formulate strategies and sustainable tourism development programs that can be implemented. Thus, this research seeks to provide a comprehensive picture of the challenges and opportunities in ecotourism development, as well as to formulate strategic steps so that the tourism sector can develop sustainably and provide optimal benefits to the region.

The benefits of this research include two aspects, namely theoretical and practical. Theoretically, this research strengthens the understanding of sustainable tourism development

by emphasizing the integration of economic, social, and environmental aspects, and enriches ecotourism theory through new models and frameworks. Practically, this research can help increase community income, preserve the environment, strengthen the role of local communities, and encourage diversification of tourist destinations. Through the ecotourism approach, this research also contributes to increasing environmental awareness, improving the quality of the tourist experience, and building the image of Sikka Regency as a responsible and sustainable tourism destination.

2. Literature Review

The concept of sustainable development has been recognized since the Our Common Future report published by WCED in 1987 under the leadership of Gro Harlem Brundtland, who defined it as meeting the needs of present generations without compromising future generations (Hahn & Knoke, 2012). This principle became the basis of global policies, including the UN Sustainable Development Goals (SDGs) in 2015, and was affirmed in Indonesia through Law No. 32/2009 on Environmental Protection and Management. Over time, this concept has been adopted by the tourism sector, with Wall (2007) emphasizing the importance of a holistic, cross-sectoral approach so that tourism development does not only pursue local economic or conservation benefits, but also safeguards ecosystems and the welfare of communities that depend on other sectors such as agriculture and fisheries. Thus, sustainable tourism should be developed in an integrated manner so that the main goal of sustainability, namely long-term ecological and social well-being, is truly achieved.

Ecotourism is a tourism concept that emphasizes environmental conservation while providing economic and social benefits to local communities. According to UNWTO (2004), ecotourism is a form of tourism conducted in natural areas to enjoy and appreciate the environment and local culture while maintaining sustainability and benefiting local communities. Ceballos-Lascuráin (1996), who first introduced the term, defined ecotourism as travel to undisturbed natural areas to enjoy the beauty of nature, learn about ecosystems, and respect local cultures. In Indonesia, the Minister of Tourism Regulation No. 14/2016 emphasizes that ecotourism supports environmental conservation, community welfare improvement, and education for visitors through the principle of sustainability that opens economic opportunities while maintaining the ecosystem. Buckley (1994) also emphasizes that ecotourism must be nature-based, support conservation, be managed sustainably, and provide environmental education for tourists. Thus, ecotourism plays an important role in building conservation awareness, maintaining ecological balance, and realizing sustainable development that benefits economically, socially and environmentally.

The principle of community-based ecotourism according to Handayani *et al.* (2022) emphasizes economic, social, and environmental sustainability through the use of environmentally friendly technology, the establishment of conservation areas, and partnerships between communities, governments, and tourism operators with fair benefit sharing and protection of local intellectual property rights. In line with that, The International Ecotourism Society (2015) in Musadad *et al.* (2022) added the principles of minimizing negative impacts, raising environmental and cultural awareness, providing direct financial benefits for conservation and communities, and respecting the spiritual rights of indigenous people. The United Nations World Tourism Organization (UNWTO) in McKercher (2003) formulates four main principles of sustainable tourism, namely environmental conservation, socio-cultural sustainability, equitable distribution of economic benefits, and effective management. These principles are in line with Yoeti (1996) who emphasized the importance of environmental

management mechanisms, community participation, and transparent governance, and supported by Weaver and Lawton (2007) who emphasized that economic benefits must be obtained without sacrificing social and environmental values.

Etymologically, the term tourism comes from the Sanskrit “pari” (all/full) and “wisata” (travel), which is defined as a complete trip without a fixed purpose (Soebagyo, 2010). In practice, tourism is accepted as the equivalent of the word “tourism” which includes travel for recreation, education, worship, and work as stipulated in Law Number 10 Year 2009. According to Safitri (2012), tourism is a complex phenomenon that involves the movement of people, goods, and services, as well as supporting sectors such as transportation, accommodation, and culinary. The World Tourism Organization (UNWTO) in McKercher (2003) emphasizes that sustainable tourism must meet the needs of today's tourists without compromising the opportunities of future generations, taking into account three main dimensions: economic, social, and environmental (Kusumawardhana, 2023). In line with this, Hadiwijoyo (2012) emphasized that sustainable tourism must preserve the environment, provide employment opportunities, and adjust to the social order of the community.

In its implementation, sustainable tourism is supported by three main pillars, namely economic, socio-cultural, and environmental. According to Yoeti (2015), the tourism sector should contribute significantly to the local economy through job creation and equitable wealth distribution, while the socio-cultural aspect should maintain local identity and involve the community in destination management (Yoeti, 2015). Buckley (2004) emphasizes the environmental pillar with a focus on natural resource protection, ecosystem management, and tourist education. The integration of these three pillars, according to Yoeti (2015), is the key to the success of sustainable tourism, which can only be achieved through the collaboration of the government, community, and private sector. However, as Hadiwijoyo (2013) reminds us, the biggest challenge is the lack of understanding and commitment from tourism actors who often pursue short-term profits without regard to long-term social and environmental impacts.

Sustainable tourism emphasizes the balance between economic, social, and environmental aspects in order to meet the needs of the current generation without compromising future generations. According to Damanik and Weber (2006), sustainable tourism indicators include four main aspects, namely economic (job creation, income generation, and efficient use of resources), social (community participation, cultural preservation, and improvement of quality of life), environmental (waste management, biodiversity conservation, energy efficiency, and maintenance of water and air quality), and institutional (planning, regulation, and sustainable management of tourist destinations). In line with that, Fandeli (2005) added that sustainable tourism must pay attention to economic balance by providing tangible benefits to local communities, preserving the environment through wise resource management, involving the community in every stage of tourism activities, protecting local socio-cultural values, and increasing education and environmental awareness for both tourists and the community.

3. Method

This research uses a descriptive method with a qualitative approach that focuses on SWOT analysis. According to Sugiyono (2018), descriptive research aims to describe phenomena in detail and systematically based on the data obtained, while Creswell (2014) asserts that qualitative approaches are relevant for understanding complex phenomena through direct interaction with research subjects. In this context, semi-structured interview techniques, FGDs, and field observations are used to identify the strengths, weaknesses, opportunities, and threats of ecotourism development in Sikka Regency. In line with Kotler and Keller (2016), SWOT

analysis is seen as an effective strategic tool in mapping internal and external conditions to formulate sustainable tourism development measures.

The research subjects are stakeholders who play an important role in the development of ecotourism, namely local governments, tourism businesses, environmental observers, local communities, and tourists. The selection of these stakeholders refers to Sugiyono's (2018) view that the determination of research subjects must consider the relationship with the research objectives so that the data is relevant and in-depth. The selection of the government, tourism managers, and environmental observers was carried out by purposive sampling according to Bungin's (2015) explanation, because they have strategic roles and specific insights. In contrast, local communities and tourists were selected by convenience sampling as explained by Nazir (2011), due to considerations of availability, ease of access, and willingness to participate.

The SWOT analysis method is used to systematically identify various internal and external factors in order to formulate a strategy for sustainable tourism development based on ecotourism in Sikka Regency. According to Rangkuti (2018), SWOT analysis functions to maximize strengths and opportunities while minimizing weaknesses and threats. Thus, this analysis is not only an evaluation tool, but also the basis for determining the direction of organizational development. Purhantara (2010) asserts that the main purpose of SWOT analysis is to place the organization in the right position in the competitive power map, so that it can compete effectively and sustainably.

Furthermore, Purhantara (2010) explains the stages of SWOT analysis, namely: (1) evaluation of the organization's strategic objectives, (2) analysis of the internal and external environment, (3) preparation of internal (IFAS) and external (EFAS) strategic factors to build a competitive profile, (4) preparation of the IE analysis matrix and SWOT matrix, and (5) strategy formulation based on the results of the analysis. This stage confirms that SWOT analysis does not stop at mapping the situation, but also produces strategic recommendations that can be implemented to improve organizational competitiveness.

Result and Discussion

Factors Encouraging and Hindering Ecotourism Development Based on Ecotourism.

Factors driving sustainable tourism development in Sikka Regency include natural and local cultural advantages, community participation, and local government support. The richness of ecosystems such as coral reefs, tropical forests, beaches, and the culture of ikat weaving and traditional rituals are authentic attractions for tourists. Community participation in protecting the environment and culture, as well as government and NGO support through regulation and education, further strengthens community-based tourism development.

The main obstacle to sustainable tourism development in Sikka lies in the inadequate infrastructure, especially road access and basic facilities at tourist sites. The capacity of tourism human resources is also still limited, especially in mastering foreign languages and destination management, resulting in less than optimal service. In addition, promotion and branding strategies are still weak, making Sikka less popular than other regions in Flores. The lack of a data-based destination management system, minimal investment in eco-friendly homestays, and weak coordination between agencies are also major obstacles to tourism management.

IFAS Analysis (Internal Factors Analysis Strategy)

The results of the IFAS analysis in accordance with the local characteristics of Sikka Regency as an ecotourism destination are as follows:

Table 3. IFAS Matrix

Description	Weight	Rating	Score
Strength			
1. Biodiversity and unique land-sea ecosystems (coral reefs, tropical forests, beaches, lakes).	0.10	4	0,39
2. Preserved local culture (ikat weaving, traditional rituals, traditional architecture).	0.10	4	0,41
3. Local communities are proactive in environmental conservation and open to community-based tourism.	0.10	4	0.41
4. Strategic location on the Flores tourist trail.	0.10	3	0.3
5. Destinations are unspoiled and less commercialized.	0.10	3	0.3
6. Local government policy support for sustainable tourism.	0.10	4	0.39
Amount	0.60		2.21
Weaknesses			
1. Basic infrastructure and accessibility (roads, public transportation, public facilities) are still limited.	0.08	2	0.16
2. Capacity of tourism human resources (foreign language, service, tourism management) is still low.	0.07	2	0.14
3. Promotion and marketing of destinations is still less than optimal, not yet widely known.	0.08	1	0.08
4. There is no sustainable and data-based destination management system.	0.08	2	0.17
5. Lack of investment in supporting sectors such as eco-friendly homestays, information centers, and educational facilities.	0.08	1	0.08
Amount	0.40		0.63
Total Weight x Score Internal Factor	1.00		2.84

IFAS results show that Sikka Regency has considerable internal strengths in ecotourism development, especially in biodiversity, local culture, and the active role of the community. Weaknesses such as limited infrastructure, low human resource capacity, and lack of promotion still exist, but can be relatively minimized. Overall, Sikka is in a favorable position for sustainable tourism development.

EFAS Analysis (External Factors Analysis Strategy)

The results of the EFAS analysis in accordance with the local characteristics of Sikka Regency as an ecotourism destination are as follows:

Table 4. EFAS Matrix

Description	Weight	Rating	Score
Opportunities			
1. The global trend towards sustainable and nature-based tourism.	0.12	4	0.49
2. Potential partnerships with NGOs, donors and educational institutions for conservation and human resource training.	0.12	3	0.36
3. Digitalization of tourism promotion through social media, tourism platforms, and international exhibitions.	0.12	3	0.36
4. Potential for thematic tourism product development: marine tourism, cultural tourism, agro-tourism, and conservation education.	0.12	4	0.49
5. National and international programs for the development of eastern Indonesia (Flores).	0.12	3	0.37
Amount	0.6		2.06

Description	Weight	Rating	Score
Threats			
1. Climate change and environmental degradation (damaged coral reefs, deforestation).	0.07	2	0.14
2. Risk of over-tourism in destinations that are not yet ready in terms of infrastructure and carrying capacity.	0.07	1	0.07
3. Conflict of interest between environmental conservation and the needs of economic development.	0.08	2	0.17
4. Lack of regulation or supervision in maintaining environmental quality and local culture.	0.09	2	0.17
5. Dependence on seasonality or weather conditions that affect visitation.	0.09	1	0.09
Amount	0.4		0.63
Total Weight x Score External Factor	1		2.69
The x-axis value is the Difference of Total Strengths minus Total Weaknesses			1.58
y-Axis Value is the Difference of Total Opportunities minus Total Threats			1.42

The EFAS results show that Sikka Regency has strong external opportunities (score 2.06) in ecotourism development, especially from the global trend of sustainable tourism, partnership with NGOs, and digitalization of promotion. Threats such as climate change, risk of over-tourism, and weak regulations remain, but with a relatively low score (0.63) so that they can still be minimized. With a total score of 2.69, Sikka's external conditions are considered good enough to be utilized in promoting sustainable ecotourism strategies.

Internal – External Matrix (IE)

The matrix consists of nine cells that combine internal and external factors, with three main strategy options: growth (growth/diversification), stability (maintenance), and retrenchment (reduction/efficiency).

Table 5. Internal-External Matrix (IE)

	High External Conditions (Score Y: 2.5–4.0)	Medium External Conditions (Score Y: 1.5–2.49)	Low External Conditions (Score Y: 1.0–1.49)
High Internal Conditions (Score X: 2.5–4.0)	Sel 1 Growth Strategy→ Full development	Sel 2 Growth Strategy→ Controlled growth	Sel 3 Retrenchment Strategy→ Reduce the activity
Medium Internal Conditions (Score X: 1.5–2.49)	Sel 4 Stability Strategy→ Keep the direction	Sel 5 Growth Strategy→ Expand selectively	Sel 6 Retrenchment Strategy→ Consolidation
Low Internal Conditions (Score X: 1.0–1.49)	Sel 7 Growth Strategy→ Market diversification	Sel 8 Growth Strategy→ Diversification of products	Sel 9 Retrenchment Strategy→ Scale reduction

The IE Matrix places Sikka Regency in Cell 6 with a retrenchment strategy. The focus is on strengthening internal capacity through improving human resources, infrastructure and collaboration, so that ecotourism develops sustainably.

SWOT Quadrant Matrix

The SWOT Quadrant Matrix was used to formulate strategies for sustainable ecotourism development in Sikka Regency through a combination of internal and external factors. This matrix resulted in four main strategies: aggressive growth (SO), diversification (WO), defensive (ST), and turnaround (WT), which form the basis for integrated and sustainable policy development.



Figure 1. SWOT Analysis Diagram

The results of quantitative SWOT analysis place Sikka Regency in Quadrant I with an aggressive growth strategy, because it has more strengths and opportunities than weaknesses and threats. This condition shows great potential for ecotourism development through the use of biodiversity, local culture, and community participation, along with the support of global trends in sustainable tourism, partnerships, and digitalization of promotion. The main strategy is to expand the market, improve services and infrastructure, and develop thematic tourism products in an innovative and sustainable manner to strengthen tourism's competitiveness and contribution to the local economy.

SWOT Strategy

SWOT analysis in sustainable tourism development in Sikka Regency resulted in four main strategy groups, namely SO, WO, ST, and WT. SO strategies utilize strengths to seize opportunities, WO strategies overcome weaknesses with opportunities, ST strategies face threats with strengths, and WT strategies minimize weaknesses while avoiding threats. These four strategies are designed based on the results of the IFAS and EFAS analysis, so that they can become the basis for the right policy direction for ecotourism development in Sikka Regency.

Table 6. SWOT Strategy Matrix

Internal Factors Analysis Strategy (IFAS)	Strength (S) 1. Biodiversity & unique ecosystems 2. Preserved local culture 3. Proactive and open community 4. Strategic location on the Flores tourist route 5. Destination is still natural 6. Regional policy support	Weaknesses (W) 1. Limited infrastructure & access 2. Tourism human resources are still low 3. Promotion is not yet optimal 4. There is no data management system 5. Lack of investment in supporting facilities
External Factors Analysis Strategy (EFAS)		
Opportunities (O) 1. Global trends in sustainable tourism 2. Partnerships with NGO's, donors, educational institutions	Strategy (SO) Utilizing strengths to seize opportunities: a. Develop cultural & nature-based thematic tourism	Strategy (WO) Reducing weaknesses with opportunities: a. Train tourism human resources through NGO/donor programs

3. Digitalization of tourism promotion 4. Thematic tourism (maritime, cultural, educational) 5. National/international programs for Flores	b. Collaborate with NGO's & educational institutions for training & conservation c. Promotion of sustainable tourism through digitalization d. Optimize strategic locations to attract tourists e. Make Sikka a model of eastern Indonesia's sustainable tourism	b. Increase digital & social media promotion c. Attract investment for homestays & education centers d. Build a data-driven destination management system e. Develop thematic tourism to expand market reach
Threats (T) 1. Climate change & environmental degradation 2. Risk of over-tourism 3. Preservation vs. development conflict 4. Weak regulation/supervision 5. Weather/season dependency	Strategy (ST) Utilize strengths to overcome threats: a. Enforce protection based on local culture & ecosystems b. Involve the community as custodians of the area's carrying capacity c. Build weather-adaptive tourism information system d. Encourage community-based conservation regulations e. Balance ecotourism & local economy with an inclusive approach	Strategy (WT) Overcome weaknesses and prevent threats: a. Build sustainable infrastructure in stages b. Strengthen local environmental & cultural supervision c. Reduce seasonal dependency with alternative tourism d. Involve all parties in tourism development regulation e. Expedite early warning system for environmental impacts & mass tourism

The SWOT strategy for sustainable tourism development in Sikka Regency emphasizes the utilization of cultural potential, nature, and community participation to capture global opportunities through thematic tourism, digital promotion, and collaboration with various parties. In addition, culture-based regulations, community supervision, and carrying capacity management are applied to deal with environmental threats, while defensive strategies are carried out through green infrastructure, strict spatial planning, and tourism diversification. Thus, these four strategies become a comprehensive policy direction for Sikka tourism to develop inclusively, sustainably and competitively.

Discussion

Ecotourism-based Sustainable Tourism Development Strategy in Sikka Regency is formulated through IE Matrix, SWOT, and SWOT main strategy analysis. The results of the IE analysis place Sikka Regency in Cell 6 with a retrenchment strategy, which focuses on strengthening internal capacity through improving the quality of human resources, infrastructure development, and cross-sector collaboration to support sustainable ecotourism management. Meanwhile, SWOT analysis shows that Sikka Regency is in Quadrant I with an aggressive growth strategy, which means it has a great opportunity to develop tourism by utilizing its strengths. From this analysis, four main strategy groups are generated, namely SO, WO, ST, and WT strategies, which form the basis of policy direction in realizing ecotourism that is not only oriented towards economic growth, but also preserves the environment and local culture.

The SO strategy in developing sustainable tourism in Sikka Regency is carried out by developing cultural and nature-based thematic tourism through packaging local potential such as ikat weaving, traditional rituals, beaches, waterfalls, forests, and organic farming into educational and recreational tourism that is in line with sustainable development. This effort is strengthened through collaboration with NGOs, educational institutions, as well as the use of digitalization for training, conservation, and tourism promotion, while maximizing Sikka's geographical position as the entrance to thematic tourism in eastern Flores. By combining local strengths and external opportunities, this strategy is expected to strengthen cultural identity,

preserve nature, increase competitiveness, and provide long-term economic benefits for the community.

The WO strategy in sustainable tourism development in Sikka Regency can be realized by utilizing external opportunities to cover internal weaknesses, particularly limited human resources, infrastructure, and tourism management. Through training facilitated by NGOs, international donors, and educational institutions, local communities can increase their capacity as tour guides, homestay managers, and creative economy actors so that they can support tourism professionally. In addition, digital promotion and social media are effective means to introduce thematic tourism such as ikat weaving, marine tourism, religion, and cultural education, while attracting investment in homestays, education centers, and environmentally friendly infrastructure. With these steps, Sikka has the opportunity to strengthen competitiveness, expand the tourist market, create new jobs, and strengthen its position as a leading destination in East Nusa Tenggara.

ST strategy in sustainable tourism development in Sikka Regency is carried out by utilizing local wisdom, customary norms, and community collective awareness to face threats such as environmental degradation, resource exploitation, and uncontrolled tourist behavior. This approach emphasizes protection based on local culture and ecosystems, collaboration between customary law, government regulations, and tourist village institutions, and community involvement as custodians of the carrying capacity of the area in order to create inclusive and equitable governance. Local strengths are also utilized to face the threats of climate change, visitation pressure, and economic inequality through adaptive tourism information systems, community-based ecotourism schemes, and empowerment of MSMEs, farmers, fishermen, and craftsmen in the tourism value chain. With the support of technology, multi-stakeholder participation, and digital innovation, this strategy ensures Sikka's tourism grows sustainably,

WT strategies in sustainable tourism development in Sikka Regency can be pursued through the gradual development of environmentally friendly infrastructure, strengthening supervision of the environment and local culture, as well as developing alternative non-seasonal tourism such as culture, culinary, and crafts. The involvement of the government, community, and business actors is key in formulating regulations so that development is balanced between economic, social, and environmental aspects. In addition, the acceleration of early warning systems related to environmental impacts and risks of mass tourism is essential to prevent damage and maintain tourist comfort. With these steps, Sikka Regency can face the global challenges of tourism while strengthening its position as a sustainable destination that is resilient to threats.

4. Conclusions

Based on the results of SWOT analysis and discussion of ecotourism-based sustainable tourism development strategies in Sikka Regency, it can be concluded that:

- a. Internal conditions of sustainable tourism in Sikka Regency show great potential for ecotourism development. The main strengths lie in the unique land and marine biodiversity, preserved local culture, and community involvement in protecting the environment. Sikka's strategic location on the Flores tourist route and regional policy support further strengthen the opportunities for the development of unspoiled destinations. However, there are weaknesses that need to be addressed, such as limited basic infrastructure and accessibility, low capacity of tourism human resources, suboptimal promotion, absence of a data-based destination management system, and lack of investment in environmentally friendly supporting facilities.

- b. From the external side, great opportunities are present through global trends in sustainable tourism, partnerships with NGOs and educational institutions, digitalization of promotion, and the potential for thematic tourism development based on nature, culture and education. In addition, the existence of national and international programs that encourage the development of eastern Indonesia further opens space for Sikka Regency to grow as a leading destination. However, a number of threats need to be anticipated, such as the impact of climate change, the risk of over-tourism, conflicts between conservation and economic development interests, and weak regulation or supervision of the environment and local culture.
- c. Based on SWOT analysis, Sikka's tourism development strategy is built through four main approaches. The SO strategy is directed at developing cultural and nature-based thematic tourism with the support of digital promotion, collaboration with NGOs, and utilization of strategic position to make Sikka a model of sustainable tourism in eastern Indonesia. The WO strategy focuses on improving the quality of human resources through training, optimizing digital promotion, attracting investment for homestays and education centers, and building a data-based destination management system. The ST strategy emphasizes the protection of local culture and ecosystems, community involvement in maintaining carrying capacity, and strengthening adaptive regulations and information systems. Meanwhile, the WT strategy leads to sustainable infrastructure development, environmental and cultural monitoring, development of alternative tourism to reduce seasonal dependency, and acceleration of early warning systems to prevent negative impacts on destinations. With this integrated strategy, Sikka Regency has the potential to develop ecotourism that is both sustainable and inclusive.

To optimally realize the ecotourism-based sustainable tourism development strategy in Sikka Regency, the author makes the following suggestions:

1. For the Local Government, to realize the ecotourism-based sustainable tourism development strategy in Sikka Regency, the local government needs to have a commitment to make tourism a leading sector by preparing a 2025-2030 sustainable tourism roadmap that involves all stakeholders and integrates the principles of SDG's and CHSE. Strategic steps that can be taken include developing thematic tour packages based on culture and nature, creating digital and physical maps of tourist routes complete with QR code information, and developing a community-based destination information system. Cross-sector collaboration is also important, both between agencies and with cultural communities, to present educational and authentic tourism content. In addition, organizing a calendar of cultural events, a social media campaign themed "Explore Sustainable Sikka", and facilitating partnerships with NGO's, universities, and MSME's will strengthen promotion and the capacity of local human resources. These efforts can be strengthened through the establishment of a tourism village training center, the Sikka Sustainability Tourism Fellowship program, and the establishment of cooperative or BUMDES-based tourism village institutions to ensure independent, transparent and participatory tourism management.
2. For local communities, an active role in participating in training and collaborating with external parties is essential to strengthen homestay development, guiding, weaving, culinary, and digital promotion. In addition, the community is expected to maintain cultural values and natural preservation as the main identity of Sikka tourism, as well as engage in conservation efforts and provide education to tourists so that sustainability can be achieved.

3. Meanwhile, educational institutions and NGO can support the transformation of inclusive tourism through community service programs, participatory research, and thematic KKN in tourist areas and surrounding villages. The central government together with development partners are expected to make Sikka Regency a national pilot project for sustainable destinations in eastern Indonesia with budgetary, regulatory and promotional support, so that Sikka can appear at the national and international levels as an example of ecotourism-based tourism best practices.

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