

TLOCOR MARINE TOURISM-LUSI ISLAND AS A MEANS OF ENVIRONMENTAL CONSERVATION AND EMPOWERMENT OF THE SURROUNDING COMMUNITY IN SIDOARJO

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ABSTRACT:

Tlocor Marine Tourism-Lusi Island, located in Sidoarjo, East Java, is an ecotourism destination that combines environmental conservation and local community empowerment. This study aims to analyze the role of tourism in the context of environmental conservation and empowerment of the surrounding community. The data were collected through field observations, interviews with five main informants (tourism coordinators, POKDARWIS members, and local communities), and documentation. In addition, numerical data were also added, including visitor information, community participation levels, economic influence, and environmental benefits to strengthen the analysis. The results of the study show that the Mangrove ecosystem is well maintained, functioning as a tourist attraction as well as a buffer for the coastal ecosystem. However, inadequate transportation access, lack of digital promotion, and low community participation are the main challenges. Nevertheless, the existence of this tourism has increased environmental awareness and created economic opportunities for the local community. With infrastructure support, better promotion, and optimal community involvement, Tlocor Marine Tourism-Lusi Island has great potential to develop into a leading ecotourism destination. Finally, this study emphasizes the importance of collaborative efforts between environmental conservation and community empowerment in sustainable ecotourism management.

Keywords: *Tlocor Marine Tourism, Lusi Island, Environmental Conservation, Community Empowerment*

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1. INTRODUCTION

As an archipelagic country, Indonesia has abundant marine wealth, both from biodiversity and marine tourism potential (Aminuddin & Burhanuddin, 2023). One of the areas fitting the latter category is the Tlocor marine tourism - Lusi Island in Sidoarjo Regency, East Java. Lusi Island is named after the Sidoarjo Mud which was formed due to the sedimentation of hot mud that spurted in the Lapindo mud burst disaster in 2006 (Prajakusuma, 2021). Lusi Island in Sidoarjo shares commonalities with other post-disaster tourist destinations, such as the Merapi Lava Tour in Yogyakarta. After the eruption of Mount Merapi, the area was developed into an educational tourist attraction that offers first-hand experience of seeing the impact of the eruption and the environmental recovery process (Muktaf, 2017). In terms of ecotourism, a mangrove-based ecotourism similar to that of Lusi Island exists in Langkawi, Malaysia. In Langkawi, tourists can observe biodiversity, such as eagles and monkeys, and understand the importance of mangrove ecosystems in maintaining environmental balance (Blanton et al., 2024). These comparisons show that tourist destinations that emerge after a disaster or are based on certain ecosystems can provide significant educational and conservation value.

The unexpected natural phenomenon created a new island at the mouth of the Porong River. Although the event was initially considered a disaster, Lusi Island birthed new potential as a unique marine tourism destination, which can provide ecological and socio-economic benefits for the people in the surrounding environment. Lusi Island is now known as an ecotourism area with a very attractive natural scenery and a beauty of mangroves that continue to be maintained (Prabandari et al., 2024). Ecotourism is a part of natural tourism that is based on ecology, prioritizing the balance between individuals and their environment. In Indonesia, ecotourism is a necessity that aims to preserve nature while improving people's welfare, with the

principle of "the more preserved, the more prosperous" (Sya & Said, 2020). Lusi Island reflects this principle through mangrove conservation which goes hand in hand with the empowerment of local communities.

In addition, its unique existence makes it a symbol of post-disaster environmental utilization. The natural conditions on Lusi Island that continue to develop, especially in the preservation of mangrove ecosystems, are the main attraction for tourists. Mangroves in this area function as natural habitats for various types of fauna, as well as a natural buffer from coastal abrasion. In addition, the biodiversity on Lusi Island creates a new ecosystem that supports the balance of the environment at the mouth of the Porong River. The urgency of the research lies in the need to answer the challenges faced in the management of Tlocor Marine Tourism-Lusi Island, especially in the aspects of environmental conservation and community empowerment. Pulau Lusi has great potential that has not been maximized, while challenges such as the lack of community participation and support from the government are still the main obstacles. This research is important in providing concrete solutions that can integrate environmental conservation with local economic development which is beneficial in the long term for the surrounding community.

Lusi Island and the surrounding area offer unique natural scenery that can be a special attraction for tourists (Yoga, 2024). In addition to its history and natural beauty, this area also has great potential for ecotourism-based tourism development, but tourism management in this area still faces various challenges. Based on initial observations and several pieces of literature, the participation of local communities in tourism management seems to be still low. This is reflected in the limited involvement of the community in activities such as tourist guides, mangrove conservation management, or the development of tourist facilities. For example, although communities have great potential to contribute, the lack of training and lack of mentoring are factors that limit their involvement. Moreover, the general report shows that support from local governments is also still limited, both in the form of strategic policies and the provision of infrastructure. Another obstacle that needs to be overcome immediately is inadequate transportation access, such as the lack of transportation facilities connecting Tlocor Pier with Lusi Island, as well as the lack of tourist facilities at the location.

Previous research has shown the importance of community assistance in increasing the capacity of tourism human resources (HR), especially in ecotourism-based areas. Study by (Insani et al., 2019) in the *Jurnal Praksis dan Dedikasi Sosial (JPDS)* highlights the important role of local community involvement, such as PKK, POKDARWIS, and Karang Taruna, in supporting tourism development in the Tlocor-Lusi Island area. The research focuses on community assistance through socialization of tourism village development strategies and souvenir making training, which succeed in improving the skills and enthusiasm of participants, as seen from the variety of souvenirs produced. It explores more on the community capacity building activities and has not discussed in depth other important aspects, such as sustainable management of natural resources, analysis of tourist behavior, and infrastructure improvement. This research aims to fill the gap by integrating environmental conservation efforts, community economic empowerment, and the development of a long-term sustainability model for Tlocor-Lusi Island marine ecotourism.

The aspect of environmental conservation is a key element in the management of marine tourism on Lusi Island, which has a unique mangrove ecosystem with great potential as an education- and conservation-based ecotourism destination. Study by (Suryani & Mursyidah, 2022) in the Indonesian Journal of Cultural and Community Development narrates the importance of utilizing this ecosystem that supports environmental sustainability, tourist attractions, and visitor involvement in mangrove planting conservation activities. However, the management of Lusi Island still faces challenges, including the lack of facilities for local community involvement in conservation management. An inclusive strategy that involves the community as active actors, the formation of tourism awareness groups (POKDARWIS), and conservation-based promotion are needed to overcome these obstacles. With an integrated approach that combines preservation, community empowerment, and improvement of tourist facilities, Lusi Island has a great opportunity to develop into a leading natural tourism destination that is environmentally friendly and beneficial to the surrounding community socially and economically.

The novelty of this study compared to the two previous studies lies in the integrative approach used, which not only focuses on the conservation of mangrove ecosystems as discussed in the study by Suryani & Mursyidah (2022) but also expands the scope of community empowerment through creative programs and local economic development. This research also highlights the importance of innovative efforts in sludge waste management and inclusive strategies involving various stakeholders such as the government or related institutions, which have not been widely discussed in previous study by Insani et al. (2019). This research offers a new perspective that combines ecological and socio-economic aspects in a sound manner and sustainability. After the Lapindo mud disaster in 2006, mud deposits that flowed into the Porong River for almost seven years formed a new island known as Lusi Island. Tlocor Marine Tourism, located in Kedungpandan Village, Jabon District, Sidoarjo Regency, has been operated by the local government since 2011 (Rian et al., 2023). Currently, tourism management is carried out by the community through the Tourism

Awareness Group (POKDARWIS). This research was conducted for one week to examine the development of tourism and community participation in the management of the destination. This study aims to identify the specific impact of the development of Tlocor Marine Tourism-Lusi Island on the surrounding community. The focus is directed at measuring changes in household income levels, analyzing shifts in employment patterns, and evaluating the effectiveness of environmental conservation practices introduced through tourism initiatives. Programs such as environmental education, tourism management training, and local resource-based creative economy development are considered to play a role in encouraging community empowerment and sustainability. Furthermore, this study examines the challenges and opportunities faced by the community in adapting to economic and environmental changes driven by the development of marine tourism.

This article highlights the advantages of the joint agenda of environmental conservation and community empowerment at the same time. The significance of this combination lies in its ability to answer the dual challenges, namely post-disaster recovery and sustainable development. Innovations in sludge waste management and ecosystem rehabilitation show how environmental restoration efforts can be integrated with socio-economic empowerment to create long-term benefits for local communities. This case is unique in the context of post-disaster tourism development, as it shows how the transformation of disaster sites formed from sedimentation due to the Lapindo mud disaster in 2006 can become a sustainable ecotourism model. Through such examinations, this study makes a scientific contribution to the understanding of how tourism can be a tool for ecological restoration and socio-economic recovery. Therefore, the results of this study are expected to make a significant contribution to the literature on marine tourism management and become a reference for policymakers and practitioners in developing environmental and community-based tourism management models in Indonesia.

2. METHOD

The research entitled Tlocor Marine Tourism-Lusi Island as a Means of Environmental Conservation and Empowerment of the Surrounding Community in Sidoarjo employed a qualitative approach with the type of descriptive research (Sugiyono, 2019). This approach was chosen to provide an in-depth understanding of social and environmental phenomena related to the development of Tlocor Marine Tourism-Lusi Island and its impact on environmental conservation and empowerment of the surrounding community.

The research location focused on the Tlocor-Lusi Island marine tourism area in Sidoarjo Regency, East Java. This location, which was formed from the sedimentation of the Sidoarjo mud, was chosen because of its potential in the development of ecotourism based on environmental conservation and local community empowerment, as well as its relevance in the context of sustainable development. The tourist location is shown in detail in Figure 1. below.



Figure 1. Map of the Tlocor Marine Tourism Area-Lusi Island (Source: Google Maps, 2025)

The data sources in this study include primary and secondary data. Primary data were obtained directly from the selected informants through the purposive sampling technique. The criteria for selecting informants include: (1) individuals who are directly involved in the management or development of Tlocor-Lusi Island marine tourism, such as the managing coordinator; (2) members of the Tourism Awareness Group (POKDARWIS) who are active in tourism activities and programs; and (3) local community representatives, including community leaders and members of youth organizations, who represent the perspectives and experiences of various stakeholder groups in the region.

These groups were chosen because they provide diverse and complementary perspectives. Management coordinators and tour managers were selected to provide insight into operational strategies and challenges in tourism development. POKDARWIS members were selected because of their active role in promoting and

implementing tourism activities. Meanwhile, local communities, including representatives of youth organizations, are engaged to capture perspectives at the grassroots level as well as the social and economic impacts of tourism on communities. Secondary data were obtained from a variety of literature relevant to the research topic, including research reports, scientific articles in journals, books, and documentation from government agencies and related organizations. This approach emphasizes the importance of integrating primary and secondary data to provide a deeper and more comprehensive understanding, thus strengthening the discussion of research (Sugiyono, 2019). The data collection technique was carried out through three main methods: interviews, direct observation, and documentation (Widyatama & Suhari, 2023). Each method is described as follows:

1. Interview Methods

In-depth interviews were conducted with key informants, including tour managers, POKDARWIS members, and local community representatives such as community leaders and youth organizations. The interviews were semi-structured with a guideline to questions that covered topics such as tourism management strategies, challenges in ecotourism development, and community participation in environmental conservation. Each interview lasted for 5-10 minutes and was conducted directly at the research site to encourage open discussion. The interview session was recorded with the consent of the informant and was fully transcribed for further analysis.

2. Live Observation

Observations were carried out in the Tlocor Marine Tourism-Lusi Island area for one week. The observation protocol was focused on three main aspects: a) Physical conditions, by observing infrastructure and natural environments, such as mangrove ecosystems, walking trails, and tourist facilities; b) Ecotourism activities by recording activities such as mangrove tours, community-led events, and interactions between tourism managers and visitors; and c) Community involvement by assessing the role of local communities in managing and supporting tourism operations. Observation notes were recorded systematically using pre-designed checklists.

3. Documentation

The documentation process involved the collection and analysis of secondary data, including government reports, local tourism development plans, scientific journal articles, and mass media archives. The specific documents analyzed included official publications from the local government, minutes of POKDARWIS meetings, and promotional materials related to the Tlocor-Lusi Island ecotourism. These documents were used to complete and validate primary data obtained through interviews and observations.

To ensure the validity and reliability of the data, triangulation was done by comparing findings from interviews, observations, and documentation (Sugiyono, 2019). This approach ensured that the conclusions drawn were supported by a variety of data sources. The data analysis in this study used the Miles and Huberman model which consisted of four stages: data reduction, data presentation, data verification, and conclusion drawing (Muhammad et al., 2015). The implementation of each stage in the context of this research is as follows:

1. Data Reduction

Data reduction was done by categorizing raw data from interviews, observations, and documentation into key themes, such as environmental conservation, community empowerment, and tourism development. The data were summarized in the form of matrices, graphs, and narratives to highlight key findings and eliminate irrelevant information. This process lasted for three days after data collection in the field.

2. Data Presentation

The reduced data was then presented systematically using visual tools such as tables and diagrams to facilitate interpretation. For example, the theme of community participation was summarized in a table that showed their roles, activities, and impacts. This stage was completed within two days of data reduction.

3. Data Verification

Data verification was carried out using triangulation of sources, methods, and theories. Data from interviews were compared with observation notes and supporting documents, while theoretical triangulation was carried out by comparing findings with existing literature. This stage was done continuously during the analysis process.

4. Drawing conclusions

The verified data were synthesized to produce conclusions that were meaningful and relevant to the research objectives. This stage took two days and was completed after the data verification process.

The fieldwork was carried out for one week from January 4 to 10, 2025, including interviews, observations, and analysis of documents. Each interview session lasted for 5-10 minutes, while observations

were carried out daily during peak tourist hours to capture various activities. This research paid attention to ethical aspects with the following procedures:

1. Informational consent, all participants were informed about the research objectives, methods, and their rights, including the right to withdraw at any time. Written consent forms were obtained prior to the interview and audio recording.
2. Concealment, participant identities were anonymized using pseudonyms, and sensitive information was stored securely to maintain privacy.
3. Data protection, the collected data, including audio recordings and transcripts, were stored in a password-protected digital file. Physical records were kept in a locked cabinet, and data will be kept for three years before being destroyed as per ethical guidelines.

Triangulation in this study was used to increase the validity of the data by comparing information obtained from various sources and methods. For source triangulation, it was carried out by comparing data from tourism management coordinators, tourism awareness groups (POKDARWIS), and local communities. Triangulation of this method involved comparing the results of interviews, observations, and documentation. Theoretical triangulation was carried out with reference to the relevant literature to ensure that the interpretation of the data can be based on a strong theoretical framework. Through this research method, it is hoped that it will not only gain new insights into the social and environmental dynamics around the tour but also offer practical solutions in sustainable development.

3. RESULTS AND DISCUSSION

3.1 Research Results

Tlocor Marine Tourism - Lusi Island is in Kedungpandan Village, Jabon District, Sidoarjo Regency, East Java which is an ecotourism destination that combines natural beauty and environmental education. Lusi Sidoarjo Island was formed from the sedimentation of hot mud caused by the Lapindo mud burst disaster in 2006 (Wikipedia, 2025). Now, this island has become a symbol of environmental rehabilitation involving mangrove planting and community-based management, providing social and economic benefits for the surrounding community. Sustainable tourism development is part of the key elements to improve the quality of the island nation (Nesticò, & Maselli, 2020). The mangrove ecosystem, which covers an area of about 94 hectares, is the focus in environmental conservation efforts. Observations show that most mangrove areas are in good condition, providing important ecological functions such as abrasion prevention and supporting biodiversity. This area is a habitat for various species, such as mangrove crabs, mudfish, and migratory birds.

This tourist area offers various facilities, such as parking areas, meeting halls, cafeterias, jungle tracking trails, public bathrooms, prayer rooms, and dining places (Jadesta, 2024). Tourists can enjoy a variety of activities, including mangrove planting, outbound, photography, and boat rentals to cruise the river and island. This facility supports a comfortable and safe travel experience, although there is still a need for improvement, especially in terms of transportation access and public comfort. Through good development, Tlocor Marine Tourism - Lusi Island has great potential to become a leading destination in East Java (Sidita, 2025). Increasing access to transportation and improving facilities which are expected to support this development, make this area ecotourism based on environmental preservation and empowerment. With planned management, this area can become a model of a harmonious tourist destination. Tourism as a means of economic development on the islands as well as affecting the condition of the surrounding community (Chiappa et al., 2018).

The mangrove planting program routinely involves tourists and local communities, with an average of 500-1000 seedlings at the beginning of the year to be planted every month. However, some areas require monitoring and maintenance to ensure long-term growth. The informant highlighted the importance of adding mangrove interpretation facilities, such as educational boards and professional tour guides, to increase tourists' understanding of the mangrove ecosystem. This study involves 5 (five) main informants consisting of: 1) tourism coordinator as many as 1 (one) person who has direct responsibility in tourism management; 2) as many as 2 (two) members of POKDARWIS who are in charge of managing ecotourism programs and promoting Lusi Island as an eco-educational tourism destination; and 3) as many as 2 (two) local communities consisting of a community leader and a small business actor or MSME who provided views and responses on the benefits and challenges of the existence of the Tlocor-Lusi Island Marine Tourism.

In addition to the involvement of informants to find out the process or activities of the life of the tourist community, the results of field observations that provide a detailed description of the physical condition and daily tourist activities in the tourist area are also shown in Table 1. are as follows.

Table 1. Field Observation of the Tlocor Marine Tourism Area-Lusi Island

No.	Aspects Observed	Availability	Information	Descriptive Notes
1.	The Beauty of Mangrove Ecosystems	✓	The mangrove ecosystem is well maintained in most areas and is the main attraction.	Most of the mangrove areas are in good condition, while a small number of others still need monitoring and replanting.
2.	Condition of Tourism Facilities	✓	Facilities such as parking areas, prayer rooms, and public bathrooms are available.	Some of the facilities still need maintenance, especially public bathrooms and prayer rooms to improve comfort.
3.	Transportation Access	×	Road access to the location is damaged, making it difficult for vehicles, especially four-wheeled vehicles.	The damaged road conditions affect accessibility and reduce the number of tourists who visit using vehicles privately.
4.	Mangrove Planting Activities	✓	The mangrove planting program is carried out regularly by tourists and local communities.	About 500-1000 mangrove seedlings for one year are planted every month, but the maintenance of the seedlings that have been planted is also still a challenge to maintain.
5.	Local Community Participation	× (Low)	Participation is still low, especially in community-based tourism management programs.	Some of the residents are actively involved in tourism-related activities, such as the POKDARWIS program.
6.	Availability of Tour Boats	✓	Sightseeing boats are available for crossing and exploration, but they are limited.	There are four units of tourist boats, which are often insufficient during tourist visits that reach their peak or are crowded.
7.	Digital Promotion	× (Minimal)	Sightseeing boats are available for crossing and exploration, but they are limited.	Digital promotion is still very limited, so the reach of potential tourists has not been maximized widely.

Source: Researcher Findings Data, 2025

The results of this observation show that even though basic facilities are available, management and promotion still require serious attention. This inadequate transportation infrastructure is one of the main obstacles in attracting more visitors. Although by observation that the facilities of the Tlocor Marine Tourism-Lusi Island are quite good, through this interview it is also shown how the conditions of the tourism are in supporting environmental conservation and empowering the local community such as an interview with one of the informants, namely the coordinator of this tourist area who is affiliated with the Ministry of Maritime Affairs and Fisheries of the Republic of Indonesia as Figure 2. are as follows.



Figure 2. Interview with the Tourism Coordinator (Source: Researcher Documentation, 2025)

1. The tourism coordinator explained that Lusi Island has great potential as a leading destination if it is supported by adequate facilities and consistent promotions. He stated: "Our main obstacle here is the lack of management funds and the low participation of local communities in tourism programmers." The lack of funds has an impact on the maintenance of facilities such as public bathrooms and prayer rooms, as well as the limited number of tourist boats (only four units). Community participation is only a few, mostly through POKDARWIS, with limited involvement from other residents. He also highlighted the importance of government support for ecotourism sustainability: "Mangroves in this region are not only a tourist attraction, but also an important buffer for coastal ecosystems." Mangroves cover 94 hectares, but still a small part of the area requires additional maintenance. This mangrove planting program involves tourists and the community, with 500-1000 seedlings provided to be planted every month. In addition, a digital promotion strategy is needed to be able to reach a wider market. Promotion is currently limited to a single social media account, so cooperation with platforms such as travel marketing, or the use of influencers is recommended to increase tourist appeal.
2. POKDARWIS members revealed the challenges in the development of ecotourism on Lusi Island. One member stated: "We have held training on making snacks from local ingredients, but marketing the product is still a big challenge." This problem reflects limited market access for local products and the need for additional training, especially in digital marketing and market access strategies. Another member added: "We still need help with the procurement of equipment to support further education and training activities." This shows the limited resources that affect the implementation of environmental education programs. Without adequate facilities, community participation is difficult to increase. They also emphasized the importance of coordination with local governments. As one member explained: "Increased funding and tourism policies are essential to address the current challenges." The main challenges include limited marketing, lack of resource support, and lack of coordination. Solutions include more focused training, collaboration with the government, and private sector involvement to improve funding and infrastructure.
3. One of the community figures explained that: "Ecotourism is very important in raising people's environmental awareness, but it must also be supported by adequate infrastructure." Small businesses also added that the presence of tourists contributes to their income but still needs better accessibility to increase the number of visits. Community leaders emphasized the importance of citizen involvement in tourism management. He added that: "People will be more concerned about the region if they feel the direct benefits of tourism." The community hopes that there will be more programs that encourage tourists to buy local products and enjoy the culinary products typical of the local community. In addition, they hope that there will be more programs that encourage tourists to buy local products and enjoy the culinary specialties of the local community.

The development of Tlocor-Lusi Island Marine Tourism has provided economic opportunities for the local community, such as opening stalls, renting boats, and selling local food products. However, interviews with informants show that only approximately 30 people from the local population are actively involved in tourism management or related activities. This low participation is due to limited skills training and support for small businesses. POKDARWIS has an important role in empowering the community through training programs. For example, a recent local snack making training involved 15 participants, who then produced and marketed the snacks as souvenirs. However, promotion and market access are still key challenges that need to be addressed through digital strategies and increased coordination with stakeholders.

In addition to the findings from the results of observations and transcripts of interviews with informants regarding the discussion of the research topic, the researcher also obtained other data in the form of documentation, which includes various visual and archival aspects related to the Tlocor Marine Tourism area-Lusi Island. This documentation provides a clearer picture of the physical condition of the area, such as the beauty of mangroves, planting activities involving tourists, and the existence of existing supporting facilities.



Figure 3. & 4. Tlocor Pier and Lusi Island Pier (From left) (Source: Researcher Documentation, 2025)

Pictures 3 and 4 show the atmosphere of Tlocor Pier and Lusi Island Pier, which are the main gateways of this tour. Tlocor Pier, as the starting point of the trip to Lusi Island, gives the first impression for tourists. However, observations show that the pier area needs improved facilities, such as more seating and accessibility improvements, to support the comfort of tourists.



Figure 5. & 6. Mangrove and Citizen MSMEs (From left) (Source: Researcher Documentation, 2025)

Activities such as mangrove planting and local community activities are seen in Figures 5 and 6. Mangrove planting regularly involves tourists and local communities, with as many as 500-1000 mangrove seedlings provided every year to be planted every month. This activity not only functions as environmental education but also has a direct impact on coastal ecosystem conservation efforts. In addition, Figure 6 shows micro, small, and medium enterprises (MSMEs) managed by local communities around tourist areas. These stalls provide food and drinks for tourists, creating a friendly atmosphere, while supporting social interaction in the tourist area. Activities like this are a form of empowerment of local communities that can be further developed.



Figure 7. & 8. Boat Activities and Children Playing (From Left) (Source: Researcher Documentation, 2025)

Figures 7 and 8 show tourists enjoying boat trips and children playing in the Lusi Island area. Boat trips are the main attraction by offering beautiful natural scenery, such as the backdrop of dense mangrove forests and a diversity of wildlife, including free-flying waterfowl. This activity creates a relaxed and educational recreational atmosphere for visitors. In addition, children playing in the Lusi Island area reflect how this area is not only a natural tourist attraction, but also a fun social interaction space for tourists of various ages. However, the limited number of tourist boats, which are only available for four units, limits the capacity of visitors, especially when tourist visits are high. Facilities in this tourist area, such as parking areas, cafeterias, public bathrooms, forest tracking trails, prayer rooms, and dining areas, are mostly available. However, observation results show that some facilities, especially public bathrooms and prayer rooms, require regular maintenance to improve tourist comfort. Transportation access remains a major challenge, as the road to the location is still damaged, making it difficult for four-wheeled vehicles to reach this place. This is a big obstacle to increasing the number of tourists, especially family tourists who often use private vehicles.

3.2 Discussion

Lusi Island in Sidoarjo is clear evidence that an area that was originally formed due to a disaster can be transformed into an ecotourism area that provides environmental and social benefits. Formed from the sedimentation of the Lapindo mud, Lusi Island is now a center for environmental conservation through mangrove conservation and community empowerment. This transformation is in line with the theoretical framework of post-disaster tourism development, which emphasizes how disaster-affected areas can be transformed into areas of economic and environmental value through targeted planning and collaboration (Zaenuri, 2014). A socio-ecological approach is important in measuring the complexity of sustainable tourism development on small islands, particularly in balancing environmental conservation with socio-economic needs. In line with this, the integration of mangrove conservation and community-based tourism on Lusi Island reflects the principles of sustainable tourism that emphasize community engagement, environmental education, and ecosystem restoration. Collaboration between communities, tourism managers, and governments shows how these efforts can create resilient tourism models, support environmental sustainability, and socio-economic development (Kurniawan et al., 2019).

3.2.1 Environmental Conservation Through Mangrove Conservation

Conservation of mangrove ecosystems is important in the management of Tlocor Marine Tourism-Lusi Island. The existence of mangroves in this area not only is the main attraction for tourists but also serves as a buffer for the coastal ecosystem. Mangroves protect areas from abrasion, provide habitat for wildlife, and improve air and water quality. Regular mangrove planting activities involving tourists and local communities strengthen conservation efforts while providing educational tourism experiences (Rokmawati et al., 2024). Conservation of mangrove ecosystems is an important element in the management of Tlocor Marine Tourism-Lusi Island. Mangroves in this area not only function as a buffer for the coastal ecosystem but also become the main attraction for tourists. Mangrove planting, which is carried out regularly by involving local communities and tourists, has strengthened environmental conservation efforts while providing educational tourism experiences. In addition, mangroves in this area play a role in protecting the area from abrasion, providing habitat for wildlife, and improving the quality of the aquatic ecosystem.

The mangrove ecosystem on Lusi Island has a dual role as a tourist attraction and ecological buffer. Observations of 94 hectares of mangrove forests show the importance of this ecosystem in maintaining biodiversity and protecting the coastline. Educational programs involving tourists and local communities strengthen conservation efforts but require ongoing funding support for ecosystem monitoring and maintenance. The observation results show that the beauty of the mangrove ecosystem is mostly well maintained. However, some of the areas still need improvement in terms of long-term management, which includes ecosystem monitoring and maintenance of planted mangrove seedlings. In an interview, the tourism coordinator revealed that this Mangrove area is also a potential ecological center, especially to study the dynamics of coastal ecosystems exposed to the impact of mud. Education to tourists about the ecological function of Mangroves provides added value for the management of this area as an environmental conservation-based destination (Butarbutar, 2021). When compared to conservation initiatives in similar areas such as the Langkawi Geopark in Malaysia, the efforts on Lusi Island have comparable potential in supporting environment-based ecotourism. However, to achieve greater effectiveness, additional efforts are needed to monitor the growth of mangroves and maintain the sustainability of their ecosystems. Indicators of the health of the mangrove ecosystem on Lusi Island show that the area has good biodiversity, with the presence of species such as mangrove crabs, migratory birds, and fish that contribute to the stability of the ecosystem.

In addition, Mangrove-based ecotourism provides an opportunity for visitors to learn about the importance of environmental sustainability (Martuti et al., 2018). This educational activity can be improved by procuring environmental interpretation facilities such as a Mangrove information center, professional and

competent tour guides, and visual aids. If supported by a sustainable funding program, this area will be able to contribute more impactfully to environmental conservation in Sidoarjo. Current conservation strategies have shown success in raising environmental awareness, but there are still challenges, such as limited funding and lack of technical training for local communities. To overcome these obstacles, more innovative approaches are needed, such as the use of technology to monitor ecosystems, increased policy support from the government, and collaboration with academic institutions or environmental organizations. With these measures, Lusi Island can be a strong example in integrating environmental conservation with sustainable ecotourism development.

In the context of regional and national tourism development, mangrove conservation on Lusi Island can be an example of integration between environmental rehabilitation and ecotourism goals. This is in line with Indonesia's coastal tourism strategy which emphasizes the protection of coastal ecosystems while promoting sustainable tourism practices. The lessons from this case can be a policy guide that balances ecological preservation with tourism growth, especially in coastal areas affected by disasters.

3.2.2 Community Empowerment Through Ecotourism

Tlocor Marine Tourism-Lusi Island provides a great opportunity for the surrounding community to be involved in economic activities that support local welfare. The presence of tourists has encouraged the growth of small businesses, such as stalls, boat rentals, and processed food production. One of the successful initiatives is the training of POKDARWIS in making traditional snacks such as cassava chips and shrimp crackers, which are now culinary tourism souvenirs.

This initiative has a positive impact, such as increasing income for stall owners and boat operators during the tourist season. However, overall community participation is still limited, with only a few actively involved, especially through POKDARWIS. Many other members of society, especially women and youth, have not been involved due to a lack of access to training and support. Although the training program has already involved 15 participants, the expansion of training and increased coordination among stakeholders are essential to increase participation, which is currently low. Although skills training has helped some groups, its scale and scope still need to be expanded. Additional training such as digital marketing and business management will help people maximize the economic potential of tourism. By improving coordination between local governments and communities, as well as expanding the reach of skills programs, community participation can increase significantly, supporting the development of more inclusive tourism.

However, interviews with informants still show that the level of community participation in tourism management is still low. This is due to limited access to skills training, lack of funding support, and lack of promotion of local products. The community leaders interviewed said that the community will be more concerned about this area if they feel significant economic benefits. Support in the form of marketing training, increased entrepreneurial skills, and access to a wider market can significantly increase community engagement (Habib & Sutopo, 2024).

In addition, community empowerment can also be focused on preserving local culture that can attract tourists (Risianti et al., 2024). Traditional arts and cultural activities can be part of the tourist experience offered. Community involvement in tourism management, promotion and provision of tourism services, creating a close relationship between tourist areas and the community (Sandika Irwan et al., 2022). This collaboration not only enriches the authenticity and attractiveness of the tourist experience for visitors but also provides economic opportunities for the surrounding community. By involving communities in various aspects of tourism, such as tour guides, handicraft production, and the organization of cultural events, local communities can directly benefit from the development of the tourism sector, while preserving their cultural heritage. Community empowerment on Lusi Island reflects the importance of implementing a community-based tourism (CBT) approach in coastal area development policies. These findings highlight the need for government support in the form of training and market access programs to increase community participation. By integrating CBT principles into regional policies, policymakers can promote sustainable economic growth in coastal areas while preserving local traditions and cultures.

3.2.3 Challenges and Strategies for the Development of Tlocor-Lusi Island Marine Tourism

Despite having great potential, Tlocor Marine Tourism - Lusi Island faces major challenges that include infrastructure, human resources, and financial limitations. One of the main obstacles is related to transportation access, which is still difficult to reach, especially due to the condition of damaged roads. This is also an obstacle for tourists who want to visit, especially those who use four-wheeled vehicles. Most of the available tourist facilities, such as toilets, prayer rooms, and places to eat have met the basic needs of tourists. However, several additional facilities such as rest areas, tourist information centers, and disabled-friendly access points can increase the competitiveness of this tourist area (Samsudin et al., 2023). On the other hand, the limited skills of local communities in tourism management and the lack of training in the fields of marketing, hospitality, and environmental education are also obstacles. Inconsistent funding further complicates the management of

facilities and digital promotion efforts, which are currently minimal. To overcome these challenges, infrastructure improvements through public-private collaboration, the development of community-based training programs with the support of universities and NGOs, and more effective digital marketing strategies are needed. With these steps, Tlocor-Lusi Island has a great opportunity to become a leading ecotourism destination in East Java that supports environmental sustainability and local community empowerment.

This research highlights the importance of infrastructure development in supporting regional tourism policies. Increasing access to transportation and tourist facilities can significantly increase the competitiveness of ecotourism destinations such as Lusi Island. Aligning these improvements with national tourism development goals, as outlined in the "Coastal Tourism Development Master Plan," can accelerate development while ensuring environmental sustainability.

Digital promotion is an important aspect that must be strengthened in the development of Tlocor Marine Tourism-Lusi Island. Observations show that promotion through social media and digital platforms is still very limited, with a lack of a targeted content strategy and the absence of an official website. This reduces the attractiveness of destinations, especially for tourists who rely on online information. To increase visibility, the development of an official website that presents complete information about tourist activities, package prices, and online booking features is a priority. In addition, social media strategies can be strengthened with attractive visual content, collaborations with influencers, and promotion of educational activities such as mangrove planting (Habibi & Ilham, 2024). Registering destinations on online booking platforms such as Traveloka or Booking.com can also expand market reach. With this strategy, Lusi Island can increase tourist engagement, support the marketing of local products, and strengthen the sustainability of ecotourism, while creating greater economic benefits for the surrounding community.

The active use of social media to share interesting content about tourist destinations can also increase visibility and tourist attraction. Improving transportation access and tourist facilities, such as rest areas and digital promotion strategies, are top priorities. Observations show that some of the facilities require immediate maintenance, and the addition of units from the previous four tour boats will significantly enhance the tourist experience. Regional tourism integration policies with Lusi Island can accelerate its growth as a leading destination.

The tourism coordinator also emphasized the importance of government support in the form of funding and policies that support ecotourism. The provision of incentives for local business actors, the development of supporting facilities and infrastructure, and the integration of ecotourism programs with other regional tourism agendas that can accelerate the development of this area as a leading destination (Anom & Suryasih, 2024). By overcoming existing obstacles, Tlocor Marine Tourism-Lusi Island has the potential to become an ecotourism icon based on environmental preservation and empowerment in East Java (Ratih & Widjajanti, 2020). Strengthening digital promotions can be a model for other coastal destinations that want to leverage technology to increase visibility and engagement for tourists. However, some critical areas need further research, such as the socio-economic impact of ecotourism on local community incomes, the ecological outcomes of mangrove conservation, and the integration of advanced technologies such as augmented reality (AR) for destination promotion. In addition, comparative studies with other post-disaster tourism destinations can uncover relevant best practices. With in-depth research in this area, Tlocor-Lusi Island can strengthen its role as a sustainable ecotourism model that supports environmental conservation, community empowerment, and technological innovation.

The strengthening of digital promotion strategies is in line with Indonesia's smart tourism development efforts, which emphasize technology-based solutions to increase tourist engagement and destination visibility. This can be a model for other coastal tourism destinations that want to integrate digital platforms into their promotional strategies.

4. CONCLUSION

Tlocor Marine Tourism - Lusi Island in Sidoarjo is an ecotourism based on environmental preservation and community empowerment which has great potential to become a leading tourist destination. Mangrove ecosystem conservation is an important effort in environmental conservation, providing an ecological function that has an impact as well as becoming an educational tourist attraction. Community empowerment through involvement in small businesses, skills training, and promotion of local products that have provided economic benefits still faces challenges in the form of low participation from the community and still minimal infrastructure support. Obstacles to transportation access, facilities that still need to be improved, and a lack of digital promotion hinder the optimization of this area. With government support, infrastructure improvements, and effective promotional strategies, Tlocor Marine Tourism-Lusi Island can become a symbol of the success of sustainable ecotourism management based on local community empowerment. Furthermore, the development of culture-based tourism programs and environmental preservation can add to the attractiveness of this tourism. It is hoped that this effort will be able to make Tlocor-Lusi Island an example of an ecotourism

destination that inspires other regions. The study also identified the need for further studies, including a study of long-term restoration of mangrove ecosystems, analysis of community empowerment models in similar contexts, and evaluation of the economic impact of ecotourism on local communities. This effort can strengthen the development of sustainable tourism in this region.

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