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## MANGROVE ECOTOURISM AS AN EDUCATION AND LEARNING FACILITY

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**ABSTRACT:** This study investigates the educational benefits of mangrove tourism on Gili Sulat, an uninhabited island designated as an Aquatic Tourism Park in Lombok, Indonesia. The study is exploratory research. The research sample was determined purposively, they were 10 fifth-semester Biology Education students engaged in practicums on Gili Sulat. Through a questionnaire and interview sessions, the study explores the students' perceptions and experiences regarding the educational aspects of mangrove ecotourism. Perception data was analyzed qualitatively. The findings reveal that the primary motivation for the students' visit was education and learning, emphasizing the unique ecosystem's allure. The students demonstrated a nuanced understanding of the mangrove ecosystem's role in protecting coastal environments and expressed heightened inspiration for environmental protection. Their suggestions for improvement, such as species name boards, and the willingness to revisit Gili Sulat for educational activities underscore the enduring impact of mangrove ecotourism on fostering environmental awareness and responsibility. The study contributes to the discourse on the educational potential of ecotourism, particularly in the context of mangrove ecosystems, advocating for the continued promotion and preservation of such destinations as invaluable educational resources.

**Keywords:** Mangrove Ecotourism, Gili Sulat, Education and Learning, Biodiversity Conservation, Experiential Learning.

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### INTRODUCTION

The study of Mangrove Ecotourism as an education and learning facility is of paramount importance in the contemporary context of environmental education and sustainable tourism. As the global community grapples with the urgent need for conservation and awareness in the face of climate change and biodiversity loss, mangrove ecosystems stand out as vital areas for exploration. Mangroves, often termed the "nurseries of the sea," are unique coastal ecosystems that provide critical habitats for diverse marine life. This study seeks to illuminate the transformative potential of mangrove ecotourism in not only showcasing the natural beauty of these ecosystems but also in serving as a dynamic platform for environmental education and experiential learning.

Mangrove ecosystems are renowned for their ecological significance as they serve as essential buffers against climate change impacts. These unique coastal



habitats play a crucial role in sequestering carbon, mitigating the effects of rising sea levels, and providing resilience against storm surges. Recent research by Bandh et al. (2023) underscores the pivotal role of mangroves in climate change mitigation, emphasizing the need for their conservation. The study of mangrove ecotourism is critical as it provides an avenue for individuals to directly witness the ecosystem services provided by mangroves, fostering a deeper understanding of their importance in the context of climate change.

Mangrove ecotourism stands at the intersection of recreation and education, offering a unique opportunity to communicate the significance of these ecosystems to a broad audience. The immersive nature of ecotourism experiences, as highlighted by (Samal & Dash, 2023), has the potential to instill lasting memories and knowledge. This study will explore how mangrove ecotourism serves as an educational facility, enhancing public understanding of the intricate ecological processes within mangrove ecosystems and contributing to a more environmentally literate society.

Beyond the ecological benefits, mangrove ecotourism has significant socioeconomic implications, particularly for local communities residing in proximity to these ecosystems. By providing employment opportunities and generating income, mangrove ecotourism can contribute to poverty alleviation and sustainable development. Studies by Kunjuran et al. (2022) emphasize the importance of community involvement in the planning and management of ecotourism initiatives. Mangroves are often deeply intertwined with the cultural heritage and traditional knowledge of coastal communities. Understanding and preserving the cultural significance of mangroves are integral components of sustainable ecotourism. Research by (Donohoe, 2011) explores the interconnection between cultural heritage and mangrove conservation, emphasizing the need for cultural sensitivity in ecotourism initiatives. Mangrove ecotourism has the potential to serve as a catalyst for conservation and restoration efforts. As visitors engage with mangrove ecosystems, they become firsthand witnesses to the impacts of human activities and the importance of conservation. The role of ecotourism in promoting conservation awareness and facilitating restoration initiatives (Kiper, 2013).

The establishment of educational programs and interpretation centers within mangrove reserves is pivotal in maximizing the educational potential of ecotourism. These centers offer a structured approach to disseminating scientific knowledge, delivering guided tours, and engaging visitors through interactive exhibits. Such programs cater to diverse audiences, including students, tourists, and local communities, enhancing public understanding and fostering a sense of environmental stewardship. While mangrove ecotourism holds great promise for education and conservation, it also presents challenges that need to be addressed. Overcrowding, habitat disturbance, and inadequate waste management are potential negative impacts associated with irresponsible ecotourism practices. Studies by Sam et al. (2023) stress the importance of adopting and enforcing sustainable practices to mitigate adverse effects.

Mangrove ecotourism has the potential to engage the public in citizen science initiatives, turning visitors into active contributors to scientific knowledge



and conservation efforts. The work of Nesha-Dushani et al. (2023) exemplifies how ecotourists can collect valuable data on mangrove ecosystems, enhancing scientific understanding while fostering a sense of environmental responsibility. The realization of the educational potential of mangrove ecotourism hinges on robust policy frameworks that balance conservation needs with the socio-economic aspirations of local communities.

One ecotourism that has the potential as a means of education is mangrove tourism on Gili Sulat, Lombok - Indonesia. Gili Sulat, nestled within the pristine expanse of the Lesser Sunda region, stands as an extraordinary educational haven with its designation as an Aquatic Tourism Park. This uninhabited island unfolds a captivating mosaic of coastal ecosystems, featuring mangroves, seagrasses, and coral reefs (Hilyana et al., 2020). Gili Sulat's mangrove ecosystem, intricately woven with tangled roots adapted to saline conditions, provides a unique setting for students to explore the interconnected web of life in coastal regions. The island's strategic geographical location and relatively untouched marine waters offer a picturesque backdrop for students to witness the delicate balance essential for sustainable coexistence. Beyond its ecological charm, Gili Sulat holds promise as an educational and learning facility, offering students a multifaceted exploration of coastal ecosystems and fostering an appreciation for the intricate relationships that shape our planet's biodiversity.

This introduction provides a foundational overview of the importance of studying mangrove ecotourism as an education and learning facility. The subsequent sections of this article will delve into each aspect, drawing on the latest research and insights to present a comprehensive understanding of the role of mangrove ecotourism in Gili Sulat in advancing education and learning. By exploring the ecological, socioeconomic, and cultural dimensions of mangrove ecotourism, this study aims to contribute to the broader discourse on sustainable tourism and environmental education.

## **METHODS**

### **Study Area and Participants**

The research focused on exploring the benefits of mangrove ecotourism as an educational and learning facility in Gili Sulat, Lombok - Indonesia. Gili Sulat, with its rich biodiversity and unique mangrove ecosystems, served as an ideal location for investigating the educational aspects of mangrove ecotourism. The study participants consisted of 10 fifth-semester Biology Education students who were actively engaged in practicums on Gili Sulat. The demographic profile of the participants revealed an age range between 19 and 20 years, evenly distributed between male and female genders. The selection of Biology Education students ensured that the respondents possessed a foundational understanding of ecological principles, enhancing the depth of their insights into the educational benefits of mangrove ecotourism.

### **Data Collection Instrument**

To gather data on the benefits of mangrove ecotourism in Gili Sulat as an educational and learning facility, a structured questionnaire was employed. The questionnaire was designed to elicit responses from participants regarding their



experiences, perceptions, and insights gained during their practicums. The questions were crafted to explore various dimensions of mangrove ecotourism, including its educational value, impact on environmental awareness, and contributions to community engagement. The questionnaire also included open-ended questions to allow participants to provide qualitative insights into their experiences. Prior to its use in the study, the questionnaire underwent a rigorous validation process conducted by two experts in the fields of ecology and education to ensure its relevance, clarity, and effectiveness as a data collection instrument.

### **Sampling and Data Collection**

The sampling strategy employed for this research involved purposeful sampling of fifth-semester Biology Education students who were actively participating in practicums on Gili Sulat. Given the specific focus on the educational aspects of mangrove ecotourism, these students represented an informed and engaged group with a particular interest in the subject matter. The data collection process took place during and after the participants' practicum experiences. Participants were briefed about the study, and informed consent was obtained before the distribution of the questionnaires. The questionnaire administration was carried out in a structured manner, allowing participants sufficient time to reflect on their experiences and provide thoughtful responses. The data collection phase aimed to capture a comprehensive overview of the benefits of mangrove ecotourism as an educational and learning facility.

### **Data Analysis**

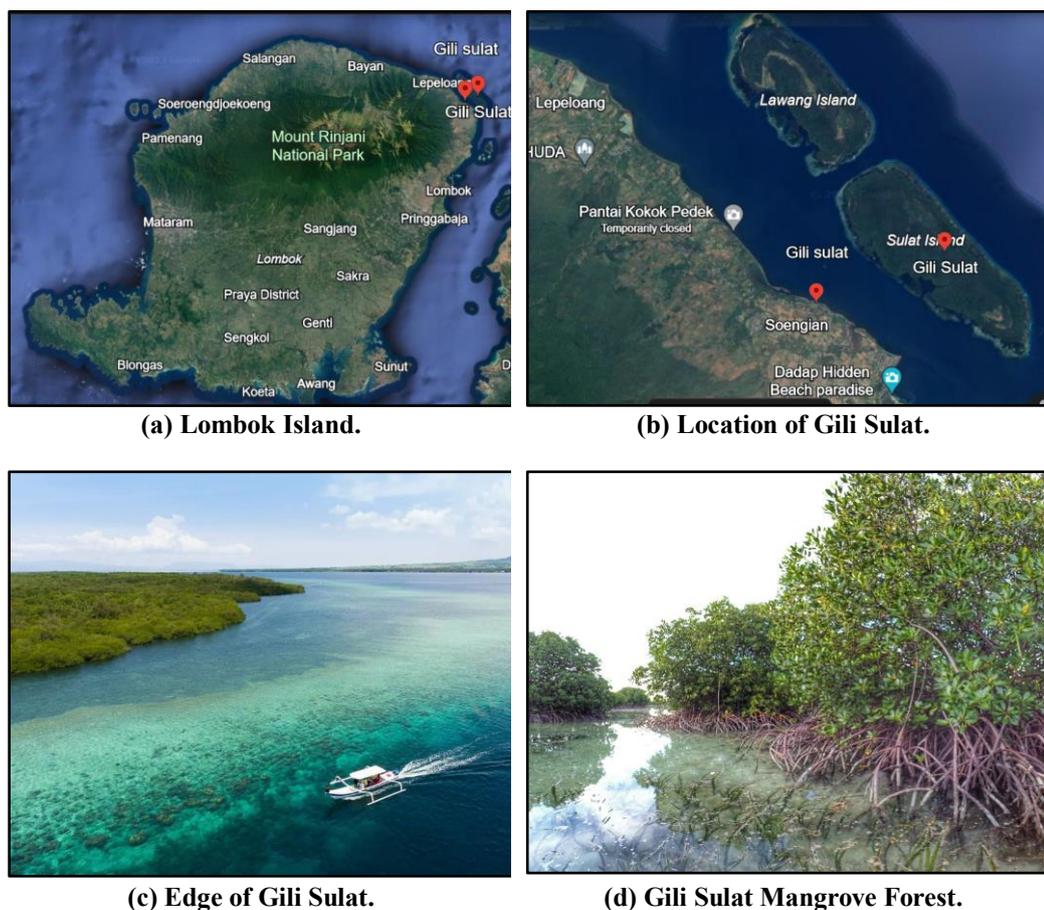
The research data, comprising responses from the structured questionnaires, was subjected to qualitative analysis to extract meaningful insights into the benefits of mangrove ecotourism in Gili Sulat. Qualitative analysis methods (Creswell & Creswell, 2018), including thematic coding and content analysis, were employed to categorize and interpret the responses. Themes related to educational outcomes, environmental awareness, community engagement, and other relevant aspects emerged through this analysis. The qualitative approach allowed for a nuanced exploration of the participants' perspectives and experiences, providing a rich understanding of the educational impact of mangrove ecotourism. The findings were presented in a narrative format, incorporating direct quotes and illustrative examples to enhance the authenticity and depth of the qualitative data.

### **Ethical Considerations**

Ethical considerations were paramount throughout the research process (Yip et al., 2016). Informed consent was obtained from all participants, and they were assured of the confidentiality and anonymity of their responses. The research adhered to ethical guidelines, ensuring that participants were treated with respect and dignity. The study also sought to minimize any potential harm or discomfort to participants. The validation process of the questionnaire involved ethical scrutiny to ensure that the instrument was clear, non-intrusive, and aligned with the research objectives. Additionally, the research team maintained transparency in communicating the purpose and objectives of the study, fostering a collaborative and ethical research environment (Felzmann, 2009).

## RESULTS AND DISCUSSION

Gili Sulat, nestled within the Lesser Sunda region, stands as a promising educational haven, particularly for students seeking an immersive learning experience in marine ecology. This uninhabited island, designated as an Aquatic Tourism Park, showcases a distinctive trifecta of coastal ecosystems—mangroves, seagrasses, and coral reefs. With an expansive mangrove ecosystem covering 641,630 hectares, complemented by a coral reef area spanning 178,688 hectares and a seagrass ecosystem spanning 47,599 hectares, Gili Sulat offers students a diverse and interconnected tapestry of ecological wonders (Hilyana et al., 2020).



**Figure 1. Gili Sulat Ecotourism Area, Lombok – Indonesia.**

The mangrove ecosystem, a vital component of Gili Sulat's coastal makeup, provides students with a living classroom to explore the ecological intricacies of these unique environments. The tangled roots of mangroves, adapted to saline conditions, serve as nurseries for marine life, offering a firsthand glimpse into the interconnected web of life in coastal regions. The seagrass ecosystem, with its vast expanse, becomes a stage for students to understand the significance of these underwater meadows in supporting marine biodiversity. Gili Sulat's coral reef ecosystem, a delicate and vibrant underwater world, invites students to explore the interconnectedness of marine life and witness the importance of conservation in



maintaining the health of these ecosystems. The island's strategic geographical location and relatively pristine marine waters provide an ideal setting for students to witness the beauty of nature while gaining an appreciation for the delicate balance required for sustainable coexistence.

Beyond its ecological richness, Gili Sulat's potential as an educational and learning facility extends to the cultural and socioeconomic dimensions. The island's designation as an Aquatic Tourism Park underscores its role in promoting responsible tourism and community livelihoods. Students engaging with Gili Sulat have the opportunity to learn not only about marine ecosystems but also about the delicate balance between environmental conservation and the socioeconomic well-being of local communities. The collaborative efforts in fisheries and ecotourism development underscore the island's potential to serve as a case study for sustainable practices, imparting valuable lessons to students about the intersection of ecology, economy, and culture. Overall, Gili Sulat emerges as a dynamic educational resource, offering students a multifaceted exploration of coastal ecosystems, environmental conservation, and the intricate relationships that shape our planet's biodiversity.

The findings from the questionnaire and interview sessions with the fifth-semester Biology Education students who visited mangrove tourism on Gili Sulat provide valuable insights into the educational benefits derived from this ecotourism destination (see the Appendix: Research questionnaire on the benefits of mangrove tourism on Gili Sulat in the context as an educational facility). This discussion will delve into various aspects, including the main purpose of the visit, perceptions of the educational aspects, understanding of the mangrove ecosystem's role, the impact on the final course competency, encounters with flora and fauna, inspiration for environmental protection, suggested improvements in educational facilities, the likelihood of revisiting, recommendations to others, experiences in other mangrove tourism locations, assessments of educational benefits elsewhere, actions for environmental preservation, and suggestions for enhancing the benefits of mangrove tourism on Gili Sulat.

#### **Main Purpose of the Visit**

The overwhelming response indicating that the main purpose of the students' visit to mangrove tourism on Gili Sulat was education and learning aligns with the fundamental goal of ecotourism. As noted by Arrobas et al. (2020), education is a central component of sustainable tourism, contributing to increased environmental awareness and fostering a sense of responsibility among visitors. Gili Sulat's unique ecosystem, comprising mangroves, seagrasses, and coral reefs, positions it as an ideal setting for educational exploration, attracting students eager to deepen their understanding of coastal ecosystems.

#### **Most Interesting Aspect Regarding Education in Mangrove Ecotourism**

The students' consensus on the most interesting aspect being the unique ecosystem underscores the significance of biodiversity and ecological complexity in educational experiences. According to Angela (2023), unique and diverse environments enhance the educational value of ecotourism. Gili Sulat's amalgamation of mangroves, seagrasses, and coral reefs provides students with a



multifaceted learning environment, stimulating their curiosity and fostering a deeper appreciation for the interconnectedness of coastal ecosystems.

### **Prior Knowledge about Ecotourism**

The revelation that the students had not learned about ecotourism before their visit to Gili Sulat suggests that the educational benefits extend beyond conventional classroom learning. Experiential learning in ecotourism settings can bridge gaps in formal education, providing practical insights that may be missed in traditional educational settings. Gili Sulat, by serving as a practical classroom, introduces students to the principles and practices of ecotourism organically.

### **Understanding of the Mangrove Ecosystem's Role**

The affirmative response to understanding the role of the mangrove ecosystem in protecting the marine and coastal environment aligns with the ecological principles that underscore the significance of mangroves in coastal resilience. This comprehension is critical for fostering environmental stewardship. Studies by De Dominicis et al. (2023) emphasize the pivotal role of mangroves in protecting coastal areas, highlighting the importance of disseminating this knowledge through ecotourism experiences.

### **Support for Final Course Competency**

The perception that the practicum activity on Gili Sulat strongly supports the final competency of the course aligns with the transformative potential of practical experiences in education. As discussed by Satrya et al. (2019), hands-on experiences in ecotourism settings can enhance students' understanding of theoretical concepts and contribute to the development of practical skills. The integration of experiential learning in the mangrove tourism context ensures a holistic approach to achieving course competencies.

### **Encounters with Flora and Fauna**

The enumeration of specific animal and plant species encountered during the visit, such as *Rhizophora mucronata*, *Rhizophora stylosa*, *Cyprea tigris*, and *Echinometra mathaci*, reflects the students' attention to detail and their ability to identify key components of the mangrove ecosystem. This aligns with the notion that ecotourism experiences contribute to biodiversity literacy, as emphasized by Butarbutar and Pollo (2020). The ability to recognize and appreciate various species indicates a successful transfer of knowledge during their visit to Gili Sulat.

### **Inspiration for Environmental Protection**

The affirmative response to feeling more inspired to protect the environment after visiting Gili Sulat underscores the potential of mangrove ecotourism as a motivational force for environmental conservation. Ecotourism experiences can evoke a sense of responsibility and commitment to environmental protection. Gili Sulat's well-maintained ecosystem becomes a source of inspiration, reinforcing the interconnectedness of environmental health and human actions (Hadiprayitno et al., 2014).

### **Suggestions for Improvement in Educational Facilities**

The suggestion to display species name boards in the Gili Sulat ecotourism area reflects a keen awareness of the importance of interpretative tools in enhancing the educational experience. Species name boards not only aid visitors in identifying



and appreciating the biodiversity but also serve as a means of education, enriching the overall ecotourism experience.

### **Willingness to Revisit for Educational Activities**

The affirmative response to the desire to revisit mangrove ecotourism on Gili Sulat for educational activities in the future signals a positive and lasting impact on the students. This aligns with the idea that sustainable tourism experiences create lasting memories and impressions. The willingness to return for educational purposes indicates the enduring educational value associated with Gili Sulat's mangrove ecotourism.

When students visit the mangroves of Gili Sulat for practical and educational purposes, they gain a multifaceted learning experience. Firstly, they have the opportunity to observe and understand the unique adaptations of mangrove ecosystems, such as the intricate root systems that thrive in saline conditions, serving as nurseries for marine life. This hands-on exposure allows students to grasp the ecological intricacies of coastal environments. Additionally, exploring the interconnectedness of mangroves, seagrasses, and coral reefs on the island provides a holistic perspective on marine ecosystems. Students can learn about the symbiotic relationships between these habitats and their crucial role in maintaining biodiversity.

Practically, students can engage in activities such as species identification, contributing to a deeper understanding of the diverse flora and fauna within the mangrove ecosystem. This experiential learning fosters a connection between theoretical knowledge and real-world application. Moreover, students may participate in environmental monitoring efforts, learning about the importance of conservation and sustainable practices. Gili Sulat's strategic location and relatively pristine marine waters offer an ideal setting for students to witness firsthand the delicate balance required for the coexistence of ecosystems and human activities.

Beyond ecological insights, the visit to Gili Sulat provides a platform for students to explore the cultural and socioeconomic dimensions of sustainable tourism. They can witness the collaborative efforts in fisheries and ecotourism development, gaining insights into the delicate balance between environmental conservation and the well-being of local communities. In essence, a visit to Gili Sulat for educational activities offers students a rich and immersive experience, instilling lasting memories and impressions that contribute to their understanding of ecological systems and the importance of responsible tourism practices.

## **CONCLUSION**

In conclusion, the study on the benefits of mangrove tourism on Gili Sulat as an educational and learning facility provides a comprehensive understanding of the transformative potential of this ecotourism destination. The students' primary motivation for visiting Gili Sulat was rooted in a quest for education and learning, emphasizing the pivotal role of ecotourism in expanding traditional classroom knowledge. Their recognition of the unique ecosystem as the most compelling educational aspect underlines the significance of biodiversity and ecological complexity in shaping educational experiences. Moreover, the students' newfound understanding of the mangrove ecosystem's role in protecting marine and coastal



environments reflects the successful transmission of ecological knowledge, aligning with the broader goals of sustainable tourism and environmental education. The tangible encounters with diverse flora and fauna and the expressed inspiration for environmental protection highlight the real-world impact of Gili Sulat's mangrove tourism on fostering a sense of environmental responsibility among the students.

Furthermore, the students' suggestions for improvement, such as displaying species name boards for enhanced educational value, and their willingness to revisit Gili Sulat for educational activities underscore the dynamic nature of mangrove ecotourism as a continual source of learning and inspiration. The positive recommendations to friends and fellow students affirm the enduring educational benefits of Gili Sulat's mangrove tourism, positioning it as a valuable educational vehicle. The findings from this study contribute to the growing body of literature on the role of ecotourism in education, emphasizing the importance of experiential learning in fostering environmental awareness and stewardship. As Gili Sulat emerges as a beacon of sustainable and educational tourism, the study advocates for the continued promotion and preservation of such ecotourism destinations for the benefit of both students and the broader community.

## **IMPLICATIONS FOR FUTURE RESEARCH**

The findings of this study on the educational benefits of mangrove tourism on Gili Sulat open avenues for future research to further explore and enhance the intersection of ecotourism and education. Firstly, future studies could delve deeper into the long-term impact of mangrove ecotourism on students' environmental attitudes and behaviors. Longitudinal research could provide insights into the sustained influence of such experiential learning on individuals' commitment to environmental conservation. Additionally, examining the effectiveness of specific educational interventions within mangrove ecotourism, such as interpretative programs or immersive technologies, could offer a nuanced understanding of the most impactful educational strategies.

Comparative studies among mangrove tourism sites can reveal educational variations, offering insights into success factors. Exploring technology like virtual reality may enhance mangrove ecotourism education. Interdisciplinary research involving educators, ecologists, and tourism experts can provide holistic perspectives. Investigating socio-economic impacts on local communities can deepen our understanding, refining educational practices and advancing sustainable tourism management.

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