

Mangrove Conservation in East Java: The Ecotourism Development Perspectives

Luchman Hakim^{1,2*}, Dian Siswanto¹, Nobukazu Nakagoshi³

¹ Department of Biology, Faculty of Mathematics and Natural Sciences, Brawijaya University, Malang, Indonesia

² Tourism Research Center, Brawijaya University, Malang, Indonesia

³ Graduate School for International Development and Cooperation, Hiroshima University, Hiroshima, Japan

ABSTRACT

An analysis of the role of mangrove ecosystems in tourism was undertaken in order to build a strategy for mangrove conservation and conceptualize sustainable mangrove-based tourism development in East Java, Indonesia. The results of the present study suggest that mangroves could be used as nature-based tourism destinations. While tourism in mangrove areas in East Java clearly contributes to mangrove conservation, it still lacks a mangrove tour program, in which it is important to deliver the objectives of ecotourism. For the sustainable use of mangrove biodiversity as a tourist attraction, it is essential to know the basic characteristics of mangroves and establish mangrove tourism programs which are able to support a conservation program. It is also crucial to involve and strengthen the participation of local communities surrounding mangrove areas. The involvement of local wisdom could increase the sustainability of mangrove ecosystems.

Keywords: *Ecosystem services, coastal conservation, community-based tourism*

INTRODUCTION

Mangroves are a muddy coastal wetland found in tropical and subtropical regions of the biosphere, which play a major role in environmental services, economy, and social benefits. Mangroves contribute to numerous environmental services, including trapping and recycling organic matter, providing shelters and surfaces for terrestrial and aquatic organisms, and contributing to the overall health of coastal environments. Mangroves are rich in terms of natural resources, which for a long time have been exploited by people. Most of the diverse mangrove ecosystems are distributed in developing countries that have recently faced numerous problems, which could potentially lead to mangrove ecosystem extinction [1, 2, 3].

A number of recent reports and scientific reviews give an overview of mangrove disturbance. A reduction in mangroves can lead to natural disasters such as coastal abrasion. Moreover, a loss of mangroves is the initial stage for biodiversity reduction, both in quality and quantity, which significantly affects coastal econo-

mies. Loss of mangroves means a loss of a wide ecological niche for feeding, breeding, and hatching of fish and marine creatures as well as migratory species. A decrease in mangroves also significantly contributes to a negative impact on the coastal economy, where many coastal dwellers depend on marine resources and the fisheries industry [4, 5, 6].

Globally, tourism is one of the significant tools to enhance and support environmental conservation, including mangrove ecosystems in tropical regions. It is especially important in East Java, Indonesia, where mangroves are naturally abundant. The development of tourism in natural areas, including mangrove ecosystems, is considered important. It is especially relevant in relation to the Indonesian government policy on tourism development. In Indonesia, tourism is growing fast and its contribution to economic earning is significant. Recently, the government of Indonesia has an ambitious target to increase and continue the international tourist growth and arrivals over the next year. Mangroves are one of the potential sites for sustainable tourism devel-

*Corresponding author:

Luchman Hakim
Department of Biology, Faculty of Mathematics and Natural Sciences, Brawijaya University
Jalan Veteran, Malang, Indonesia 65145
E-mail: luchman@ub.ac.id

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opment.

It is, however, interesting to note that mangrove based tourism activities in Indonesia are rarely discussed or explored in relation to increasing tourism industry performance in mangrove areas and ensuring the sustainability of mangrove ecosystems as a tourism resource. One of the best opportunities is to ensure that mangrove-based tourism is implemented based on sustainable principles. East Java has a negative record regarding the loss of biodiversity, coastal forest deforestation, and especially mangrove exploitation [7]. Therefore, promoting sustainable tourism in the mangrove environment is crucial. The objectives of this paper are to evaluate the recent status of mangroves in East Java, identify the recent spot of mangrove-based tourism destinations, describe recent tourism programs and activity in mangrove areas, and establish recommendations for future sustainable use of mangrove ecosystems in the tourism industry.

MATERIALS AND METHODS

Prior to the field trip, we identified all mangrove-based tourism destinations in East Java through secondary data examination. We collected information about vegetation and wildlife resources in mangrove areas. We also collect information related to the sociocultural condition of the area, the level of tourist visitation in mangrove areas, and other relevant information. Literature was collected from numerous sources, including libraries and government agencies. The literature review was conducted to get a vivid picture of the recent status of mangrove ecosystems and tourism activity in East Java.

From the secondary data, we selected some places to visit and intensive discussion and observation were conducted with tourism managers, local tourism stakeholders, and local communities. Site selection was based on the site status as a mangrove-based tourism destination being intensively promoted as a tourism destination, accessible, and popular.

In order to identify the tourism program, interviews with destination officers and visitors were conducted. The informants were subsequently asked to identify numerous issues regarding the uses of mangroves as tourist attractions, to assess the limitations of tourism in mangrove areas, and to describe an approach to solve the problem and build sustainable tourism in mangrove areas. Data were analyzed descriptively.

RESULTS AND DISCUSSION

The mangroves of East Java

East Java is one of the densely populated provinces in Indonesia. Located in a tropical area, the mangroves of East Java have been documented in abundance. An abundant mangrove population was found in the northern part of Java Island, while in the south coast mangroves grow patchily in several locations. The muddy environment of the northern coast allows mangrove growth to thrive [7]. Recently, about 85,000 ha (6.24% of the total province area) of mangroves were found in East Java with numerous conditions [8]. The biodiversity of the mangrove ecosystem of East Java is considered high. It is estimated that East Java has 30 major mangrove plant species and 29 associated mangrove species [9].

The northern coast of East Java was previously a habitat for mangrove species. The forest runs west to east, stretching from the Tuban Regency in the west to the Baluran National Park in the east. The wide mangrove area located in the Brantas River delta encompasses Gresik, Surabaya, Sidoarjo, Pasuruan, and Probolinggo [7]. Nevertheless, rapidly expanding shrimp farming, urban development, and industrial development has contributed to mangrove forest clearing. In Lamongan, Gresik, and Surabaya, mangroves have been replaced by industry and shrimp aquaculture. Aquaculture, through the establishment of shrimp ponds, is the ultimate factor contributing to mangrove changes [10]. A relatively good mangrove ecosystem was recently found in the eastern part, spreading from Probolinggo Regency to Baluran National Park. In the coastal area of Probolinggo Regency, mangrove species such as *Avicennia alba*, *A. marina*, *A. officinalis*, *Excoecaria agallocha*, and *Sonneratia alba* grow. In Probolinggo, a rehabilitation effort for degraded mangroves managed to increase the mangrove forest from 209.32 ha in 2001 to 295.20 ha. in 2011, in 39 coastal villages [11]. However, the southern area of East Java is a rapidly developing area and many mangrove ecosystems have been changed into unsustainable uses.

In the southern part, the majority of mangroves grow in protected areas. In Sempu Island Nature Reserve, *Excoecaria agallocha*, *Kanelia obovata*, *Rhizophora apiculata*, *R. mucronata*, and *Bruguiera gymnorhiza* growth strives. A huge and abundant mangrove ecosystem was found in Segoro Anak at Alas Purwo National Park. Compared to the northern population, the population within a protected area is less disturbed. The strict control and management of the protected area seem to be an effective strategy to conserve mangroves. Barriers to such strategies include the limited area for conserva-

tion and many mangrove populations are located in unprotected areas. Therefore, exploration of sustainable mangrove ecosystems is needed.

It is quite difficult to define the appropriate time for mangrove disturbance. However, the inception of the New Order Regime in 1976 contributed significantly to the recent environmental degradation and social problems [7, 12]. In coastal areas, scholars notes that the first incidence of mangrove disturbance was initiated by illegal conversion of mangrove ecosystems under government control into culture ponds in the 1970s [10]. The rapid development of urban areas and industrial sites in the 1980s led to the transformation of many mangroves, but social problems remained unsolved. The unsustainable development created environmental pollution, natural disasters, and social conflicts. Since the mid-1990s, the issues of natural resources conservation dramatically increased. However, a contradictive situation appeared after the New Order fall in 1997 which was followed by the Indonesia economic crisis. Vast tropical forests and natural resources were disturbed, including mangrove [13].

There is a commitment to mangrove conservation, as represented by the rehabilitation of degraded mangrove ecosystems in East Java. The area of mangrove forest rehabilitation in East Java was about 461 ha in 2003 and increased to 2,150 ha in 2006. In 2007, 2,865 ha of degraded mangrove areas were rehabilitated. Recent data on mangrove rehabilitation are not available but it seems that government and local community efforts to restore mangrove ecosystems has grown significantly. It is especially important, as mangroves in some areas are still threatened as indicated by continuous disturbance of such ecosystems, especially remote areas where government and community control is limited.

Recent locations of mangrove-based tourism destinations

Tourism in coastal environments has grown significantly and many types of ecosystems now under assessment for tourism development. In East Java, coastal areas provide abundant resources for recreational activities, ranging from coral reefs, white sandy beaches, coastal forests and mangrove forests. Coral reefs and white sandy coastal beaches were intensively used in many kinds of tourist activities, ranging from sport to sunbathing. There is, however, little attention paid to using mangroves as recreation sites. Some of the informants in this study note that this is because the mangrove environment is close to a muddy environment which is

not suitable for tourism activities to enjoy nature. In addition to that, the dense vegetation and root structure of mangroves become a barrier for visitors to explore mangroves. Compared to the white sandy beaches and reef ecosystems, mangroves are considered less attractive destinations. However, mangroves still have numerous biodiversity resources which potentially could be developed as natural attractions.

From the literature study, it is clear that national parks are the pioneer for mangrove-based recreation. In East Java, efforts to involve mangrove ecosystems in tourism packages were promoted in Alas Purwo National Park, Meru Betiri National Park, and Baluran National Park. This seems to be related to national park innovation to increase the economic value of national park resources through ecotourism programs. The mangrove-based forests in PERHUTANI (National Forest Company under the Ministry of State Owned Enterprises) were less promoted and developed. In the national parks, a comprehensive planning process was undertaken by the Ministry of Forestry Assistance, involving both mangrove conservation and local community economic development. In Alas Purwo National Park, for example, mangrove conservation activities involve developing many local activities which are able to increase local community prosperity. Tourism is one of the possible activities to be promoted in mangrove areas of national parks.

Among mangrove ecosystems in national parks, rapid mangrove-based tourism activity was found in Alas Purwo, especially in the Bedul area. The development of tourism-based mangroves is especially initiated by the local community in Summersari Village. About 4 ha of mangrove area were used as tourism activity in a total of 30 ha of the Bedul area. The initiation of tourism occurred in 2007 and a local organization to manage mangrove-based tourism in Bedul was established. There are no definite numbers for tourism because of a lack of visitor resorts, but it is estimated that tourist arrivals were significant. Since it opened as a new tourism destination, the number of visitors increased and reached their highest number in 2010, in which about 67,976 visitors arrived. In 2011, however, the number of visitors reduced to 46,225 and in 2015, visitors numbered 23,688 [14, 15]. The mangrove ecosystem with its huge biodiversity in Meru Betiri National Park has so far rarely been considered as the main tourism attraction by domestic tourists. About 8 ha of the mangrove ecosystem in the Bandalit coastal area (located in the eastern part of the park) was less exploited by visitors. Simi-

lar to the situation at Meru Betiri, the mangrove ecosystem in Baluran National Park was rarely involved in the tourism program. Visitor interest in the mangroves is low. In both national parks, the level of collaboration among the local communities and national parks was relatively low. According to national park staff, one of the problems faced by the national park in their efforts to involve communities in mangrove conservation and tourism development is the relatively poor human resources and capacity.

In East Java, recent tourism in mangrove areas can be found in Pancer, Cengkong in Trenggalek Regency, Wonorejo and Gunung Anyar in Surabaya, BeeJay Bakau Resort in Probolinggo Regency, Ujung Pangkah in Gresik Regency, Bangkalan in Madura Island, Clungup-Sendang Biru in Malang Regency, Bedul and Pang-pang gulf in Banyuwangi. Mangrove-based tourism is at the initial development stage in BeeJay Bakau Resort, Ujung Pangkah, and Bangkalan. There are still improvements in tourism infrastructure and facilities. Mangrove-based tourism began in the early 2000s, driven by the economic importance of tourism and the growing awareness of mangrove conservation. Mangrove-based tourism in Pancer, Wonorejo, Clungup, and Bedul was rapidly developed and attracted tourists to visit mangrove ecosystems (Figure 1 and Table 1). These forest areas are relatively less disturbed, with many restoration programs implemented, and the forests have a variety of flora and fauna. These sites are also easily accessible and supported by the transportation system. Other mangrove areas are located in remote areas where there is little support for the transportation system.

The contribution of the community nearby the mangrove forest in the initial development of mangrove-based tourism destinations was identified as crucial. In Cengkong, the local community group called Kejung Samudera has contributed significantly in tourism initiation. The organization of Kejung Samudera views tourism in mangrove ecosystems as an integral part of mangrove conservation in Cengkong. In Clungup the activity of the conservation group movement built the Clungup Mangrove Center (CMC) as a community instrument in the conservation program. The CMC also works to provide information and promotion of conservation of the mangrove ecosystem through tourism. The staff of the CMC argues that mangrove-based tourism has opportunities to provide funding for mangrove conservation. In Wonorejo, Surabaya, the contribution of the local tourism community (locally called Kelompok Sadar Wisata or POKDARWIS) has been important.

The local government of Surabaya and the local community in Wonorejo contributes significantly to the initiation of mangrove tourism. A number of voluntary organizations have been actively involved in mangrove rehabilitation programs in Wonorejo.

These local communities have a great commitment to the conservation of mangrove forests. From the perspective of community-based tourism, collaboration with local people surrounding mangrove ecosystems has provided continuous support for mangrove conservation. According to informants, many local organizations have introduced and promoted ecotourism as a form of creative economic activity that is complementary to the mangrove conservation program. The creation of various new jobs in tourism sectors has been a major focus in community-based tourism in mangrove areas. Informants argue that the existence of recreation sites in mangrove areas seems to be able to contribute to the preservation of mangrove stands, and therefore implies that recreation will become a strategy for conservation. Perhaps the biggest issue is managing the relationship between the community and the forest authority (i.e. national parks, PERHUTANI and local government). Managing mangroves for tourism is a complex activity. The complexity is influenced by the desire to conserve mangroves and generate income or other economic benefits from mangroves. Informants point out that the development of tourism in mangrove areas clearly offers local residents income generation and provides jobs, but it is also important to note that both tourists and local residents through recreational activities if not well managed and controlled, contribute to mangrove degradation.

Ecotourism programs in mangrove areas

In Indonesia, the use of mangroves as recreation sites has been reported by numerous authors [16, 17, 18, 19]. There are numerous potential attractive and educational ecotourism programs in mangrove-based tourism destinations, but so far, few programs have been implemented. This includes mangrove sightseeing, visiting aquaculture, fishing, canoeing, bird watching and volunteering in mangrove conservation programs. There are also mangrove trails and mangrove river tour programs. Other popular activities associated with recreation in mangrove forests include photography. There is, however, little research on mangrove-based tourism destinations examining the popularity and preferences of tourists in mangrove-based tourism programs.

Based on the interviews, recent mangrove recreation

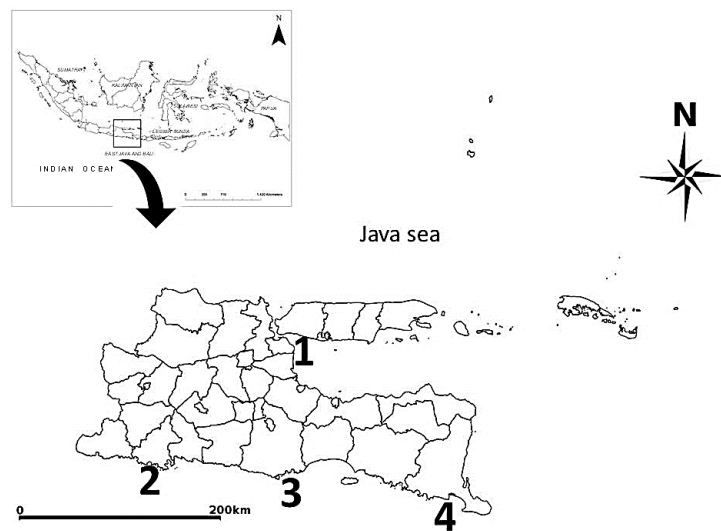


Figure 1. Mangrove-based tourism destinations in East Java. (1) Wonorejo, Surabaya, (2) Cengkong, Trenggalek, (3) Clungup, Malang, and (4) Bedul, Banyuwangi

activity in East Java has been integrated into some formal activities. These include: Rehabilitation actions which involve programs by companies through CSR schemes; Official meetings with numerous government offices; Training programs conducted for high school and university students; Community gatherings.

Mangrove ecosystems are used for public recreation, but education aspects in tourism programs lack implementation. The lack of education programs was observed to be related to the capacity of the tourist guide. This is especially crucial in relation to issues in ecotourism programs in mangrove ecosystems. Ecotourism is "responsible travel to natural areas that conserves the environment, sustains the well-being of the local people and involves interpretation and education" [20] and in such a tourism form, education is an important aspect. In the development of educational programs for tourists, destination managers face scientific constraints. According to informants, it is not easy to determine mangrove potentiality and determine the tourism package in mangrove ecosystems. The significance of biological, ecosystem service and aesthetic appeal of mangrove ecosystems in the context of tourism is still not fully appreciated and understood. According to informants, there are a number of reasons for this: Absence of visitor centers or if available the condition was poor; Lack of a biodiversity database, which is basic resource for tourism program development; Inadequate skill to interpret mangrove resources; Absence of tourism programs which are designed to increase visitor knowledge about mangroves; Less local community involvement; Lack of local govern-

ment attention and support.

As the area of a mangrove ecosystem gradually becomes famous as a new nature-based tourism destination, education and nature interpretation become important. Scholars point out that education and interpretation are the instruments for increasing enjoyable and meaningful recreation experiences. These are also the tools to assist and control tourist behavior in mangrove environments. The goals of education and interpretation are increasing tourist knowledge, awareness, and support of mangrove conservation. These aspects seem absent in East Java mangrove tourism destinations, including mangrove-based tourism destinations in the national parks.

Mangroves, bioecologically, have unique features which differ from other tropical ecosystems. Visitors often want to find out about a particular area with special features and wish to gain new experiences. So far, there are no guided tours and visitors freely explore all accessible areas in the mangrove ecosystem. Since the control is poor, it is possible for visitors to conduct vandalism activity. There is evidence of mangrove disturbance caused by tourist activity. Solid waste in mangrove environments indicates a low tourist appreciation of mangrove conservation. Visitors can also leave mangrove areas without learning anything about mangrove ecosystems. Tourism destination managers have also observed difficulties controlling tourist numbers and behavior.

This is the challenge for destination managers and local communities who organize tourism in mangrove areas to develop guided walks along designated routes

Table 1. Some notable mangrove ecosystems visited by tourists

Ekowisata Mangrove Wonorejo (Wonorejo Mangrove Ecotourism)	
Location	Wonorejo, Surabaya city
Coordinates	7° 18' 76" S–112° 48' 922" E to 7° 18' 328" S–112° 50' 691" E
Form	Mangrove forest along river corridors
Biodiversity features	<i>Avicennia alba</i> , <i>A. marina</i> , <i>Rhizophora mucronata</i> , <i>Sonneratia casiolaris</i> , <i>Nypa frutican</i> , <i>Bruguiera cylindrical</i> , <i>Aegyceras floridum</i> , <i>Excoecaria agallocha</i> , <i>Xylocarpus moluccensis</i> . There are 140 bird species, of which 31 are classified as protected birds [31].
Management aspect	Managed by local community (POKDARWIS) and city government
Rehabilitation supporter	Unilever, Johnson Controls, English First (EF), Wismilak Group, Honda Citra Graha, Airlangga University, Citylink, Pertamina
Cengkong	
Location	Trenggalek Regency
Coordinates	8° 17' 983" S–111° 42' 178" E to 8° 18' 176" S–111° 42' 305" E
Form	Mangrove forest along river corridors
Biodiversity features	<i>Avicennia alba</i> , <i>Acanthus ilicifolius</i> , <i>Bruguiera exaristata</i> , <i>B. gymnorrhiza</i> , <i>B. parviflora</i> , <i>Nypa fruticans</i> , <i>Xylocarpus granatum</i> , <i>Ceriop tagal</i> , <i>Excoecaria agallocha</i> , <i>Sonneratia alba</i> . 21 bird species were found [32].
Management aspect	Tourism managed by local community "Kejung Samudera"
Rehabilitation supporter	PERHUTANI, Forestry Office of East Java Province
Clungup	
Location	Malang Regency
Coordinates	8° 26' 527" S–112° 40' 021" E to 8° 26' 196" S–112° 44' 777" E
Form	Mangroves distributed patchily, mixed with lowland coastal forest
Biodiversity features	<i>Rhizophora apiculata</i> , <i>Rhizophora mucronata</i> , <i>Bruguiera gymnorrhiza</i> , <i>Bruguiera sexangula</i> , <i>Ceriops decandra</i> , <i>Ceriops tagal</i> , <i>Aegiceras corniculatum</i> , <i>Excoecaria agallocha</i> . Birds include <i>Pernis ptilorhynchus</i> , <i>Haliaeetus leucogaster</i> , <i>Anthracoceros albirostris</i> , <i>Accipiter trivirgatus</i> , <i>Spilornis cheela</i> , <i>Otus lempiji</i> , <i>Loriculus pusillus</i> , and <i>Rhyticeros undulates</i> .
Management aspect	Managed by Clungup Mangrove Centre
Bedul	
Location	Alas Purwo NP (Banyuwangi Regency)
Coordinates	8° 36' 124" S–114° 13' 503" E to 8° 36' 387" S–114° 16' 515" E
Form	Mangroves occupy a large area in Segoroanak lagoon
Biodiversity features	At least 27 mangrove species were found. These included <i>Avicennia alba</i> , <i>A. marin</i> , <i>Bruguiera sexangula</i> , <i>B. gymnorrhiza</i> , <i>B. cylindrica</i> , <i>Ceriops tagal</i> , <i>C. decandra</i> , <i>E. coecaria agallocha</i> , <i>Xylocarpus moluccensis</i> , and <i>X. granatum</i> . Bedul is important to 16 migratory bird species from Australia.
Management aspect	Collaboration with local community in Sumberasih Village.
Supporter	Japan International Cooperation Agency, university, local NGOs

in mangrove areas with interpretation activities. A comprehensive survey of visitor interest and motivation to visit mangroves seems to be an important aspect in building the tourist programs.

While tourism in mangrove areas has shown significant growth, it has not yet been fully supported by local government. It is also not an entirely clear statement that the local and regional tourism development includes mangroves as a potential attraction to be developed. Lack of basic data seems to be a barrier among local government to develop attractions, facilities, and infrastructure for mangrove sustainably.

Toward sustainable ecotourism in mangrove environments

The use of mangrove ecosystems in a sustainable manner should be considered comprehensively as economic, environmental and social aspects [21, 22]. There are numerous studies regarding economic valuation of mangrove ecosystems in East Java, but few of them are used in the political dimension in mangrove management. Without this evaluation, only recognized commercial goods will be exploited and environmental services of mangrove ecosystems ignored. Tourism in mangrove areas is mostly based on environmental services value [1, 23, 24] and therefore creativity and innovation

to optimize mangrove resources sustainably is important. Informants point out that the problems for local communities are that they are poorly skilled or knowledgeable regarding tourism product development. Training for local people is necessary in this case since many of the tourism products are confined with standard quality and should meet visitor satisfaction.

Regarding environmental perspectives, planning and implementation of tourism in mangrove areas should also mitigate and minimize numerous risk factors for both physical and biological origins [25]. Design for nature-based tourism destinations, including mangrove areas, should meet several criteria. Following scholars' recommendations, landscape modification should be minimized, providing a chance for the local identity to survive. Biophysically, the proper design for mangrove tourism areas should have the ability to accommodate environment, support sustainability of biodiversity, and perform local character [26].

One of the fundamental characteristics of ecotourism in mangrove-based areas is the development of mangrove interpretation. Informants in this study note that interpretation development is rarely the local managers and tourist guide's priority due to a lack of human resources in mangrove biodiversity recognition. Observation indicates that most of the tourism activity in mangrove

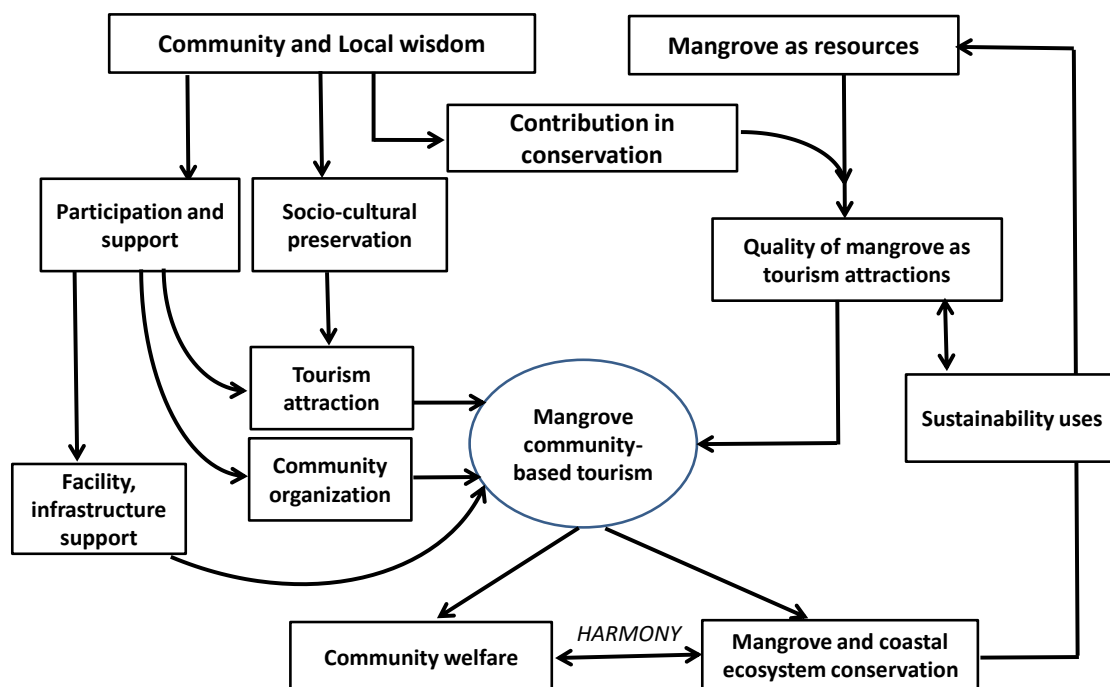


Figure 2. Conceptual framework for local community-based mangrove tourism, with local wisdom as a fundamental aspect of mangrove-based destination sustainability and competitiveness

grove areas lacks interpretation. Skepticism about mangrove interpretation among guides was also found. To ensure that the objectives of ecotourism are addressed, the tourism program activity usually includes mangrove interpretation on the tour program [27, 28]. Informants point out that human resources skill improvement in mangrove-based tourism is a fundamental aspect in mangrove planning and development as a tourism destination. The ability of destination managers and guides to understanding biodiversity and the ecosystem of mangroves, therefore, becomes crucial. This requires the identification of flora and fauna of mangroves, biogeophysical aspects of mangroves and human–mangrove ecosystem interactions.

In order to develop sustainable mangrove-based tourism, community participation and development is crucial (Figure 2). Involving and enhancing the wisdom of the local community is also essential. Local people have lived in mangrove areas for a long time, and in many cases, there is a mutual relationship between humans and their environment, including mangroves. Understanding and involving local wisdom in mangrove management has important implications for mangrove-based tourism management because of its role in defining active community support in mangrove conservation and local culture preservation [29, 30]. Local wisdom is particularly important to increase the locality and uniqueness of local culture and tradition as part of the mangrove-based tourism attraction. In the tourism industry, local culture preservation has become increasingly important. This has become a crucial instrument to implement in ecotourism and achieve sustainable mangrove-based tourism.

CONCLUSION

Mangroves are important resources, which until recently were under serious threat of disturbance. Some mangrove areas in East Java are still preserved, but this situation has rapidly changed. In East Java, tourism potentially became a strategy for mangrove conservation. Mangrove-based tourism activity is generally found in an area where the local community, who are actively involved in preserving mangroves, initiate tourism programs and promote mangroves as alternative nature-based tourism destinations. The increase of tourist visitation in mangrove areas in East Java supports the concept that mangrove ecosystems have a potential future as unique and attractive tourism destinations. This also confirms previous studies by researchers who identified ecotourism as one of the important instruments for

mangrove conservation. The success of mangrove tourism in the studied area could be due to a combination of factors, including mangrove site accessibility, local community involvement, the quality of mangrove ecosystems, and availability of mangrove tourism programs.

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