

Literacy of socio-ecological system and coastal tourism in Labuan Bajo

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ABSTRACT

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Instability and inequality in the socio-ecological system in Labuan Bajo, Indonesia, are due to the lack of awareness of coastal communities and tourists towards the environment/ecology. The orientation of this study aims to determine how the coastal community of Labuan Bajo understands human interaction with the environment/ecology (socio-ecological system). This study used a qualitative method with 32 informants (native people, volunteers, and officers). We asked them how coastal communities interpret their environment, their interactions with the environment/ecology, their experiences maintaining socio-ecological systems, and survival strategies in tourist areas. The study results showed that the traditional knowledge of coastal communities contains local wisdom values that are useful in socio-ecological systems. For example, they have in-depth knowledge of the natural cycle, fishing seasons, and the behavior of certain marine species. They also understand the condition of the local ecosystem. Knowledge of local ecosystems such as coral reefs, mangrove forests, endemic species, and how to maintain ecological balance. They also have literacy about the impact of tourism activities. Understanding the potential impacts of tourism activities on the environment and how to minimize them, such as good waste management.

Keywords: coastal tourism, Labuan Bajo social-ecological system, Labuan Bajo

INTRODUCTION

Looking at the current development of tourism, ecotourism has become one of the growing tourist attractions throughout the world, including Indonesia (Cole, 2017; Fatina et al., 2023; Kodir et al., 2020). This can be seen from tourism development, especially in coastal areas, which now prefer ecotourism as the main destination (Forero, 2022). Tourism has also grown rapidly in NTT, especially in coastal areas, due to policies issued by the Ministry of Tourism and Creative Economy (Damanik, 2016; Rizkiyana, 2023). Despite the lack of public understanding of ecotourism and socio-ecology in coastal areas, the ecotourism aspect in Indonesia continues to exist gradually with significant growth (Misgiati et al., 2024; Nyoko et al., 2021). This is because tourism is one of the economic growth agents initiated by the Government to increase the State Revenue and Expenditure Budget (APBN) (Haris et al., 2023; Kisnarti et al., 2021)

Given the significant development of ecotourism, especially in coastal areas, socio-ecological literacy and the development of sustainable tourism models are needed to increase the potential and marketability to tourists (Austin & Clark, 2012; Frank, 2017; Yakovenko et al., 2019). Therefore, this study highlights the potential of ecotourism-based tourism, especially in the management mechanism and development model of environmentally based tourism where the community still benefits from preserving the surrounding natural environment. Looking at the context of tourism, the concept of coastal environmental awareness is one of the important points where increasing welfare must be proportional to optimizing environmental quality in coastal tourism areas (Barca, 2019; Eversberg et al., 2022; Longo et al., 2016; Romano et al., 2021; Ruwet, 2021).

Labuan Bajo, an area with great natural potential, also contributes to developing ecotourism in NTT (Misgiati et al., 2024). As one of the leading tourist destinations in Indonesia, the NTT regional government is moving to develop its tourism aspects, especially those based on ecology. A location that is quite well-known to tourists is Labuan Bajo, which is located in West Manggarai Regency (Dwipayanti et al., 2022). It uses the concept of ecology in optimizing its tourism. Seeing the success of Labuan Bajo as a tourist attraction, it is worth studying how the concept of developing ecological tourism and the community's understanding of socio-ecology so that it can be applied and developed on other islands in NTT (Erb, 2019). The reason is that the ecotourism-based tourism model developed by stakeholders in Labuan Bajo can influence the location of other ecological-based tourist destinations throughout Indonesia (Fatina et al., 2023; Kodir et al., 2020; Nyoko et al., 2021). Therefore, this research will analyze the socio-ecological concepts and systems developed in Labuan Bajo to carry out socio-economic transformation in different locations.

As a result, with the help of various parties who share the same awareness of the socio-ecological system, some people have gradually begun to choose other professions in the field of ecotourism (Meiji et al., 2023). This is a good picture, considering that previously, some of them worked as fishermen by fishing illegally, such as bombing fish (Haris et al., 2023; Misgiati et al., 2024). Therefore, this study focuses more on how the socio-ecological system of the coastal community of Labuan Bajo participates in the development of ecological/marine-based tourism. This change exemplifies how people in remote areas can be directed towards a better socio-ecological system for improving coastal tourism objects. This study aims to explain how the coastal community of Labuan Bajo understands the socio-ecological system and ecotourism preservation.

Several researchers have researched ecotourism in Labuan Bajo. However, related to the sociological study of the socio-ecotourism system, it is something new based on a comparison of previous studies. Therefore, researchers will conduct a sociological study to see how the socio-ecological system literacy of the coastal community of Labuan Bajo, its relationship with the environment/ecology, and its interaction with tourists and the environment. Heni Masruroh et al. studied the change in people's livelihoods from hunting to tourism after people realized the importance of preserving the environment as a tourist attraction (Meiji et al., 2023). However, Yvonne A. Braun et al. saw that this was not good for the sustainability of ecology in Costa Rica because many tourists damaged the ecology. On the other hand, Stefano B. Longo et al. said that ecology would still face challenges. He saw that environmental degradation was influenced by the demands of the modern economic system, but that balance could still be maintained through good socio-ecological relations (Longo et al., 2016). Geraldine KL Chan also found the same thing that

ecotourism in Malaysia was developed by paying attention to social relations, social interactions, social values, norms, sanctions and benefits at the informal level between social actors who are connected and collectively involved in tourism activities (Chan, 2015). Meanwhile, Arash Riasi et al. said that the increase in ecotourism in Iran was developed through online advertising, and this supported the community's economy (Braun et al., 2015). The same thing is true in Indonesia, as found by Elsin Titaley, where the community's expectations for ecotourism development can support the community's economy, ecological preservation, and socio-cultural sustainability (Titaley, 2023).

In this study, the researcher wants to make a sociological contribution to the ongoing debate around the human-nature relationship and its relevance in overcoming the current socio-ecological crisis. A sociological approach is needed to analyze the relationship between humans and the environment/ecology based on the idea of a society that is theoretical and substantial. From a sociological perspective, the human-nature relationship is always socially mediated: this relationship is a relationship between socialized individuals and socialized nature in certain social conditions (Eversberg et al., 2022). Therefore, two sociological approaches will be used: environmental sociology and tourism sociology. Concerning the socio-ecological system, an environmental sociology approach is needed to examine how humans relate and interact with the environment/ecology. Meanwhile, the issue of ecotourism development in coastal areas requires a sociology of tourism approach to examine coastal community groups in providing services to tourists and how they introduce local wisdom as tourist attractions.

RESEARCH METHODS

This study uses a qualitative method to dig deeper into data on research subjects related to ecotourism. The selection of a qualitative method with a phenomenological approach is considered more appropriate, especially considering the models developed by stakeholders in the tourism area in the context of ecotourism and the model components used for tourism development in NTT. The study follows the stages of problem identification, introduction, data collection, data processing, data analysis, and conclusion. The study was conducted in the Labuan Bajo tourist area, West Manggarai Regency, NTT, Indonesia. This location was chosen because of the massive development of tourism in Labuan Bajo, which includes not only domestic tourists but also foreign tourists. In addition, issues related to the ecotourism/coastal tourism crisis and the socio-ecological system can be answered in this place. We interviewed 32 informants, including 20 native people, 8 volunteers, and 4 officers. We asked them how coastal communities interpret their environment, their interactions with the environment/ecology, their experiences maintaining socio-ecological systems, and survival strategies in tourist areas. Informants in this study are people who live in coastal areas that are used as tourist attractions in Labuan Bajo, West Manggarai Regency, NTT. They are also part of service providers, facility providers, and ecotourism managers.

The types of data in this study are divided into two, namely primary and secondary data. First, the primary data of this study are individuals who are members of the tourist location management group and coastal communities in Labuan Bajo. Information exploration is carried out on these subjects because they experience and understand the conditions of ecotourism management and planning. Contextual studies are carried out periodically. Research related to ecotourism focuses more on the perspective of the management community, especially their experiences in interpreting what has been done and gone through and their interactions with the

environment/ecology. Second, related to the need for secondary data such as document archives (photos/videos) are also presented to obtain more comprehensive information when conducting observations of the coastal environment and ecotourism.

The data collection technique used is observation, where researchers and the team emphasize more aspects of habits and see the coastal environment and ecotourism, where agents interact dynamically with each other. We observed not only native people around the coastal area in Labuan Bajo city but also people who live and work on Komodo Island due to the central destination. Another important thing is in-depth interviews with coastal communities in tourist areas and about how they interact with the environment/ecology. Interviews were conducted and followed the flow of informants so as not to seem stiff and so that the data obtained could flow naturally.

The following are data analysis techniques researchers use (Miles & Huberman, 1994). First, analysis was used to collect interview and observation data. Data obtained from interviews and observations were recorded and then divided into two, namely descriptive and reflective data. Descriptive data is data obtained by researchers naturally, such as events seen, witnessed, heard, or experienced by the researcher himself. This is pure data because the researcher has no opinion or interpretation regarding the phenomena experienced. Reflective data contains impressions, opinions, comments, and interpretations of the researcher regarding the subjects and objects encountered. Researchers used this data as material for the next stage of the data collection plan. Second, data reduction was done to select, simplify, abstract, and transform raw data obtained in the field. Data reduction activities continue throughout the data collection process by making summaries, coding, tracing themes, creating clusters, creating partitions, and writing memos. This is done to sharpen, direct, classify, discard unnecessary data, and organize data so that conclusions can be drawn and verified. Third, data presentation was carried out to produce a picture of the conditions that occur between humans and the environment in the coastal tourism area of Labuan Bajo. The data presented was data that has gone through the verification stage and was considered information that can answer the formulation of the problem in this study, as well as answer the issues of the socio-ecological system in the coastal tourism area of Labuan Bajo. Fourth, during the research process, conclusions were also drawn. However, this can be done after sufficient data is collected by making temporary conclusions. After the data is truly sufficient, a conclusion will be made.

RESULTS AND DISCUSSION

Coastal Community Understanding of Socio-Ecological Systems

Coastal community understanding of socio-ecological systems (SES) in Labuan Bajo combines traditional knowledge, direct experience, and external influences from government policies and development programs. Increasing informant awareness and participation in sustainable natural resource management is key to balancing community welfare and coastal ecosystem health. Coastal community understanding of socio-ecological systems in Labuan Bajo is generally influenced by their daily interactions with the surrounding environment, traditional practices, local knowledge, and existing government policies and development programs. Coastal communities are aware that their lives depend on Natural Resources. Their livelihoods depend highly on marine resources such as fish, seaweed, and coral reefs. Many people as fishermen, seaweed farmers, or in the marine tourism industry. Meanwhile, marine resource management is

often based on local knowledge and traditional practices of the local community in Labuan Bajo that have been passed down from generation to generation.

The concept reflects how humans and ecological systems are co-dependent and evolve together, with mutual feedback loops influencing outcomes over time. We found several programs in Labuan Bajo, e.g., Climate Change: SES frameworks help assess vulnerabilities and plan for adaptive responses. Sustainable Development Goals (SDGs): Many SDGs implicitly recognize SES, particularly in goals related to environmental conservation, economic growth, and social well-being. Urban Planning: Integrating green spaces and sustainable infrastructure as part of urban SES. Moreover, coastal communities also understand the impact of the environment and climate change because they often experience the impacts of climate change, such as rising sea levels, changing weather patterns, and increasing frequency of storms. They understand these changes from direct experience, although they do not always associate them with the concept of global climate change. They also know that environmental damage such as overexploitation, pollution, and destruction of habitats such as coral reefs and mangroves also affect their well-being.

On the other hand, traditional knowledge of coastal communities in Labuan Bajo contains local wisdom values that benefit socio-ecological systems. For example, in Local Ecological knowledge, they have in-depth knowledge of natural cycles, fish seasons, and the behavior of certain marine species. Therefore, this traditional practice contributes to sustainability, namely the prohibition of fishing or taking certain resources at certain times. As a coastal area, there are important for SES in Labuan Bajo, e.g., (1) Coral reef management, which Involves balancing tourism, fishing, and conservation efforts to protect the reef's health while supporting local economies; (2) Agricultural landscapes: Farmers depend on soil health, water availability, and climate while influencing these factors through farming practices; (3) Urban ecosystems: Cities interact with surrounding environments through resource consumption, pollution, and green space management (Brooks & Renick, 2024; Helmi et al., 2024; Pedraza-Gama et al., 2024).

The Coastal Community of Labuan Bajo has experienced a generational change in the paradigm of critical thinking in maintaining ecological balance, including programs to maintain environmental sustainability with the motto of clean seas and increasing economy, meaning that the level of literacy in understanding maintaining ecology is very well responded to. From the results of observations, it turns out that the coast of Labuan Bajo has become a very promising tourist attraction, both for culinary tourism and marine tourism. With the existence of tourist attractions, the coastal community of Labuan Bajo is about to maintain environmental cleanliness as an aesthetic value in tourism. Coastal communities are also aware of government policies and interventions; for example, the Indonesian Government has implemented various policies to protect the coastal environment, such as marine protected zones and fishing regulations. Awareness and acceptance of these policies vary among the Labuan Bajo Community. Economic empowerment programs are often introduced to them to help develop more sustainable livelihood alternatives, such as ecotourism and environmentally friendly marine cultivation (Peng et al., 2021).

The problem that occurs in the coastal communities of Labuan Bajo is the lack of understanding and participation in decision-making. Their lack of involvement in decision-making about resource management is often a factor in the failure of coastal conservation and management programs. In addition, collaboration with NGOs is also still lacking in developing programs that support sustainable resource management and increase local capacity. This problem occurs

because of the challenges and obstacles in the coastal communities of Labuan Bajo, namely education, access to information, economy, and welfare. Limited access to information and education is often an obstacle to increasing community understanding of broader and more complex ecological concepts. In addition, dependence on unsustainable economic activities due to economic pressures and daily needs often hinders Labuan Bajo conservation and sustainable management efforts.

The Relationship and Social Interaction of Coastal Communities with Nature

The relationship between coastal communities and ecotourism in Indonesia shows great potential for improving economic welfare and environmental conservation, provided it is well-managed and involves the active participation of local communities. The relationship between coastal communities in Labuan Bajo and ecotourism is very close and involves various social, economic, and environmental aspects. Ecotourism in Labuan Bajo offers opportunities for communities to improve economic welfare while preserving the natural environment. From an economic perspective, ecotourism is an alternative source of income. Ecotourism provides an alternative source of income for communities that previously relied solely on fishing or agriculture. This includes work as tour guides, transportation providers, homestay managers, or sellers of handicrafts and souvenirs. In addition, making Labuan Bajo a tourist attraction also impacts improving infrastructure. Ecotourism development often improves local infrastructure, such as roads, health facilities, and education, benefiting local communities. The benefits gained by coastal communities in the tourism sector foster motivation to preserve the environment. Ecotourism often provides incentives for communities to preserve their natural environment. The awareness that ecotourism's sustainability depends on nature's beauty and integrity encourages communities to protect coral reefs, mangrove forests, and other habitats. With ecotourism, environmentally damaging activities such as fishing with explosives or mangrove felling can be reduced because the community gets a new, more sustainable source of income.

The human-nature relationship is at a pivotal moment, as environmental challenges demand a shift toward more sustainable and harmonious interactions (Galeana-Pizaña et al., 2024; Helseth et al., 2024). This requires balancing human development with the preservation of natural systems for future generations. Coastal environmental conservation programs and socio-ecological system literacy are often carried out through community empowerment activities. Ecotourism literacy programs usually involve local communities in their planning and management. This active participation ensures that the community's interests and needs are accommodated while providing a sense of ownership of the ecotourism program. Ecotourism literacy is also often accompanied by training for the community, for example, in foreign languages, business management, and sustainable ecotourism practices. This increases the capacity and skills of the coastal community of Labuan Bajo.

To maintain harmony between the social environment and the non-social environment, local community awareness must be built to be consistent and committed together with the Komodo sub-district government institutions in maintaining a friendly environment where Labuan Bajo is a World Tourism object so that the community can maintain this balance. The ecology of foreign tourists who live in the hotel area or homestay in Labuan Bajo and its surroundings highly upholds the values of the agreement, where the Labuan Bajo community in Komodo Village as residents of the coastal area 90% are Muslim, so there are limitations that Hotel owners and

Foreign Tourists must understand after 24.00 then religious leaders and Muslim youth can reprimand Cafes and restaurants to close, this is the balance of social relations with ecology that rolls in Labuan Bajo.

Literacy of the socio-ecological system is also carried out through informally conducted environmental education. This can happen through the interaction of local communities with tourists and educational programs that often accompany ecotourism, and they gain a better understanding of the importance of environmental conservation and sustainable practices. Children and young people in coastal communities get greater exposure to conservation concepts and can be inspired to participate in environmental conservation in the future.

The challenge of the relationship between coastal communities and nature is that communities risk becoming too dependent on ecotourism. If there is a decrease in the number of tourists due to external factors (for example, natural disasters or pandemics), community income can be disrupted. In addition, the arrival of tourists can bring social and cultural changes that may not always be positive, such as changes in local values and traditions or the emergence of conflicts between the needs of tourists and local communities. Without good management, ecotourism can cause environmental degradation that is intended to be preserved, such as damage to coral reefs due to uncontrolled snorkeling or diving.

Literacy of Socio-Ecological Systems of Coastal Communities in Developing Ecotourism

Coastal community literacy in building and supporting ecotourism involves the understanding and skills needed to develop, manage, and maintain ecotourism activities sustainably. Basic literacy includes understanding ecotourism, sustainability principles, environmental conservation, and the empowerment of local communities. It also includes understanding how ecotourism can improve local communities' economic welfare, environmental conservation, and socio-culture. Coastal communities also understand the condition of local ecosystems. Knowledge of local ecosystems such as coral reefs, mangrove forests, endemic species, and how to maintain ecological balance. They also have literacy about the impacts of tourism activities. Understanding the potential impacts of tourism activities on the environment and how to minimize them, for example, through responsible snorkeling practices or good waste management.

Management and operational skills are important for coastal communities to understand (Sharp et al., 2024). Skills in managing ecotourism businesses, including planning, marketing, financial management, and administration, are also needed to provide quality services to tourists, such as good communication, friendliness, and knowledge of local tourist attractions (Räsänen et al., 2024). The level of awareness of coastal communities to utilize tourist attractions as a source of livelihood for local children because, in the afternoon after school, children who are able to speak English can be tourist guides at tourist attractions, so local children are encouraged to learn, and even the government responds with a policy with the increasing number of foreign tourists, the East Manggarai Regency Government through the Education and Culture Office recommends building a SMKN majoring in hospitality and tourism, meaning that to answer the demands of the global world, it is necessary to prepare human resources that are relevant to the development of tourist attractions.

The above is supported by empowering coastal communities by increasing literacy of social-ecological systems. This is usually done by involving the community in planning and

decision-making related to ecotourism to ensure that the programs developed are in accordance with their needs and desires. Building local leadership that is able to lead and direct ecotourism initiatives. In addition, they also participate in training programs offered by the government, NGOs, or educational institutions on ecotourism, conservation, and business management, as well as continuing education on best practices in ecotourism and environmental conservation.

The continuation of the development program is carried out in collaboration and partnership with NGOs and the Government. Collaborate with non-governmental organizations, governments, and educational institutions to obtain technical, financial, and policy support. Building partnerships with tourism business actors can also improve the promotion and development of tourism products. Furthermore, the literacy of the coastal community of Labuan Bajo about technology and social media can improve online promotion. Using social media and online platforms to promote ecotourism destinations and attract more tourists. Literacy about digital marketing strategies to expand market reach.

Literacy on social and cultural issues can also improve the preservation of local culture. Integrating aspects of local culture into ecotourism, such as arts, crafts, traditions, and folklore, can enrich coastal communities' understanding. This can also improve their skills in dealing with potential conflicts between tourist needs and the interests of local communities. Literacy of socio-ecological systems in the coastal community of Labuan Bajo is generally constrained by limited access to education and information. To overcome this problem, solutions are provided such as involving mobile training programs that visit coastal communities. In addition, there are limitations in funding and human resources. This can be overcome through cooperation with international organizations and NGOs that focus on sustainable development and ecotourism. By developing this literacy, coastal communities can be more effective in developing and supporting sustainable ecotourism, which in turn improves their well-being and protects the natural environment.

CONCLUSION

The coastal community's understanding of the socio-ecological system in Labuan Bajo is generally influenced by their daily interactions with the surrounding environment, traditional practices, local knowledge, and existing government policies and development programs. Coastal communities realise that their lives depend on Natural Resources. On the other hand, the traditional knowledge of coastal communities contains local wisdom values that benefit the socio-ecological system. For example, in Local Ecological knowledge, they have in-depth knowledge of the natural cycle, fishing seasons, and the behaviour of certain marine species. With ecotourism, environmentally damaging activities such as fishing with explosives or mangrove logging can be reduced because the community gets a new, more sustainable source of income. Coastal communities also understand the condition of the local ecosystem. Knowledge of local ecosystems such as coral reefs, mangrove forests, endemic species, and how to maintain ecological balance. They also have literacy about the impacts of tourism activities. Understanding the potential impacts of tourism activities on the environment and how to minimize them, for example, through responsible snorkeling practices or good waste management.

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