

Mangrove wetland ecotourism development potential in the Sungsang-Sembilang Region, South Sumatra

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Abstract. The mangrove ecosystem, found in coastal wetlands, has a particularly unique natural resource potential. Its biodiversity provides vital ecosystem services to local populations. However, rising environmental degradation has resulted in policy efforts, particularly to protect coastal mangroves in the Sungsang-Sembilang region through tourist development projects. The purpose of this study is to examine how people see the potential of environmental power in the Sungsang-Sembilang mangrove area as it prepares to become an ecotourism destination. Data collection utilized a questionnaire design on numerous societal factors such as age, gender, occupations, and economic income. Data from questionnaires were examined using chi-square to discover factors with a connection (p -value 0.05), and then data were evaluated using SWOT analysis to establish best policy plan for growing ecotourism in Sungsang-Sembilang mangrove region. Community characteristics such as age, occupation, and economic income had been found to be related to perceptions of the carrying capacity of the environment in Sungsang-Sembilang mangrove area as an ecotourism area (p -value 0.05), whereas gender characteristics had no relationship (p -value $>$ 0.05). Based on these findings, Sungsang-Sembilang mangrove region should be developed as an ecotourism destination with many policy options that are in line with the environmental circumstances shown by this study.

Key Words: coastal wetlands, ecotourism, natural resources, Sungsang-Sembilang, SWOT analysis.

Introduction. Coastal wetlands provide a variety of ecological services that benefit human well-being (Sutton-Grier & Sandifer 2019; Clarke et al 2021). Protection against storm surges and floods, regulation and purification of water, preservation of habitat and biodiversity, carbon sequestration, facilitation of learning and research, and recreation are just a few of the functions offered by coastal ecosystems (Watson et al 2019; Jordan & Fröhle 2022). Swimming, diving, snorkeling, fishing, boating, bird tours, and mangrove excursions are all available in coastal wetlands. Sustainable tourism in coastal wetland regions has had a favorable influence on environmental and economic quality (Lee et al 2020; Dushani et al 2021).

Because of anthropogenic pressures driving a fast reduction in biodiversity, coastal ecosystems are one of the most vulnerable natural systems in the world (Almond et al 2020; Cooley et al 2022). Most of the world's coastal wetlands are thought to have been lost as a result of urbanization and industrialization (Li et al 2020; Sharma et al 2021). Natural areas exploitation for agriculture and aquaculture, mineral resources, hunting of protected species, recreation, and other anthropogenic activities endangers coastal wetlands (Xu et al 2019; Ogidi & Akpan 2022). Changes in these coastal wetlands have resulted in the rise of tourism, which contributes both directly and indirectly to changes in wetland habitat.

To retain its high image in ecotourism circles, it is critical to expand the ecotourism business with little environmental disruption. Although tourism looks to be economically feasible in the tropics, the environmental effect of growing tourism in coastal regions must be considered. To accomplish sustainable tourism management

goals, policymakers and administrative decision-makers must be aware of the trade-off between tourist preferences for "wilderness" and protected forests on the one hand, and the growth of tourism amenities on the other (Tseng et al 2019; Sæþórsdóttir & Hall 2020; Zheng et al 2021). The allocation of the limited financial resources available for ecotourism development is dependent on the findings of this study.

A rising amount of work on the value of the carrying capacity of places with potential for mangrove ecotourism has stressed the specific role of coastal wetlands in the supply of mangrove ecosystem services (Abdillah et al 2020; Towoliu et al 2020; Tang et al 2022). The majority of extant research focuses on commercial fishing, coastal storm defense, and water purification functions (Trégarot et al 2021). Several studies have been conducted to estimate the value of coastal wetlands for tourism and recreation in mangrove zones (Marasinghe et al 2021). The contingent valuation method (CVM) has been used to determine visitors' willingness to pay (WTP) for developing tourist destinations (Song et al 2021). This strategy provides comprehensive WTP for tourist growth. It does not, however, equip decision-makers with the essential knowledge about the relative importance of the numerous traits that characterize the development or the potential trade-offs in management choices involving, for example, tourism facilities and protection of biodiversity.

The carrying capacity of the biological and non-biological environment may be investigated further, particularly for the development of ecotourism in the Sungsang-Sembilang coastal swamps. Fisheries, mangrove forests, and flora and fauna are examples of biological potential, whereas minerals, mining materials, and tourism are examples of non-biological potential (Nugroho et al 2019; Kurniawati & Aliman 2020; Choudhary et al 2021; Kasim et al 2021). This location is also next to a globally significant conservation area, the Sembilang National Park, which is located on the east coast of Sumatra and is home to the biggest mangrove environment in western Indonesia. This national park is one of the coastal wetland ecosystems included in an important region since it protects all groups of migrating birds from across the world (Darmawan et al 2020). Birdlife International has designated this location as an important bird location. From October through February, birds traveling from East Asia to Australia pause here.

This region has a distinct identity that is not shared by other regions. Based on the conditions described above, it is critical to investigate and develop ecotourism in the swamps around Sungsang-Sembilang, Banyuasin Regency, ecotourism that highlights issues like environmental conservation, socio-cultural empowerment of local populations, and educational components.

Material and Method

Study area. This study was carried out in Banyuasin Regency's coastline ecotourism potential region of Sungsang-Sembilang. The study was scheduled from November through December 2023. Figure 1 shows the research locations. The Sungsang-Sembilang region on the coast of South Sumatra boasts a pretty broad view of mangrove vegetation. The mangrove forest region was separated into two management areas: one in Sungsang village, which included Sungsang I, Sungsang II, Sungsang III, and Sungsang IV villages, and the second in Sembilang village, which was supervised by the Sembilang National Park.

The Sungsang-Sembilang mangrove environment has tourism potential based on the potential of its natural resources. One feature of this area's natural prosperity is the diversity of species found in mangrove forests, such as Sumatran tigers, shorebirds, migrating birds, and macrobenthic creatures including crabs, sea snails, shellfish, and arboreal animals (Rozirwan et al 2021, 2022; Fitria et al 2023). Locals exploited these natural resources for a variety of purposes, including hunting for crabs and shellfish for sustenance, fishing, and clearing swampland for shrimp farming. Because Sungsang village is a coastal population center on the coast of Banyuasin Regency, conditions in the village were quite crowded. Many food shops, buildings, and other establishments were

run by locals, and processed fish items were the most sought-after specialty from this region.

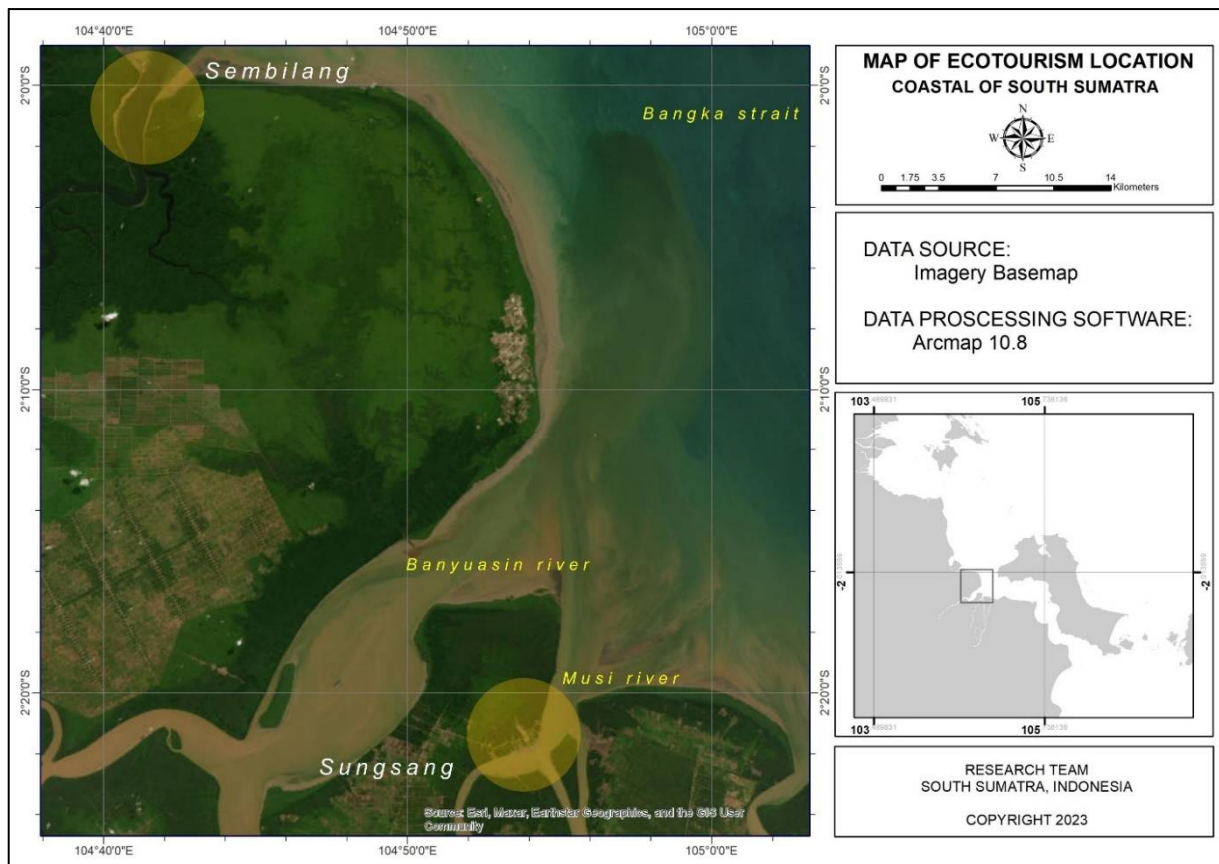


Figure 1. The Sungsang-Sembilang region is located on the coast of South Sumatra.

Data collection. Data was collected using a survey method, which is a research method that uses questionnaires and direct interviews with respondents at the study site to collect samples from a community and characterize the characteristics of the population as a whole (Musa et al 2020; Marasinghe et al 2021; Swangjang & Kornpiphat 2021). The data were gathered via direct field surveys and interviews: 1) direct observation of the state of the potential ecotourism region of the Sungsang coast; 2) data on the findings of surveys and interviews with members of the local community regarding the development of the Sungsang-Sembilang coast's ecotourism potential. The collection of data in the Sembilang region necessitated a 2-hour speedboat ride from the Sungsang village pier.

The main data sources were direct observation of the state of the Sungsang-Sembilang coastal ecotourism potential area, data from questionnaires and interviews with local communities, and information from the community's understanding of opportunities for developing the Sungsang-Sembilang coastal ecotourism potential. The information was gathered through direct field surveys and interviews (Marasinghe et al 2021).

Data analysis. Data from interviews were analyzed using chi-square bivariate analysis in IBM SPSS Statistics 27 software to show local community perceptions of ecotourism potential in this case in the form of an estimate of the carrying capacity of the ecotourism environment (Longépée et al 2021; Bhuiyan et al 2022). Furthermore, the SWOT technique was employed to determine the best model for managing wetland ecotourism in Sungsang-Sembilang (Swangjang & Kornpiphat 2021; Vipriyanti et al 2022).

Results and Discussion

Ecotourism potential based on local community perceptions. The population center was located along the seashore of Sungsang-Sembilang. Locals who lived in the region played a significant part in determining an area's potential for ecotourism. Ecotourism development was predicted to have an economic, social, and cultural impact, both directly and indirectly. Figure 2 depicts the demographic characteristics of respondents in Sungsang-Sembilang village based on questionnaire data.

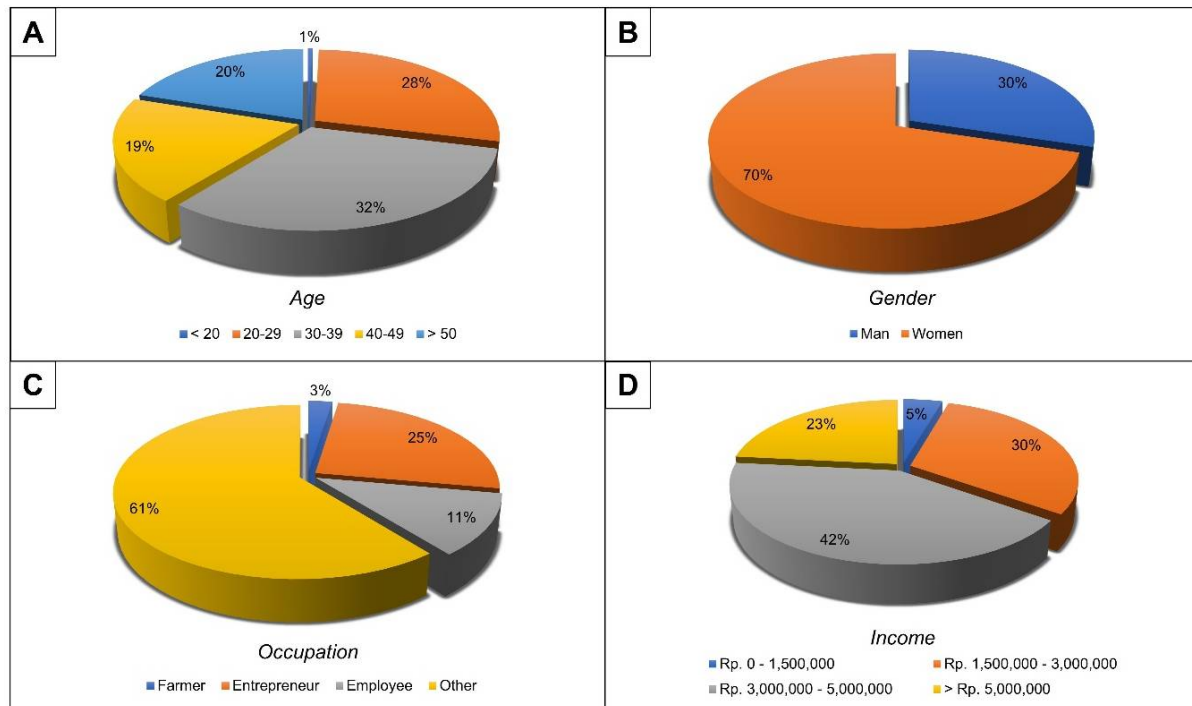


Figure 2. Percentage of the demographic characteristics of the people in Sungsang-Sembilang village.

The demographic features of the respondents were used to determine the local community's opinion of the carrying capacity of the environment (Figure 2). According to Table 1, the p-value showed whether or not there was a link between the two variables. The p-value ($0.005 < \alpha$ value 0.05), indicated that there was a relationship between the variables, but the p-value ($0.005 > \alpha$ value 0.05), indicated that there was no relationship. According to Table 1, local community perceptions based on age had a relationship with social participant (SP), economic activity (EA), and economic business (EB); local community perceptions based on gender had no relationship with the carrying capacity of the ecotourism environment; local community perceptions based on work had a relationship with all of the carrying capacities of the ecotourism environment, namely ecotourism development (ED), SP, EA, and EB; and local community perceptions based on income had a relationship with ED and SP.

Ecotourism operations in coastal locations, particularly in the Sungsang-Sembilang area, elicited a variety of responses from the local people. The state of SP, EA, and EB were affected by the community age category. Age had a link with participation in ecotourism activities; in this situation, a more mature age might contribute experience and perspectives on ecotourism development. Furthermore, older ages provides more innovative ideas for carrying out commercial and development activities within the scope of ecotourism locations (Carvache-Franco et al 2019; Musa et al 2020; Dushani et al 2023). As part of the endeavor to promote ecotourism areas, this served as a foundation for continuing to include community members of all ages in managing the potential of ecotourism regions, particularly in the Sungsang-Sembilang mangrove ecotourism area.

Local populations enthusiastically embrace ecotourism activities since they will have a good influence on their life. Each gender study has the same aims and intent to create mangrove tourist sites in coastal wetlands (Gnansounou et al 2021; Thompson 2022; Dushani et al 2023). Community occupations, on the other hand, have a significant link with the carrying capacity of the ecotourism ecosystem. Several community organizations involved in the commerce sector would respond favorably to the growth of the ecotourism region; for them, this is a chance to expand the business that is being carried out (Graci & Van Vliet 2019; Ramaano 2021; Nyangoko et al 2022). Meanwhile, surveys of locals with greater earnings show that they are quite positive about the growth of ecotourism areas (Swangjang & Kornpiphat 2021; Jadin & Rousseau 2022; Sahputra et al 2022). The community wishes to make a direct contribution to ecotourism operations. Individuals with higher incomes are more open to ecotourism development in their communities, but individuals with lower incomes are concerned about their economic viability, which is indirectly accused of removing part of their income.

Table 1

Community perceptions of the carrying capacity of the environment as ecotourism

Category	<i>p</i> value (chi-square)			
	ED	SP	EA	EB
Age	0.47	0.086	0.001	0.001
< 20				
20-29				
30-39				
40-49				
> 50				
Gender	0.364	0.052	0.274	0.274
Man				
Women				
Occupation	0.001	0.042	0.02	0.02
Farmer				
Businessman				
Private employee				
Others				
Income	0.001	0.005	0.513	0.513
Rp. 0-1500000				
Rp. 1500000-3000000				
Rp. 3000000-5000000				
> Rp. 5000000				

Notes: ED = ecotourism development; SP = society participant; EA = economic activity; EB = economic business.

Identification of ecotourism areas. Sungsang–Sembilang is an area located along the coast of South Sumatra so it has a very wide landscape of mangrove vegetation. The mangrove forest area consists of two management areas, the first area is located in Sungsang village which consists of several villages namely Sungsang village I, Sungsang village II, Sungsang village III, and Sungsang village IV. The second area is located in Sembilang village which is managed by Sembilang National Park. The ecotourism potential of the two areas is presented in Table 2.

Based on natural resource potential, the Sungsang-Sembilang mangrove landscape offers potential as a tourism location. This area's natural wealth includes biodiversity of mangrove forest species such as Sumatran tigers, shore and migratory birds, and macrobenthic creatures (crabs, sea slugs, shellfish, and arboreal animals) (Roziwan et al 2022).

Another prospect for Sungsang-Sembilang is the potential for the community's social life. There are traits and qualities that might be a natural tourist attraction or a

cultural tourist attraction. From a socio-cultural standpoint, the socio-cultural potential of tourism is tied to the usual life of fishermen in the village (Mozumder et al 2018). Various aspects of fishing villages' lives can be processed and marketed as a type of tourist attraction. This socio-cultural potential can be realized through fishing activities, the processing of marine products such as shrimp paste and dried fish crackers, traditional coastal culinary (sea food) and souvenirs, old and pristine stilt houses, cultural arts attractions such as traditional dances, and so on (Effendi et al 2022; Lukman et al 2022; Thompson 2022).

Table 2

Identification of Sungsang-Sembilang ecotourism potential

<i>Location</i>	<i>Ecotourism type</i>	<i>Ecotourism potential</i>
Sungsang	Land	Mangrove tourism Seafood culinary center Craft center
	Water	Water recreation Fishing
Sembilang	Land	Mangrove tourism
	Water	Water recreation Migratory bird tourism fishing Bagan tours

The port is one of the major infrastructures in Sungsang village. In the morning, the scenario at Sungsang's port/dock consists of numerous fishing operations that can become tourism objects or tourism activities, particularly the process of fishing in the sea near the mouth of the Musi River. This activity may be done at a site close to Sungsang village. The activity might take half a day and can be done in the morning or afternoon.

The way of life of fishermen in the Sungsang-Sembilang region may be tied into a tourist-friendly tour package. The availability of housing is critical in order for travelers to feel more at ease when visiting tourist attractions (Saidmamatov et al 2020; Sumarmi et al 2022). Various fisheries items can be packaged as souvenirs (Lasso & Dahles 2023). Fishing activities are quite appealing to the fishing community (Treephan et al 2019). The Sembilang fish is one of the typical brackish water fish that is distributed in the waters of South Sumatra. Visiting the fishing house is another fishing-related activity that may be undertaken. Fishing house may be a fishing tourist attraction since it is located in the center of a shallow sea that is also useful for catching and housing fish using nets (Djunaidi et al 2020; Lasso & Dahles 2023).

SWOT analysis of ecotourism development. Based on the study that evaluated the relevance of external and internal elements as well as the interrelationships between these components, four potential methods were obtained. The following is the strategy for Sungsang-Sembilang mangrove ecotourism activities (Figure 3).

Developing mangrove conservation and rehabilitation as a tourism program. While the concept of ecotourism has always emphasized conservation, there is no disputing that infractions occur. Tourism has a harmful influence on the environment. Losses are also possible if there are no significant consequences or oversight from management or the government, as well as a lack of understanding and awareness within the local population about the importance of ecotourism. Lin (2019) agreed that community empowerment plays an important role in mangrove area restoration initiatives.

Identification of the appropriate environmental challenges can assist in directing the area to remain safe from harm. A conservation management system approach will result in sustainable tourist areas (Hall 2021). This identification as a preventative approach that can explain conservation hurdles can aid in the achievement of an ecologically friendly program.

Increasing community participation and empowerment. More community engagement in the management of the Sungsang-Sembilang mangrove ecotourism can improve the local economy. Along with mangrove protection, community engagement in mangrove ecosystem management will benefit local communities (Begum et al 2021; Sukuryadi et al 2021; Lasso & Dahles 2023). In the Sungsang-Sembilang mangrove forest, community empowerment may undoubtedly lead to community-based ecotourism. The development of community-based ecotourism has been shown to boost regional economies and is currently being implemented in several nations (Noh et al 2020; Kunjuraman et al 2022).

The participation of local populations in tourist initiatives should not be separated; local citizens are not a hindrance to the expansion of ecotourism. Positive stakeholder feedback will be extremely beneficial in assisting tourist planning and management, and community empowerment will surely give significant value in boosting the carrying capacity of the ecotourism ecosystem.

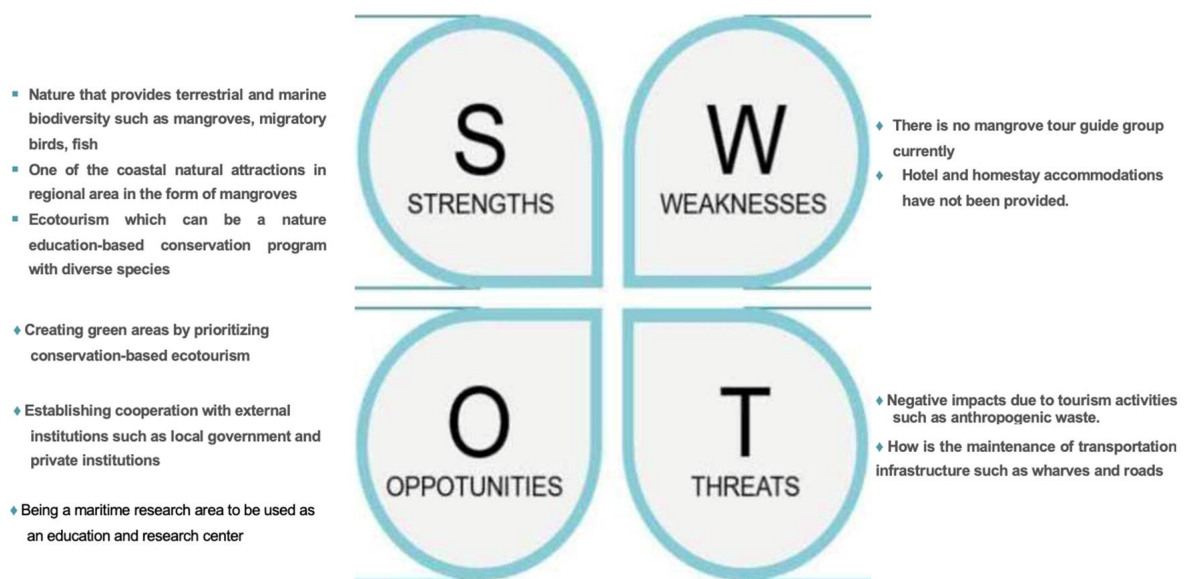


Figure 3. SWOT analysis of the Sungsang-Sembilang mangrove ecotourism area.

Strengthening laws and regulations to conserve mangroves. Mangrove ecosystems are of great importance for coastal areas. Ecological functions provide these duties by providing nourishment, spawning sites, and feeding grounds for the fauna connected with them (Trégarot et al 2021; Vipriyanti et al 2022). Additional benefits of mangrove forests include coastal wildlife habitat, carbon sequestration, and biodiversity protection (Owuor et al 2019; Basyuni et al 2022; Lin et al 2022).

The government's legislative framework for the use and management of mangrove forests should serve as the foundation for environmental management policies. It is feasible to designate mangrove forest ecosystem areas through local rules by providing a new discourse to the community as a sustainable community-based management, adhering to environmental quality standards, and carrying capacity in attaining sustainable development.

Strengthening the concept of ecotourism. To optimize its attractiveness as a tourist destination, the government must continue to improve the mangrove ecotourism region. This might have an impact on how well people's economies perform. Ecotourism is described as a local context in which the environment and the local inhabitants feel connected (Chan et al 2021; Sobhani et al 2022; Lasso & Dahles 2023). In addition to meeting local needs, ecotourism may help conserve the core ecosystem and its environs through interconnected ecological chains (Treephan et al 2019; Abidin et al 2021; Harahab et al 2021).

Ecotourism has generated major advantages for rural enterprises, local communities, and local governments, which are spilling into the wider service industry in fast expanding economic activity, particularly in developing nations (Surjanti et al 2020; Thompson 2022). Ecotourism is the most important sort of sustainable tourism development because of its direct interaction with natural resources. Ecotourism development is a strategy for growing the economy based on natural resources (Makian & Hanifezadeh 2021; Rhama & Kusumasari 2022).

Conclusions. The Sungsang-Sembilang mangrove area's environmental carrying capacity has major potential for the promotion of natural resource-based tourism. The community believed that developing ecotourism in Sungsang-Sembilang is one of the solutions for improving the lives of local residents. Ecotourism in the Sungsang-Sembilang region had a greater association to features of ED, SP, EA, and EB, according to the characteristics of the recognized population based on their age, occupation, and income. This realization must be accompanied by policy strategies, such as developing mangrove conservation and rehabilitation as a tourism program, increasing community participation and empowerment, strengthening laws and regulations to protect mangroves, and enhancing the concept of ecotourism.

Conflict of interest. The authors declare that there is no conflict of interest.

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