

Sustainable Mangrove Ecotourism Development Strategy in Aceh Jaya

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ABSTRACT

Sustainable mangrove ecotourism development is one of the strategic approaches in utilizing natural potential for tourism while preserving the environment. This research was conducted in Gampong Baro Village, Setia Bakti District, Aceh Jaya, with the aim of identifying mangrove ecotourism development strategies that can support local economic sustainability and environmental preservation through a SWOT analysis approach. Mangrove-based ecotourism in the region has unique appeal and has the potential to improve the well-being of local communities, but it also faces a variety of challenges, including limited infrastructure and threats to environmental sustainability. Research data were obtained through field observation methods, interviews with local communities and stakeholders, and literature studies. The results of the analysis show that the main strength of this mangrove ecotourism lies in its high biodiversity and local government support for sustainable tourism. On the other hand, weaknesses such as the lack of tourist facilities and low community skills in tourism management are obstacles in development. Opportunities include growing interest in nature-based tourism and potential collaborations with conservation agencies, while the main threat is ecosystem damage due to uncontrolled human activities. This study concludes that appropriate strategies for the development of mangrove ecotourism in Gampong Baro include community capacity building, infrastructure development that supports conservation, and the involvement of various stakeholders in conservation efforts. Suggestions are given to local governments and communities to increase promotional efforts, expand collaboration with conservation agencies, and optimize local resources so that mangrove ecotourism in the region can develop sustainably and provide long-term benefits to the environment and local economy.

Keywords: *Ecotourism, Mangrove, SWOT Analysis, Aceh Jaya*

Introduction

Mangrove-based ecotourism has become an important approach in natural resource management that aims to combine aspects of environmental conservation with the economic empowerment of local communities. Gampong Baro Village in Setia Bakti District, Aceh Jaya Regency, Aceh, is one of the coastal areas that has great potential to be developed as a sustainable mangrove ecotourism destination. With its natural beauty and high mangrove biodiversity, the village has important ecological functions, such as coastal protection from abrasion, habitat for various marine species, and carbon sequestration that supports climate change mitigation (Aini et al., 2023; Sugiarto & Ramadania, 2023). Through the development of mangrove ecotourism, Gampong Baro Village is expected to improve the economic level of the community while maintaining environmental sustainability (Alam et al., 2023; Marhanah et al., 2023; Puspitasari, 2023).

This research is very relevant because the people of Gampong Baro Village are still mostly dependent on the fisheries sector, with limited access to alternative sources of income. The presence of mangrove ecotourism can open up new opportunities such as providing jobs in the tourism sector, businesses in the field of local crafts and typical culinary, as well as the provision of tourism facilities (Alam et al., 2023; Puspitasari, 2023). Namun, untuk Achieving sustainable development, there are various challenges that need to be overcome, both in terms of infrastructure, public understanding of the principles of ecotourism, and environmental threats that may arise due to tourism activities in mangrove areas (Nuraini, 2021; Pengamanan et al., 2023; Sinar et al., 2023). With these various opportunities and challenges, the development of mangrove ecotourism in Gampong Baro Village requires careful planning and the right strategy so that economic, social, and environmental benefits can be achieved in a balanced manner.

The development of mangrove ecotourism in Gampong Baro Village has several opportunities that support its success. First, tourists' interest in sustainable tourism in coastal areas is increasing, creating opportunities for Gampong Baro Village to become a local and foreign tourist destination. In addition, mangrove-based ecotourism can help improve the economy of the surrounding community, which has been limited to the fisheries sector. This development also opens up new jobs, both as tour guides, homestay operators, and local product business actors (Hartini et al., 2023; Nuraini, Sitompul, et al., 2023; Suprayetno et al., 2022). With the important ecological functions of mangroves such as carbon sequestration and habitat for marine life, ecotourism in this village supports sustainable environmental conservation. Local government support for coastal tourism development has also strengthened this opportunity, especially with partnerships with NGOs that focus on conservation and community empowerment. As global awareness of the importance of mangrove ecosystems in climate change mitigation increases, the region also has the potential to receive support from international organizations that support environmental conservation projects (Hidayat et al., 2023; Rahmadani et al., 2023).

However, the development of ecotourism is also faced with several challenges that require serious attention. One of them is the lack of adequate infrastructure in Gampong Baro Village, which limits the accessibility and comfort of tourists. Local communities have not yet fully understood the sustainable ecotourism practices needed to maintain a balance between economic benefits and environmental impacts. The high risk of damage to mangrove ecosystems due to climate change also adds to the challenges in maintaining the sustainability of this region. In addition, the limited government budget for long-term projects requires a creative funding strategy. The limited number of human resources with

International Conference on Digital Sciences and Engineering Technology (ICDSET)

Theme: "Integration and Interdisciplinarity: Digital Sciences, Engineering and Technology Concepts Frameworks"

Volume 2, No 1 (2025)

<https://proceeding.pancabudi.ac.id/index.php/ICDSET/>

skills in the field of tourism and environmental management makes collaboration with external institutions indispensable (Abdi Sugiarto et al., 2023; Nuraini, 2019; Nuraini, Alamsyah, et al., 2023). Another challenge faced is the risk of abrasion and pollution that can threaten the health of mangrove ecosystems.

Based on this background, the main question asked in this study is about the right strategy to develop sustainable mangrove ecotourism in Gampong Baro Village. In addition, this study seeks to answer what are the opportunities and challenges that affect the success of mangrove ecotourism development, as well as how social, economic, and environmental aspects affect the sustainability of ecotourism in this region. This study aims to analyze appropriate strategies in the development of sustainable mangrove ecotourism, identify opportunities and challenges faced, and assess the social, economic, and environmental influences on the sustainability of mangrove ecotourism in Gampong Baro Village. This research involves several main variables that are the focus of the analysis. Ecotourism development strategy is a key variable that includes planning and implementation measures to develop sustainable ecotourism that supports conservation and improves community welfare. Opportunity is a variable consisting of various positive factors that can support the success of ecotourism, such as government support, economic potential, and partnerships with non-governmental institutions. Challenges are variables that include obstacles that need to be overcome, such as lack of infrastructure, limited human resources, and environmental threats. Meanwhile, the sustainability of ecotourism is a bound variable that includes the success of ecotourism management in preserving the environment and improving community welfare. Through this analysis, the research is expected to make a significant contribution in developing a strategy for sustainable mangrove ecotourism development in Gampong Baro Village, and can be a reference for ecotourism development in other coastal areas.

Methodology

Research on sustainable mangrove ecotourism development strategies in Gampong Baro Village, Setia Bakti District, Aceh Jaya Regency, will be carried out in 2023. The methodological approach used in this study is a SWOT analysis, which aims to identify strengths, weaknesses, opportunities, and threats in the development of mangrove ecotourism in the region (Nuraini, Alamsyah, et al., 2023; Pengamanan et al., 2023; Sugiarto & Ramadania, 2023). Through SWOT analysis, this study seeks to produce a comprehensive strategy to maximize the potential of mangrove ecotourism in a sustainable manner, while anticipating various challenges that may be faced (Adriyanto et al., 2023; Hudaiby et al., 2023). This research was carried out in Gampong Baro Village, Setia Bakti District, Aceh Jaya Regency, Aceh. This village was chosen as the research location because it has great potential to be developed as a sustainable mangrove-based ecotourism destination. The research implementation time is throughout 2023, with field observation and primary and secondary data collection carried out in several stages during this period. This study uses a qualitative descriptive approach that aims to provide a comprehensive overview of the actual conditions as well as the potentials and challenges faced in the development of mangrove ecotourism in Gampong Baro Village.

The data used in this study consisted of primary data and secondary data. Primary data was obtained through in-depth interviews with local stakeholders, such as village officials, ecotourism managers, and local communities involved in ecotourism and fisheries activities. Secondary data were collected from various related literature, official reports from

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local government agencies, as well as previous research relevant to the topic of mangrove ecotourism. The data in this study was collected through several techniques, namely field observation, interviews, and documentation. Field observations were carried out to see firsthand the condition of the mangrove ecosystem, available ecotourism facilities, and activities carried out by the community and tourists. In-depth interviews were conducted with key stakeholders in Gampong Baro Village, including community leaders, local governments, and the private sector playing a role in ecotourism development (Baintan et al., 2024; Umaroh, 2023). Documentation is done to collect secondary data from various sources such as reports, journals, and supporting scientific articles.

The analysis method used in this study is a SWOT analysis, which focuses on identifying strengths, weaknesses, opportunities, and threats in mangrove ecotourism development (Hidayat et al., 2023; Rahmadani et al., 2023; Tarigan 2017).

- a. Strengths are identified as internal factors that support the development of ecotourism, such as the rich biodiversity of mangroves, support from local governments, and the high economic potential that can be obtained by the community through ecotourism activities.
- b. Weaknesses refer to internal limitations that can hinder the development of ecotourism, such as lack of infrastructure, limited public understanding of the principles of sustainable ecotourism, and limited skilled human resources in the field of tourism.
- c. Opportunities are external factors that can be used to support the development of ecotourism, such as increasing tourist interest in sustainable natural tourism, support from NGOs, and potential partnerships with the private sector for the development of tourism facilities.
- d. Threats include external challenges that can hinder the success of mangrove ecotourism, such as the threat of abrasion, pollution risk, and the impact of climate change that can affect mangrove ecosystems.

The results of this SWOT analysis are then used as a basis for developing a sustainable mangrove ecotourism development strategy. The resulting strategies are categorized into four groups, namely the SO (Strengths-Opportunities) strategy, the WO (Weaknesses-Opportunities) strategy, the ST (Strengths-Threats) strategy, and the WT (Weaknesses-Threats) strategy. The SO strategy focuses on how to utilize the strengths they have to take chances, the WO strategy aims to overcome weaknesses in order to take advantage of opportunities, the ST strategy seeks to maximize the strength to face threats, and the WT strategy aims to reduce weaknesses and avoid threats.

Conceptual Framework

The conceptual framework in this study describes the relationship between the variables studied, namely strengths, weaknesses, opportunities, and threats in the sustainable development of mangrove ecotourism.

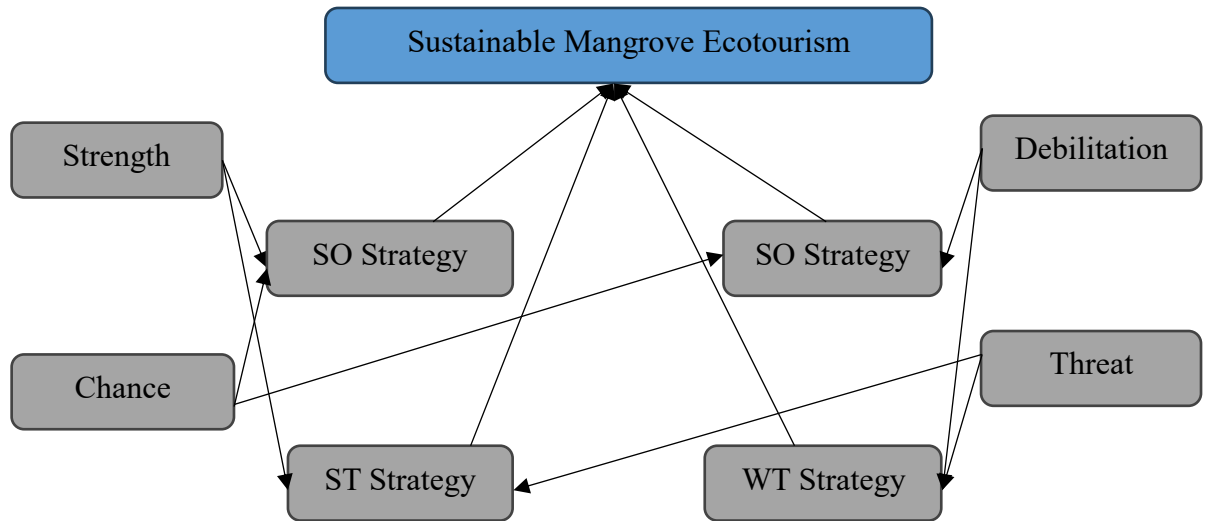


Figure 1. Conceptual Framework: Mangrove Ecotourism Development Strategy with SWOT Analysis

Source : Author's Analysis, 2024

This graph shows how each of the SWOT factors (Strengths, Weaknesses, Opportunities, and Threats) interact to form relevant strategies:

1. SO (Strengths-Opportunities) Strategy: Harnessing strengths to take chances.
2. WO (Weaknesses-Opportunities) Strategy: Overcoming weaknesses to take advantage of opportunities.
3. ST (Strengths-Threats) Strategy: Use strength to deal with threats.
4. WT (Weaknesses-Threats) Strategy: Reduce weaknesses to avoid threats.

Each strategy is linked to the ultimate goal, which is sustainable mangrove ecotourism in Gampong Baro Village, which is expected to be achieved through the implementation of these strategies.

Literature Review

A. Ecotourism and Mangrove Ecosystems

Ecotourism is a form of tourism that prioritizes responsibility for the environment and nature conservation, while making a positive contribution to the welfare of local communities (Baintan et al., 2024; Umaroh, 2023). According to The International Ecotourism Society (TIES), ecotourism focuses on tourism activities that are responsible for preserving the environment and respecting the culture and economy of the local community (Hudaiby et al., 2023; Novianti et al., 2024). The main aspects of ecotourism include the protection of the ecosystem, learning for tourists about the environment, and the development of the local economy. Ecotourism also helps to raise awareness and support for the conservation of natural resources that are often threatened by unsustainable economic development. In Aceh, the development of mangrove-based ecotourism has great potential

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due to its biodiversity and uniqueness of its ecosystem, which is able to attract tourists and support environmental conservation if managed properly. Mangrove ecosystems are one type of ecosystem that is very important for the coastal environment because they function as coastal protectors from abrasion, fish spawning grounds, and natural filters to prevent pollutants from entering the ocean. According to Tomlinson (1986) in (Pattaray & Herman, 2024) Mangroves are typical vegetation that grows in coastal tidal areas and deltas, especially in tropical regions. Mangrove ecosystems play a major role in maintaining ecological balance and providing economic benefits to the people living around the area. Mangroves are habitats for various animal species, such as fish, shrimp, and crabs, which have high economic value and support the fisheries sector. Mangrove conservation is very important, especially in ecotourism areas, because in addition to being a tourist attraction, its existence also supports environmental and economic stability.

B. SWOT Model in Sustainable Ecotourism Development

The SWOT model is an analysis used to assess strengths, weaknesses, opportunities, and threats in the context of a specific development strategy. According to Wheelen and Hunger (2015) in (Pattaray & Herman, 2024; Setioko & 'Ulya, 2024), SWOT analysis is the first step to identifying internal and external factors that affect a particular organization or program, making it easier to formulate relevant strategies. In the context of mangrove ecotourism development, SWOT analysis helps in identifying positive aspects and challenges faced by the mangrove area in Gampong Baro Village. For example, the strength of this ecotourism lies in its attractive biodiversity, while its weakness may be related to the limitations of tourism infrastructure. Opportunities arise from increasing public interest in nature tourism, while threats can be in the form of environmental pollution or mangrove degradation. Through SWOT analysis, the resulting strategy becomes more targeted in maximizing potential and reducing existing risks.

Sustainable ecotourism development aims to create a balance between tourism activities and nature conservation and the economic development of local communities. This concept is in line with the principles of sustainable development which include economic, social, and environmental aspects. According to Swarbrooke (1999) in (Pattaray & Herman, 2024; Setioko & 'Ulya, 2024), Sustainable ecotourism must consider the impact on the environment while providing equitable economic benefits to local communities. In Gampong Baro Village, sustainable ecotourism development is very important to maintain the preservation of mangrove forests while improving community welfare. This can be realized through programs such as training for the community in tourism management, improvement of basic facilities, and environmental campaigns to reduce pollution. This strategy is expected to help the community utilize the potential of mangroves without damaging the environment.

Environmental conservation is one of the important aspects in the development of ecotourism, especially to preserve biodiversity and maintain ecosystem balance. According to Meffe and Carroll (1997) in (Baintan et al., 2024; Hudaiby et al., 2023), Environmental conservation aims not only to protect certain species or habitats, but also to maintain sustainable ecological processes. In the context of mangrove ecotourism in Gampong Baro Village, conservation is very important considering the ecological function of mangroves in protecting the coast from abrasion, absorbing carbon, and providing habitats for various species. Through conservation programs involving local communities, ecotourism activities

can provide educational benefits for tourists and strengthen public awareness of the importance of mangrove conservation.

Previous studies on the development of mangrove ecotourism show that community-based management is able to improve the quality of tourism and environmental conservation. Research by (Baintan et al., 2024) found that active community participation is very important in maintaining ecotourism sustainability. Rahayu (2023) shows that government policy support and training of local communities in tourism skills can increase regional income through ecotourism. Other research by (Alam et al., 2023) underlining the importance of adequate facilities and infrastructure as an additional attraction for tourists. Research (Baintan et al., 2024; Novianti et al., 2024; Umaroh, 2023) emphasized that the role of non-governmental organizations (NGOs) in providing assistance and environmental conservation campaigns is very beneficial in the development of sustainable ecotourism. These studies show that the right strategies in ecotourism development can harness local potential and the support of various parties to achieve sustainability.

Results and Discussion

This study aims to identify sustainable mangrove ecotourism development strategies in Gampong Baro Village, Setia Bakti District, Aceh Jaya Regency. Based on data collection techniques, the results of this research were obtained from field observations, in-depth interviews with stakeholders, and documentation of secondary sources. From field observations, it is known that the mangrove ecosystem in Gampong Baro Village has great potential for ecotourism development because of its biodiversity. The mangrove trees in this area grow luxuriantly, providing habitat for a wide range of species of fauna and flora that are of great value to tourists and scientists alike. However, there are obstacles to tourism infrastructure, such as road access that is difficult to pass during the rainy season, lack of basic facilities such as toilets and garbage cans, and information boards that are not yet available. The results of interviews with the village government, community groups, and tourism managers show that community support for mangrove ecotourism development is quite high. The community realizes that ecotourism can increase village income. Some residents have even taken the initiative to offer boat services and tour guides, albeit informally. The main challenge revealed from the interview is the lack of knowledge and skills of the community in managing sustainable ecotourism. Most of the respondents also stated that assistance from local governments or non-governmental institutions is highly expected. Based on documentation and secondary data, statistical data shows an increase in tourist visits to the coastal areas of Aceh in the last three years, especially tourists interested in ecotourism. Policy support from the government, especially environmental conservation programs and community economic empowerment through tourism, has supported this increase. However, data from the Central Statistics Agency (BPS) of Aceh shows that environmental pollution due to plastic waste and abrasion continues to increase in coastal areas, including in the mangrove area of Gampong Baro Village.

The results of the study were analyzed using a SWOT model. The SWOT matrix is described as follows:

Table 1. Research SWOT Matrix

SWOT	Strengths (S)	Weaknesses (W)
Opportunities (O)	SO: Take advantage of mangrove biodiversity and community support to attract tourists.	WO: Improve basic facilities and community skills to welcome the interest of tourists.
Threats (T)	ST: Use supportive policies to address abrasion and pollution through conservation.	WT: Overcome infrastructure limitations with NGO collaboration to address environmental risks.

Source : Author's Analysis, 2024

Based on the results of the analysis, the resulting sustainable mangrove ecotourism development strategy includes a strategy to strengthen the potential of nature and community support as a strength, the use of increased tourist interest as an opportunity, and mitigation of infrastructure challenges and pollution risks as an anticipatory step.

- 1. Strategi SO (Strengths-Opportunities):** Utilizing mangrove biodiversity and the support of local communities to attract domestic and foreign tourists. This support is in line with research (Hidayat et al., 2023), which shows that the existence of active local communities can increase the attractiveness of ecotourism. In line with that, research (Rahmadani et al., 2023) found that community support strengthens ecotourism sustainability through improving the quality of tourism experiences.
- 2. Strategi WO (Weaknesses-Opportunities):** Improvement of basic facilities and community skills training to take advantage of tourists' growing interest in ecotourism. These results are in line with research by (Nuraini, Sitompul, et al., 2023), which revealed that community training in tourism management improves the quality of ecotourism. In addition, research by (Baintan et al., 2024; Umaroh, 2023) It also supports that the skills of local communities are an important factor in attracting tourists who care about sustainability.
- 3. Strategi ST (Strengths-Threats):** Utilization of policy support to address the threat of abrasion and pollution through environmental conservation programs. Research by (Hudaiby et al., 2023; Novianti et al., 2024; Umaroh, 2023) Support these results by showing that government policies play an important role in reducing the negative environmental impact on ecotourism.
- 4. Strategi WT (Weaknesses-Threats):** Reduce weaknesses in the form of limited infrastructure by collaborating with non-governmental organizations (NGOs) to reduce the risk of pollution and abrasion. These results are in line with research (Adriyanto et al., 2023; Hudaiby et al., 2023) which shows that collaboration with NGOs and community programs can strengthen the capacity of ecotourism in the face of environmental threats.

This research is supported by several previous studies that show consistent results. Among them, research (Alam et al., 2023; Marhanah et al., 2023; Puspitasari, 2023) which highlights the importance of community participation in ecotourism management, which was also encountered in Gampong Baro Village. Research (Umaroh, 2023) support the need to upskill local communities to support sustainable ecotourism development. (Muazir et al., 2024; Setioko & 'Ulya, 2024; Wiwin et al., 2024) It also shows that improving local skills is essential to attract tourists who value the concept of sustainability. Hartono's research (2023) also supports this finding, especially in the important part of the role of government policies in dealing with the issue of abrasion and environmental pollution. However, there are several previous research results that are not in line with the findings of this study. Research by (Nugroho, 2024) argues that the development of ecotourism does not always require full community participation if the government has provided adequate infrastructure, while in Gampong Baro Village, community participation is the main factor. Moreover (Mubarok et al., 2023) assessed that mangrove areas that are at risk of being polluted are less attractive to tourists, in contrast to the conditions in Gampong Baro Village which still attract tourists. While research (Anggraini et al., 2024) emphasizing the importance of independent mangrove management by the government, in Gampong Baro Village support is needed from NGOs and the local community. Other research by (Nugrohanto et al., 2024) mentioned that the increase in ecotourism should be focused on adding tourist attractions, but in Gampong Baro Village, the conservation approach is preferred. Finally, research (Muazir et al., 2024) mentioning that biodiversity is not strong enough to be the main attraction without complete infrastructure, in contrast to the findings at the site of this study which show that tourists are still interested in the existing natural conditions.

Conclusion

This study shows that the strategy for sustainable mangrove ecotourism development in Gampong Baro Village, Setia Bakti District, Aceh Jaya, can be achieved through strengthening community participation, improving basic infrastructure, and utilizing biodiversity that attracts tourists. Government policy support, active community participation, and collaboration with non-governmental organizations and the private sector are important components in facing local challenges such as pollution and abrasion that threaten mangrove ecosystems. These measures not only aim to protect the environment, but also improve the well-being of local communities through a sustainable ecotourism-based economy. Based on these findings, it is recommended that local governments and other stakeholders expand community training programs to improve their skills in tourism management, strengthen environmentally friendly tourism facilities, and initiate environmental conservation campaigns involving all levels of society. This is expected to increase conservation awareness and create attractive and competitive ecotourism for domestic and international tourists. With strong synergies between communities, governments, NGOs, and the private sector, the development of mangrove ecotourism has the potential to provide sustainable economic, social, and environmental benefits, while maintaining biodiversity and mangrove ecosystem functions that are important for climate change mitigation and coastal area protection.

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International Conference on Digital Sciences and Engineering Technology (ICDSET)

Theme: "Integration and Interdisciplinarity: Digital Sciences, Engineering and Technology Concepts Frameworks"

Volume 2, No 1 (2025)

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