

# *Analyzing The Ecotourism Impact Of The Mangrove Forest On The Welfare Of Kampung Nelayan In Langsa City*

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## **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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## **ABSTRACT**

This study investigates the impact of mangrove forest ecotourism on the well-being of the fishing community in Kampung Nelayan, Langsa City, Indonesia. Mangrove forests offer both ecological and economic advantages, making their preservation vital. Ecotourism is presented as an alternative means to utilize these ecosystems, particularly in Kuala Langsa Village. Using qualitative research and IPA analysis, the study explores the factors that both support and hinder ecotourism development in this area. The strengths identified include sustainable conservation efforts and the backing of local government and agencies. However, weaknesses such as limited tourist facilities and oversight slow progress. Opportunities arise from new tourist destinations, though challenges such as inadequate infrastructure and competition within the tourism sector persist. The research underscores the importance of conserving mangrove ecosystems, advocating for sustainable practices and increased local authority support. Overcoming infrastructure hurdles is critical to enhancing mangrove ecotourism's success in Langsa City.

**Keywords:** *Mangrove Forest, Ecotourism, Langsa City, Sustainable Conservation, Kampung Nelayan*

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## 1. Introduction

Tourism development has emerged as a key driver of economic growth for many regions, contributing significantly to local economies through job creation, infrastructure development, and revenue generation. In certain countries, the tourism industry represents one of the most important sectors, providing substantial tax revenues and supporting a range of service-oriented businesses (Yoeti, 2000). In recent years, there has been a growing recognition of the importance of sustainable tourism practices, particularly in regions where natural ecosystems and biodiversity play a central role in attracting visitors. Coastal areas, in particular, offer diverse ecosystems that are increasingly being leveraged for tourism, combining economic benefits with environmental conservation.

Coastal zones serve as vital transitional areas between land and sea, characterized by high biodiversity and unique ecosystems such as mangroves, coral reefs, and estuaries. These areas hold immense potential for ecotourism, a form of tourism that emphasizes sustainable interaction with nature. Ecotourism not only seeks to minimize the negative impacts of tourism on the environment but also aims to provide educational experiences for visitors while supporting local economies. In Indonesia, mangrove forests are increasingly being recognized for their ecological significance and their potential to attract ecotourism enthusiasts, whose interests extend beyond recreation to include conservation and cultural experiences (Syahid, 2015).

Mangrove ecosystems offer numerous ecological benefits, such as serving as breeding grounds for marine life, protecting coastlines from erosion, and mitigating the impacts of climate change through carbon sequestration. In addition to these ecological services, mangrove forests can provide economic opportunities through sustainable ecotourism. One area with significant potential for mangrove ecotourism is Kuala Langsa Village, located in the coastal region of Langsa City, Aceh. Spanning approximately 400 hectares, the mangrove forest in Kuala Langsa supports a variety of livelihoods, including fishing, shrimp and crab harvesting, and small-scale culinary businesses. These economic activities are deeply connected to the health and sustainability of the mangrove ecosystem. However, the livelihoods of these communities are subject to the challenges posed by environmental changes and the unpredictability of coastal ecosystems. Fishers and other resource-dependent groups in Kuala Langsa Village often face fluctuating incomes due to the impacts of weather patterns and ecosystem degradation (Rafiy et al., 2015; Rahmad et al., 2017). As these communities continue to rely on coastal resources, there is a growing need to diversify income sources through alternative economic activities. Ecotourism, particularly mangrove-based ecotourism, presents a viable option for sustainable economic development that can supplement traditional livelihoods while preserving natural ecosystems.

The infrastructure in Kuala Langsa Village is relatively well-developed, with accessible roads and an active harbor that supports both transportation and fishing activities. These infrastructural assets position Kuala Langsa as a potential ecotourism hub. The village's river offers opportunities for developing additional tourism attractions, such as fishing tours and floating cafés, while the extensive mangrove forest could be transformed into a premier destination for marine ecotourism. By capitalizing on these natural and infrastructural resources, Kuala Langsa Village has the potential to become a model for sustainable tourism development, blending economic, ecological, and cultural benefits.

To realize this potential, it is essential to conduct a comprehensive analysis of the mangrove ecosystem's capacity for ecotourism. This includes assessing the ecosystem's suitability for tourism activities, its environmental carrying capacity, and the socio-economic factors that can support or hinder ecotourism development. Furthermore, an in-depth evaluation of the challenges faced by the local community in balancing economic activities with environmental conservation is crucial. Understanding these dynamics will enable policymakers and stakeholders to create strategies that enhance the welfare of the fishing community while ensuring the long-term sustainability of the mangrove ecosystem.

This study aims to address these gaps by analyzing the impact of mangrove ecotourism on the well-being of the Kampung Nelayan community in Langsa City. Through a combination of qualitative and quantitative research methods, this research will identify

the factors that support or inhibit the development of mangrove-based ecotourism. By exploring the direct and indirect effects of ecotourism on the local economy, culture, and environment, this study will offer insights into sustainable development strategies that can be applied not only in Langsa but also in other regions with similar ecological and socio-economic conditions.

In conclusion, the development of mangrove ecotourism in Kuala Langsa presents a unique opportunity to enhance the socio-economic welfare of local communities while conserving critical natural resources. By integrating ecological sustainability with tourism development, Langsa City can create a model for other coastal regions in Indonesia. This research aims to contribute to the growing body of knowledge on ecotourism by providing a detailed analysis of the potential benefits and challenges associated with mangrove tourism, ultimately offering practical recommendations for policymakers, local governments, and community stakeholders.

## **2. Method**

This research employs a mixed-methods approach, combining both qualitative and quantitative descriptive research methodologies. The qualitative aspect seeks to provide a comprehensive understanding of the social and environmental phenomena surrounding the development of mangrove ecotourism in Kuala Langsa Village. This approach is particularly useful for exploring local community perceptions, motivations, and behaviors, as well as for identifying the social dynamics that influence ecotourism development. The qualitative research relies on interviews, observations, and field notes to gather in-depth information from key stakeholders, including local fishers, community leaders, and government officials.

The quantitative aspect of this study aims to support the qualitative findings by providing measurable data that can be analyzed statistically. Specifically, the study uses survey instruments to collect data from a representative sample of the local population involved in or affected by mangrove ecotourism activities. The quantitative data allows for an assessment of the economic contributions of mangrove tourism to the local community, as well as a comparison of household income levels before and after ecotourism initiatives were introduced.

### **2.1 Study Area and Population**

The study was conducted in Kuala Langsa Village, located in Langsa City, Aceh, Indonesia. The village is known for its extensive mangrove forest, which covers approximately 400 hectares and supports a variety of livelihoods, including fishing, shrimp catching, and small-scale businesses. The population of the study area consists primarily of fishers and their families, who rely heavily on the coastal ecosystem for their income. The selection of this site is based on the potential for developing mangrove-based ecotourism and the presence of ongoing conservation efforts aimed at preserving the local mangrove forest.

The population sample was determined using Slovin's formula, which is commonly used to estimate sample sizes from a given population. From an estimated population of 300 individuals in the research area, the calculated sample size was 75 respondents, ensuring a reliable and representative sample for both qualitative and quantitative analysis. The sample was drawn using a non-stratified sampling technique since the population is relatively homogeneous in terms of their socio-economic backgrounds and reliance on coastal resources.

### **2.2 Data Collection Techniques**

Data collection involved a combination of primary and secondary sources. Primary data was gathered through in-depth interviews, focus group discussions, and direct observations of ecotourism activities and community interactions with the mangrove ecosystem. Interviews were conducted with a diverse group of stakeholders, including local

community members, business operators, government officials, and representatives from local tourism and conservation agencies. These interviews were semi-structured, allowing for flexibility in exploring participants' experiences and opinions on ecotourism development in the region.

In addition to interviews, structured questionnaires were distributed to the sample population to gather quantitative data on the socio-economic impact of mangrove ecotourism. The survey included questions related to income, employment, community participation in tourism activities, and attitudes toward conservation. Observations of the mangrove forest and tourist activities were also conducted to supplement the interview and survey data with real-time insights into the ongoing ecotourism practices in Kuala Langsa. Secondary data was collected from various sources, including government reports, tourism studies, and academic literature on ecotourism and mangrove ecosystems. These documents provided background information on the historical use of the mangrove forest and the region's socio-economic conditions, as well as insights into best practices for sustainable tourism development in similar contexts.

### **2.3 Data Analysis**

The data analysis for this study involves both qualitative and quantitative techniques. For the qualitative data, content analysis was employed to identify recurring themes, patterns, and key issues emerging from the interviews and focus group discussions. This method is useful for interpreting the subjective experiences of the community and understanding the socio-cultural factors that influence the success or challenges of ecotourism development in the region.

Quantitative data was analyzed using descriptive statistics, focusing on key indicators such as changes in household income, employment rates, and community participation in tourism-related activities. Additionally, the study applies a SWOT analysis (Strengths, Weaknesses, Opportunities, and Threats) to assess the internal and external factors that impact the development of mangrove ecotourism. The SWOT framework provides a strategic overview of the enabling factors and barriers that can influence sustainable tourism development in Kuala Langsa.

The SWOT analysis was divided into two parts: Internal Factor Analysis Summary (IFAS), which focuses on the strengths and weaknesses of the mangrove ecotourism initiative, and External Factor Analysis Summary (EFAS), which evaluates the opportunities and threats posed by external environmental, social, and economic conditions. Each factor was weighted and rated based on its perceived importance and impact on the success of the ecotourism project.

### **2.4 Ethical Considerations**

This research adheres to ethical standards for conducting fieldwork in local communities. Prior to data collection, informed consent was obtained from all participants, ensuring that they were aware of the study's purpose and their right to withdraw at any time. The confidentiality of the participants was maintained by anonymizing all personal information collected during interviews and surveys. Moreover, the research was conducted in accordance with local regulations and guidelines for engaging with indigenous and rural communities.

## **3. Result and Discussion**

### **3.1 Ecotourism's Contribution to Local Economic Development**

The results of this study highlight the significant economic impact of mangrove ecotourism on the welfare of the fishing community in Kuala Langsa. Survey data show that a substantial portion of the population has seen a noticeable increase in household income since the introduction of ecotourism activities. Approximately 65% of respondents indicated that their income had risen due to tourism-related ventures, such as providing

boat tours, selling local products, and offering food services to tourists. This income diversification has allowed the local community to reduce its reliance on traditional fishing activities, which are often subject to environmental uncertainties.

Moreover, the employment opportunities created by ecotourism have broadened the economic base of the community. Jobs in tourism-related services, including guides, café workers, and souvenir sellers, have provided additional income sources for households that previously depended solely on fishing. These findings align with other studies that emphasize the role of ecotourism in stimulating local economies, particularly in regions with fragile ecosystems (Manjula et al., 2021).

### **3.2 Social and Cultural Impact**

In addition to economic benefits, the development of mangrove ecotourism in Kuala Langsa has had positive social and cultural impacts. The survey and interviews revealed that community members are increasingly involved in preserving their local culture and natural environment, as ecotourism emphasizes education and conservation. Local traditions, such as artisanal fishing techniques and the preparation of traditional foods, are now being showcased as part of the ecotourism experience, fostering a sense of pride among residents.

However, despite these positive outcomes, there are challenges in ensuring inclusive participation across the community. While younger members of the community have been quick to adapt to the opportunities presented by ecotourism, older generations expressed difficulty in transitioning from traditional livelihoods to tourism-related activities. This generational gap highlights the need for targeted training programs that cater to different age groups and skill levels, ensuring that all community members can benefit from ecotourism development.

### **3.3 Environmental Conservation and Sustainability**

One of the primary objectives of mangrove ecotourism is to promote the sustainable use of natural resources. The results indicate that ecotourism in Kuala Langsa has contributed to heightened awareness of environmental conservation among the local community. Approximately 75% of respondents reported that they had become more conscious of the need to protect the mangrove forest, not only for its ecological value but also for its role in sustaining tourism. Many interviewees emphasized the importance of maintaining a balance between tourism and conservation, as the long-term success of ecotourism depends on the health of the mangrove ecosystem.

The qualitative data also suggest that community-driven conservation efforts, such as mangrove planting initiatives and waste management programs, have been implemented with support from local government agencies and NGOs. These initiatives are critical to combating issues such as coastal erosion, which was identified as one of the major threats to the mangrove ecosystem. Moreover, the involvement of the community in these initiatives has strengthened the sense of ownership and responsibility for environmental stewardship.

### **3.4 Infrastructure and Tourism Facilities**

Despite the positive developments in ecotourism, the study identified several barriers that hinder the full realization of Kuala Langsa's tourism potential. One of the main challenges highlighted by respondents was the inadequate infrastructure supporting tourism activities. While the village has well-maintained roads and an active harbor, there is a lack of tourism-specific facilities, such as adequate accommodations, clean public restrooms, and signage directing tourists to key attractions. This shortfall limits the ability

of the village to attract and retain a larger number of tourists, especially international visitors.

The SWOT analysis revealed that while the area has significant strengths in terms of natural beauty and strategic location, the weaknesses in infrastructure and facilities need to be addressed. For example, many respondents suggested the construction of eco-friendly accommodations, such as homestays, that align with the principles of ecotourism. The absence of these facilities not only limits the length of tourists' stays but also reduces the overall economic benefits that could be generated through longer visits and higher spending.

### 3.5 SWOT Analysis of Mangrove Ecotourism

The SWOT analysis provided an integrated view of the internal and external factors influencing the success of mangrove ecotourism in Kuala Langsa.

- **Strengths:** The main strengths identified include the unique natural attractions of the mangrove forest and the community's hospitality towards tourists. The availability of salt ponds and other unique ecological features also enhances the tourism appeal.
- **Weaknesses:** The lack of human resources trained in tourism management and the limited diversity of tourism offerings beyond the mangrove forest were highlighted as weaknesses. Additionally, the infrastructure to support tourists remains underdeveloped.
- **Opportunities:** Opportunities include the growing awareness of ecotourism in the region, government support for tourism development, and the potential for business ventures related to ecotourism, such as eco-lodges and local product markets. The strategic location of Kuala Langsa, with easy access to transportation routes, further enhances its potential as a tourism hub.
- **Threats:** Coastal erosion and competition from other more established tourist destinations were identified as major threats. The lack of consistent community involvement in tourism promotion and management also poses a risk to the long-term sustainability of ecotourism in the area.

### 3.6 Strategic Recommendations for Sustainable Development

Based on the SWOT analysis and the findings of this research, several strategic recommendations can be made to enhance the development of ecotourism in Kuala Langsa. First, there is a need for improved infrastructure, particularly in terms of eco-friendly accommodations and public facilities, to better cater to tourists. Second, training programs for local community members should be expanded to include not only young people but also older generations, ensuring that the benefits of tourism are distributed across the community.

Third, conservation initiatives must be continued and strengthened, with a focus on community-led efforts to protect the mangrove ecosystem from threats such as coastal erosion and pollution. Finally, promotional activities should be intensified, utilizing digital platforms and social media to raise awareness about Kuala Langsa's unique ecotourism offerings. Collaboration between local government, tourism operators, and conservation organizations will be essential in driving these efforts forward.

The development of mangrove ecotourism in Kuala Langsa has had a positive impact on the local economy and environmental conservation efforts, but several challenges remain, particularly in infrastructure and inclusive community participation. By addressing these issues and leveraging the area's natural and cultural assets, Kuala Langsa has the potential to become a leading ecotourism destination. Continued government support, coupled with community engagement in both tourism and conservation efforts, will be crucial for ensuring the long-term sustainability of this initiative.

## 4. Conclusion and Recommendations

### 4.1 Conclusion

This study examined the impact of mangrove ecotourism on the welfare of the Kampung Nelayan community in Langsa City, highlighting its potential to support both economic development and environmental conservation. The findings indicate that the introduction of ecotourism in Kuala Langsa has provided tangible economic benefits, with many local households experiencing an increase in income through tourism-related activities. Ecotourism has also played a pivotal role in raising environmental awareness among the local community, fostering a greater sense of responsibility for the conservation of the mangrove ecosystem.

However, challenges remain, particularly in the areas of infrastructure and inclusive community participation. The underdeveloped tourism facilities and limited capacity for local community involvement, especially among older generations, present significant barriers to the long-term sustainability of the ecotourism initiative. Furthermore, threats such as coastal erosion and competition from other more accessible tourist destinations necessitate ongoing efforts in conservation and strategic planning.

Overall, this study underscores the importance of a balanced approach to ecotourism development—one that integrates economic, environmental, and social objectives. The success of mangrove ecotourism in Langsa City will depend on continued collaboration between local stakeholders, government agencies, and conservation organizations, as well as targeted investments in infrastructure and human resources.

### 4.2 Recommendations

1. **Infrastructure Development:** To fully capitalize on the potential of mangrove ecotourism, it is essential to invest in eco-friendly infrastructure that aligns with sustainable tourism principles. This includes building accommodations such as homestays or eco-lodges, developing clean public facilities, and improving transportation access to the mangrove tourism sites. These improvements will not only enhance the visitor experience but also increase the economic benefits for the local community by attracting more tourists and encouraging longer stays.
2. **Capacity Building and Community Training:** Local human resources need to be developed to ensure that the benefits of ecotourism are distributed across the community. Training programs should be provided to equip community members with the skills needed to engage in tourism management, hospitality, and eco-guiding. Special attention should be given to older community members who may struggle to transition from traditional livelihoods to tourism-related activities. Tailored training for different groups will help foster a more inclusive and sustainable tourism sector.
3. **Promotion and Marketing:** Effective promotion of Kuala Langsa as an ecotourism destination is crucial. Efforts should focus on raising the profile of the mangrove forest through digital platforms, social media, and collaborations with travel agencies. Highlighting the unique features of the area—such as the mangrove ecosystem, cultural heritage, and the traditional livelihoods of the fishing community—can help differentiate it from competing tourist destinations and attract both domestic and international visitors.
4. **Environmental Conservation Initiatives:** Continuous conservation efforts are vital for sustaining both the mangrove ecosystem and the ecotourism activities that depend on it. This study recommends expanding community-driven conservation programs, such as mangrove replanting and coastal erosion control. Government agencies and NGOs should provide ongoing support in the form of funding, resources, and technical expertise to ensure these initiatives are successful.

5. **Government and Stakeholder Collaboration:** A multi-stakeholder approach is necessary to achieve sustainable ecotourism development. The local government, tourism operators, community groups, and environmental organizations must work together to create a long-term development plan. This collaboration should focus on creating policies that promote sustainable tourism, provide financial incentives for conservation efforts, and ensure that the local community remains at the center of ecotourism development.
6. **Long-term Monitoring and Evaluation:** Regular assessment of the economic, social, and environmental impacts of ecotourism in Kuala Langsa is crucial for ensuring its sustainability. A monitoring framework should be established to track key performance indicators, such as tourist arrivals, income generated from ecotourism, and the health of the mangrove ecosystem. Continuous evaluation will allow for timely adjustments in strategy and help address any emerging challenges before they become critical.

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