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Exploring the Ecotourism Potential of Mangrove Ecosystems: A Case Study of Bhadrika Mangrove Tourism Park for Sustainable Coastal Development in Indonesia

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Abstract
This study explores the ecotourism potential of the Bhadrika Mangrove Tourism Park in Bengkulu, Indonesia, with the aim of assessing its attractiveness as a sustainable tourism destination that can contribute to both environmental conservation and local economic development. The research was conducted in July-August 2020, utilizing a mixed-methods approach that combined field observations and semi-structured interviews with local stakeholders, community members, and visitors. The data were analyzed using descriptive methods and the Scenic Beauty Estimation (SBE) technique to evaluate the aesthetic appeal of the park's mangrove ecosystems. The results revealed that the park's diverse mangrove species, river estuaries, and coastal landscapes offer significant potential for educational and recreational tourism activities. Key attractions include guided tours, photography zones, children's play areas, and local food vendors. The study also highlighted strong community support for ecotourism, with local residents expressing interest in participating in tourism-related activities and benefiting from increased job opportunities. Despite the promising potential, the study identified several challenges, including the need for infrastructure improvements and the importance of maintaining a balance between tourism growth and ecological preservation. This research contributes to the growing body of knowledge on mangrove ecotourism by providing a detailed case study of a lesser-known mangrove site in Indonesia. The findings suggest that with appropriate management, the Bhadrika Mangrove Tourism Park could serve as a model for sustainable ecotourism in coastal regions, promoting both conservation and community empowerment.

Keywords: Coastal Communities; Ecotourism; Indonesia; Mangrove Ecosystem; Sustainable Tourism.

INTRODUCTION

Mangrove forests are tropical and subtropical coastal ecosystems that are crucial for the ecological balance of coastal areas. These forests are characterized by the presence of salt-tolerant trees and shrubs that thrive in the intertidal zones of tropical coastlines. Mangroves provide various ecosystem services, including coastal protection, carbon sequestration, biodiversity support, and water filtration (Akram et al., 2023; Bimrah et al., 2022; John et al., 2022). Their roots serve as natural barriers against erosion, protecting coastlines from storm surges and rising sea levels. In addition, mangroves are essential for marine biodiversity, providing breeding grounds for a variety of fish and invertebrate species, many of which are vital to local fisheries (Cannicci et al., 2021; Ward et al., 2022; Zakaria & Rajpar, 2015).

Despite their significant ecological value, mangrove ecosystems are under threat due to a variety of anthropogenic factors, including coastal development, logging, and pollution (Woodroffe, 2002). According to a study by Ahmed et al. (2017), mangrove forests have been rapidly disappearing globally, with significant losses reported in Southeast Asia, where economic activities such as shrimp farming and urbanization have led to the destruction of these critical habitats. In Indonesia, the mangrove area has decreased drastically, with around 43% of mangrove forests in protected areas being degraded due to over-exploitation (Arifanti et al., 2022; Du et al., 2023; Goldberg et al., 2020). This alarming trend underscores the need for comprehensive conservation strategies that focus on the sustainable

management of mangrove ecosystems.

One potential solution to this issue is the development of mangrove-based ecotourism, which offers an opportunity to both conserve and utilize mangrove ecosystems in a way that benefits local communities. Ecotourism, as defined by Samal and Dash (2023), is a form of sustainable tourism that involves responsible travel to natural areas while promoting conservation and supporting local communities. In the context of mangroves, ecotourism can provide an economic incentive for the protection of these ecosystems by generating revenue through activities such as guided tours, bird watching, and environmental education programs. It can also raise public awareness about the importance of mangrove conservation, thereby fostering a sense of environmental stewardship among local populations (Tagulao et al., 2022).

Indonesia, with its extensive coastline and diverse mangrove ecosystems, presents a significant opportunity for the development of mangrove ecotourism. Several studies have explored the potential of mangrove-based ecotourism in various regions of Indonesia, including Bali, where mangrove management is integrated with tourism in the Perancak Estuary (Nuraeni & Kusum, 2023; Seary et al., 2021). In Surabaya, the Wonorejo mangrove area has also been recognized for its potential to boost local tourism through sustainable management practices (Mirza et al., 2023; Swangjang & Kornpiphat, 2021). These studies highlight the economic benefits of ecotourism for local communities and emphasize the need for effective management strategies to ensure the long-term sustainability of mangrove ecosystems.

However, despite the growing recognition of mangrove ecotourism as a sustainable development tool, there are few studies that specifically assess the ecotourism potential of the Bhadrika Mangrove Tourism Park in Bengkulu, a region known for its rich mangrove ecosystems. The existing literature on mangrove-based ecotourism often focuses on well-known destinations such as Bali or Surabaya (Erni Puspanantasari Putri et al., 2023; Hakim et al., 2018; Idajati & Widiyahwati, 2018), leaving a gap in research on other promising regions like Bengkulu. The Bhadrika Mangrove Tourism Park, located in the Gading Cempaka district of Bengkulu City, offers unique opportunities for ecotourism development due to its diverse mangrove species, river estuaries, and proximity to the long Bengkulu coastline. Yet, little is known about the potential of this site to support sustainable tourism initiatives that balance conservation with local economic development.

This study aims to fill this gap by exploring the ecotourism potential of the Bhadrika Mangrove Tourism Park in Bengkulu. The primary objective is to assess the park's attractiveness as a tourism destination and determine the key factors that could contribute to its development into a sustainable mangrove-based ecotourism site. The research will also provide insights into how local communities can benefit from ecotourism initiatives, with a focus on economic, social, and environmental outcomes. By addressing these aspects, this study will contribute to the growing body of knowledge on mangrove ecotourism in Indonesia and offer practical recommendations for policy makers and stakeholders involved in sustainable coastal management. Through this research, the potential of the Bhadrika Mangrove Tourism Park can be better understood, offering a model for other regions seeking to develop ecotourism as a tool for environmental conservation and community empowerment.

METHODS

This study was conducted in the Bhadrika Mangrove Tourism Park, located in the Gading Cempaka district of Bengkulu City, Indonesia, from July to August 2020. The primary objective of the study was to assess the ecotourism potential of the park and its ability to contribute to local community development through sustainable tourism practices. A mixed-method approach was employed, combining both qualitative and quantitative data collection methods to provide a comprehensive analysis of the park's tourism potential.

Study Area

The Bhadrika Mangrove Tourism Park is situated in the coastal area of Bengkulu City, Indonesia. The site is characterized by a diverse mangrove ecosystem, which includes a variety of mangrove species, estuaries, and coastal areas that are highly attractive to both local residents and potential

tourists. The park is easily accessible from the city and offers a variety of activities, including educational tours, nature walks, and recreational activities.

Data Collection

Data collection for this study was conducted using a combination of field observations and structured interviews with local stakeholders, visitors, and community members. Field observations were performed to assess the physical characteristics of the Bhadrika Mangrove Tourism Park, including its mangrove ecosystems, river estuaries, and beach areas. Photographs were taken to document the park's key attractions, such as the mangrove stands, which are of particular interest for tourism activities. The observations focused on identifying potential tourist activities, including educational tours, nature walks, and recreational opportunities like photography spots and children's play areas. In addition to observations, interviews were conducted with key stakeholders, such as local government officials, business owners, and community leaders, to gather insights on the potential for ecotourism development. These interviews aimed to explore their perspectives on the park's role in the local economy, the environmental benefits of ecotourism, and the community's interest in participating in tourism-related activities. Further interviews were carried out with visitors to gain an understanding of their experiences and perceptions of the park. These interviews focused on their views regarding the park's attractiveness, the activities offered, and the potential benefits of ecotourism for the local community. All interviews were semi-structured, allowing for in-depth discussions and capturing diverse viewpoints. Through these methods, data were collected on the park's ecological and aesthetic appeal, as well as the community's attitudes and willingness to support sustainable tourism initiatives.

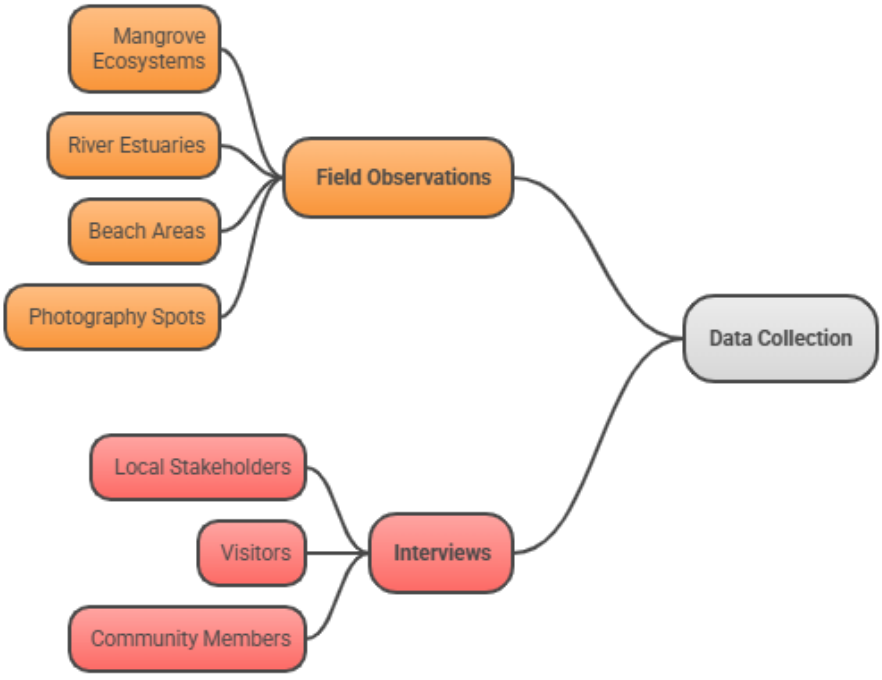

Figure 1. Data Collection Mapping

Data Analysis

Data analysis was carried out using both qualitative and quantitative methods to provide a comprehensive understanding of the Bhadrika Mangrove Tourism Park's ecotourism potential. The qualitative data from field observations and interviews were transcribed and analyzed thematically, with key themes emerging around the attractiveness of the park, the activities it offers, and community involvement. These themes were further categorized to focus on aspects such as the ecological features of the mangrove ecosystem, tourism opportunities, and the perceptions of local residents, stakeholders, and visitors. The qualitative analysis helped to uncover insights into the park's strengths, such as its biodiversity and natural beauty, and the community's potential role in supporting ecotourism. To

complement the qualitative findings, the Scenic Beauty Estimation (SBE) method was employed to assess the aesthetic value of the park's landscape. This quantitative approach involved evaluating the visual appeal of different areas within the park based on photographs taken during field observations. Ratings were assigned to various attractions, such as mangrove forests and river estuaries, providing an objective measure of their attractiveness. The results from both the thematic analysis and the SBE method were then integrated to form a holistic view of the park's potential for sustainable tourism. To ensure the validity of the findings, the data were cross-checked with existing literature on mangrove ecotourism, further strengthening the study's conclusions.

Validity and Reliability

To ensure the validity and reliability of the data, triangulation was employed by comparing data obtained through observations, interviews, and the SBE method. Additionally, the interviews were conducted with a diverse range of respondents to capture a variety of perspectives, including local residents, tourists, and stakeholders involved in tourism management. The results were cross-checked against existing literature on mangrove ecotourism to validate the findings and ensure consistency with previous studies (Chamberland-Fontaine et al., 2022; Quevedo et al., 2023).

Ethical Considerations

Ethical approval for the study was obtained from the relevant local authorities, and informed consent was obtained from all interview participants. Participants were assured of their anonymity and the confidentiality of their responses. The study adhered to ethical standards of research, ensuring that all data collection procedures were conducted in an ethical and respectful manner.

RESULTS AND DISCUSSION

Potential and Tourist Attractions of Bhadrika Mangrove Tourism Park

The Bhadrika Mangrove Tourism Park in Bengkulu features several key attractions that make it a viable candidate for ecotourism development. Among the most notable features are the park's diverse mangrove ecosystems, river estuaries, and coastal areas, all of which are rich in biodiversity and offer ample opportunities for ecotourism activities. The park's mangrove stands, in particular, are home to various species of mangroves that play vital roles in the coastal ecosystem.

Table 1: Mangrove Species Found in Bhadrika Mangrove Tourism Park

Family	Species	Local Name	Ecological Role
Avicenniaceae	Avicennia alba	Api-api	Main species
Rhizophoraceae	Bruguiera cylindrica	Tanjung putih	Main species
Combretaceae	Lumnitzera racemosa	Mangadai	Secondary species
Euphorbiaceae	Excoecaria agallocha	Buta-buta	Secondary species
Myrsinaceae	Aegiceras corniculatum	Teruntum	Secondary species

Based on Table 1, five mangrove species were identified within the park. Two species, Avicennia alba and Rhizophora cylindrica, are considered the main mangrove species, while three species Lumnitzera racemosa, Excoecaria agallocha, and Aegiceras corniculatum are categorized as secondary species. These species contribute to the park's biodiversity and ecological function, supporting both wildlife and tourism activities.

Ecotourism Activities and Facilities

The park offers a wide variety of activities that can attract tourists, both for educational purposes and recreational enjoyment. One of the primary activities available is guided tours through the mangrove forest, which provide visitors with an opportunity to learn about the species and the ecological importance of mangrove ecosystems. Additionally, the park features a photography zone, where visitors can capture the beauty of the mangrove forest and its surrounding landscapes. The scenic views, including wooden hanging chairs and bridges overlooking the mangrove forest, provide excellent

spots for photography.

The park also offers a range of recreational facilities, such as an outbound area and a children's playground with attractions like a hobbit house garden, a fountain, treehouses, and slides. These facilities enhance the park's appeal, particularly for family-oriented visitors.

In terms of amenities, the park is equipped with essential facilities, including restrooms, a prayer room, and food vendors offering local Indonesian dishes like *Es Kelapa Muda* (young coconut ice), *Sate* (satay), and *Tongseng* (a traditional Indonesian stew). These services add to the overall visitor experience, making the park not just an ecological destination, but also a place for relaxation and cultural immersion.

Community Perception and Economic Potential

Interviews with local stakeholders, community members, and visitors revealed a positive reception towards the development of the Bhadrika Mangrove Tourism Park. Many respondents expressed enthusiasm about the potential for the park to contribute to local economic development, particularly by providing new job opportunities and fostering community engagement in tourism-related activities. The local community sees the park as an opportunity to boost the local economy through tourism while simultaneously preserving the natural environment.

Table 2. Community Engagement and Perceptions of Ecotourism

Aspect	Community Response	Perceived Benefit
Local Economic Impact	Positive response from local business owners	Increased tourism-related revenue, job creation
Environmental Conservation	Support for sustainable tourism practices	Preservation of mangrove ecosystem, awareness
Community Involvement	High level of community interest in participating	Empowerment through tourism-related activities

Based on Table 2, the local community is supportive of the development of the Bhadrika Mangrove Tourism Park as an ecotourism destination. Respondents view the park as a valuable asset for local economic growth, particularly through tourism-related revenues and job creation. Moreover, there is strong support for sustainable tourism practices, with many individuals expressing interest in actively participating in ecotourism activities to help preserve the park's natural environment.

Discussion

The development of ecotourism in mangrove areas has gained significant attention due to its potential to balance environmental conservation with economic development. The findings of this study on the Bhadrika Mangrove Tourism Park in Bengkulu align with previous research that highlights the importance of mangroves as both ecological and economic resources. Studies by Akram et al. (2023) and Seary et al. (2021) have shown that mangrove ecosystems are not only essential for biodiversity but also offer valuable opportunities for ecotourism development, particularly in coastal regions of Indonesia. Similar to these studies, the Bhadrika Mangrove Tourism Park offers significant ecotourism potential, with its diverse mangrove species, river estuaries, and coastal areas, which can attract both educational and recreational tourism.

The results of this study contribute to the growing body of knowledge on sustainable ecotourism practices in mangrove ecosystems. Unlike previous studies that focused on well-established ecotourism sites in regions such as Bali and Surabaya (Purnamawati et al., 2022; Rosilawati & Ariyati, 2021), this research emphasizes the potential of lesser-known mangrove areas like Bhadrika in Bengkulu. The study's unique contribution lies in its detailed exploration of local community perceptions and the park's tourism infrastructure, which are crucial factors in the successful implementation of sustainable ecotourism initiatives. It highlights how community involvement and local economic empowerment are central to the success of ecotourism projects, a key factor that has been underexplored in similar studies.

Furthermore, the study's findings underscore the importance of combining ecological preservation with the development of tourism activities that engage and benefit the local community. While previous studies by Zurba et al. (2022) have emphasized the need for sustainable tourism practices, this research specifically demonstrates how the Bhadrika Mangrove Tourism Park can serve

as a model for integrating environmental education, recreation, and local participation. It suggests that ecotourism can foster a deeper understanding of mangrove ecosystems among visitors while providing tangible benefits to the local population through job creation and increased tourism revenues.

However, the research also has limitations that should be considered. First, the study was conducted over a limited period (July-August 2020), which may not fully capture the seasonal variations in tourist visitation and community engagement throughout the year. Moreover, the study relied on self-reported data from interviews with stakeholders and community members, which may introduce bias in the responses. While the study provides valuable insights into the potential of the park, further research is needed to explore the long-term impacts of ecotourism on both the environment and the community. Additionally, a more detailed economic analysis of the direct and indirect benefits of ecotourism, including job creation and local business development, would enhance the understanding of the park's potential to support sustainable economic growth. Lastly, the park's infrastructure and management strategies require further investigation to ensure that the development of tourism activities does not compromise the park's ecological integrity.

This study highlights the significant potential of the Bhadrika Mangrove Tourism Park to serve as an ecotourism destination, contributing to both environmental conservation and local economic development. It also emphasizes the need for comprehensive management strategies that balance tourism growth with the protection of mangrove ecosystems. Although the findings provide a promising outlook for the park, further research is necessary to refine ecotourism strategies and ensure the long-term sustainability of the park as both a tourist attraction and a vital ecological resource.

CONCLUSION

In conclusion, the Bhadrika Mangrove Tourism Park in Bengkulu presents significant potential for ecotourism development, offering both ecological and economic benefits to the local community. The park’s rich biodiversity, including a variety of mangrove species and its coastal landscapes, makes it an attractive destination for educational and recreational tourism. The positive response from the local community, coupled with the potential for job creation and sustainable tourism activities, highlights the park’s capacity to contribute to the region's economic growth. This study adds to the growing body of knowledge on mangrove ecotourism by demonstrating how such initiatives can support environmental conservation while empowering local communities.

However, successful development will require careful management to ensure the park’s natural resources are preserved while promoting sustainable tourism practices. Key factors such as infrastructure development, community engagement, and environmental education will play crucial roles in the park’s long-term success. The research also identifies the need for further studies to assess the long-term impacts of ecotourism on both the environment and the local economy, as well as to refine strategies for managing visitor flow and maintaining ecological integrity. Despite these challenges, the Bhadrika Mangrove Tourism Park represents a promising opportunity for sustainable ecotourism, providing a model for other regions seeking to balance conservation with community development.

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