

Wildlife and tourism in East Java southern coastal area: challenges for ecologically sustainable tourism

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Abstract

The southern coastal area in East Java is known for its biodiversity. There are protected areas stretching from the Blambangan peninsula in the east, with a rich flora and fauna critical for the karst ecosystem in the west in the Pacitan Regency. Visiting the natural area, including the coastal area with great biodiversity, will become the favorite tourism program. This paper has reviewed the recent status of biodiversity, recent and future tourism trends, the effects of tourism infrastructure development to wildlife, and recommendation for future wildlife tourism development in the southern coastal area of the East Java province. From the literature study, direct observation and interviews with local people, environmental activist, and local government, some important findings should be discussed. First, it is clear that the southern coastal area is an area with high biodiversity level and important for the development of future tourism. Second, tourism grows significantly and provides opportunities to support biodiversity conservation in coastal area. Third, it was a phenomenon where recent infrastructure development to trigger economic development and tourism led to potential threats to the future of biodiversity. Fourth, the sustainable wildlife tourism implementation in southern coastal area is crucial. The aspects related to the biodiversity conservation, local coastal dweller socio-cultural development, and local economy development are important to incorporate into sustainable tourism development strategy.

Keywords

coastal ecosystem, coastal tourism, biodiversity, community development

Introduction

The southern coastal area of East Java is the focus of recent national development. The area has potential natural and bio-resources but is less developed. Most of the southern coastal areas in the East Java province have been known as the less developed regions. Administratively, the southern area of East Java belongs to the eight regency, namely Banyuwangi, Jember, Lumajang, Malang, Blitar, Tulungagung, Trenggalek, and Pacitan. In these areas, most of the community in the southern coastal area has a lower economic status and poor access to basic infrastructure. For this

reason, many communities in the southern coastal area are poor and become the target of recent development programs (Fauzi, et al., 2019; Hendarto, 2019).

The southern coastal area is dominated by the karst ecosystem. Compared to other areas in East Java, the southern coastal area is relatively less suitable for agricultural production. The combination of cultivation in dry lands, low soils fertility, poor skilled farming and the absence of technology lead to the low productivity of crops and other agricultural products (Whitten et al., 1996). The agroforestry system is one of the suitable farming systems. Within the agroforestry system, coffee, clove, coconut, and numerous fruits plant species are grown with numerous crops. The agroforestry system supports biodiversity conservation. Birds, insect, and small mammals have been reported in the agroforestry system in the southern coastal area.

Furthermore, the southern coastal area of East Java is endowed by spectacular coastal landscape with abundant mangrove forest, lowland forest, and beautiful white sandy beaches. Many places have been known as nature-based tourism destinations (Whitten, et al., 1996). Moreover, many nature-based destinations have been established as famous tourism destinations in 1980s, and it has been known as East Java nature-based tourism icons, including Grajagan (Banyuwangi), Watu Ulo (Jember), Balekambang (Malang), Serang (Blitar), and Prigi (Trenggalek). Those beaches listed were listed in many travel magazines since the 1980s as the most beautiful the southern coast of East Java province.

The future challenges of tourism development are related to the main issues to manage natural resources for more creative tourism programs. With the high level of biodiversity, especially wildlife, the development of sustainable wildlife tourism is the crucial key to stimulate local economic growth while providing opportunities to support wildlife conservation. In the southern coastal area of East Java, wildlife tourism is a potential option to be developed. This paper thus aimed to review some aspects related to the biodiversity conservation and tourism in East Java southern coastal area for the implementation of wellness tourism as an important special interest post-pandemic. The paper is organized as follows: First, we analyze recent biodiversity of southern coastal area. Second, we discuss the recent tourism development in the southern coastal area. Third, we evaluate the recent infrastructure development in the southern coastal area as one of the potential triggers for economic development. Fourth, we discuss the potentiality for the implementation of sustainable wildlife tourism in the southern coastal area. We collected data from numerous works and field surveys, respectively.

Biodiversity of the coastal area

The southern coastal area of East Java has been recognized as biodiversity habitat. Lowland forest, stretching from the Banyuwangi regency in the east to the Pacitan Regency in the west is home to numerous plant and animal species with a high conservation value. Previously, the concern to protect forest and bio-resources in the coastal area has been conducted by Dutch colonial government by the designation of some place as protected area. The Dutch colonial government argues that lowland tropical forest is the crucial ecosystem for economic earnings and scientific aspect. In the recent modern era, the government of Indonesia continues to protect and preserve such areas as the conservation forest. Recently, the forest was designated as national park, strict nature reserve, and wildlife reserve (Fig. 1 and Table 1). In addition to this area, another tropical forest was managed by PERHUTANI, the state-owned enterprises in the forestry sector.

Table 1. Conservation area in the southern coastal area of East Java

<p>Alas Purwo National Park (43.420 ha.); Banyuwangi Regency</p> <p>Ecosystem diversity: Lowland national park with numerous habitat: savanna, mangrove. lowland tropical forest, bamboo forest</p> <p>Notable species: Mammals includes <i>Bos javanicus</i>, <i>Cuon alpinus</i>, <i>Cervus timorensis</i>, <i>Muntiacus muntjak</i>, <i>Sus scrofa</i> <i>Panthera pardus</i> and <i>Felis bengalensis</i>. Reptiles includes <i>Lepidochelys olivacea</i>, <i>Eretmochelys imbricata</i>, <i>Chelonia mydas</i>, <i>Dermochelys coriacea</i>, <i>Varanus nebulosus</i>, and <i>Python molurus</i>. Numerous birds, insects, and plants were found.</p>
<p>Meru Betiri National Park (58,000 ha); Banyuwangi and Jember</p> <p>Ecosystem diversity: Mangrove, swamp forest, coastal forest, lowland deciduous forest, rheophyte forest.</p> <p>Notable species: Mammals includes <i>Panthera pardus</i>, <i>Bos javanicus</i>, <i>Macaca fascicularis</i>, <i>Trachypithecus auratus</i>, <i>Muntiacus muntjak</i>, <i>Lomys horsfieldii</i>, <i>Nycticebus javanicus</i>. Marine reptiles includes <i>Chelonia mydas</i>, <i>Dermochelys coriacea</i>, <i>Lepidochelys olivacea</i>, and <i>Eretmochelys imbricata</i>. Many birds were recorded, including <i>Pavo muticus</i> and <i>Nizaetus bartelsi</i>.</p>
<p>Nusa Barung Island Wildlife Reserve (6,100 ha); Jember Regency</p> <p>Ecosystem diversity: Small island, lowland tropical forest</p> <p>Notable species: Mammals species includes <i>Cervus timorensis</i>, <i>Sus sp.</i>, <i>Macaca fascicularis</i>, <i>Trachypithecus auratus</i>. Reptiles includes <i>Chelonia mydas</i>, <i>Eretmochelys imbricata</i>, <i>Varanus salvator</i>, <i>Phyton sp.</i> Numerous birds, insects and plants species were also found.</p>
<p>Watangan-Puger Strict Nature Reserve (2 ha): Jember</p> <p>Ecosystem diversity: coastal forest and lowland tropical forest</p> <p>Notable species: Mammals species includes <i>Trachypithecus auratus</i>. Reptile species include <i>Varanus salvator</i> and <i>Phyton reticulatus</i>. Various species of birds were also recoded.</p>
<p>Sempu Island Strict Nature Reserve (877 ha): Malang Regency</p> <p>Ecosystem diversity: Small island, lowland tropical forest, lakes, coral reefs</p> <p>Notable species. Mammals include <i>Trachypithecus auratus</i>, <i>Macaca fascicularis</i>, <i>Sus sp.</i>, <i>Muntiacus muntjak</i>, and <i>Tragulus javanicus</i>.</p>



Fig 1. Map of the East Java province and the distribution of crucial conservation areas

The conservation area, including forest under management of PERHUTANI, is a crucial habitat for numerous plants and animal species (Aryanti, et al., 2021). Interestingly, many animal species inhabiting lowland tropical forest have been recognized as vulnerable, endangered, and critically endangered. These include Green peafowl (*Pavo muticus*, Endangered), Leopard (*Panthera pardus*, Vulnerable), Javan langur (*Trachypithecus auratus*, Vulnerable), Javan pangolin (*Manis javanica*, Critically Endangered) and Binturong (*Arctictis binturong*, Vulnerable). Some important species are “Data Deficient” under the IUCN status, including Java mouse-deer (*Tragulus javanicus*). In the past, the coastal forest used to be the habitat of the Javan tiger (*Panthera tigris sondaica*, IUCN extinct). Many biological and ecological data are limited, leading to the opportunity for the southern coastal area as laboratory for nature and conservation education.

Recent finding of Javan slow loris (*Nycticebus javanicus*, critically endangered) in coastal forest in Malang Regency open opportunities to the new records of such species in East Java. (Aryanti, et al., 2021). Scholars point out that recent distribution of Javan slow loris included the area outside the protected area system (Voskamp, et al., 2014). With an increase in the disturbance of systematic habitat and poor local community support to protect forest, the continuous habitat degradation will lead to the population extinction. Thus, this leads to the significant argument for lowland tropical forest conservation in the coastal area in southern East Java.

The Javan hawk eagle (*Nisaetus bartelsi*, endangered), an endemic birds species to Java, has been recorded in the southern coastal area in Malang. The birds were found in the canopy of tall trees species. Furthermore, the coastal area is home to numerous birds. Thus, a recent survey has confirmed that the Sempu strict nature reserve is the habitat for at least 66 birds, of which 10 have been recognized as endemic to Indonesia archipelago. Two species, namely Banded woodpecker (*Chrysophlegma miniaceum*) and dan Fulvous-chested Jungle Flycatcher (*Rhinomyias olivaceus*) are on the IUCN Red List species (Andriyono, et al., 2016).

Recently, some species have been found in the protected area, whereas in the past, species were found in the forest beyond the protected area system (i.e. Banteng) Banteng (*Bos javanicus*, Endangered), Banteng is for a mamal special in wildlife tourism (Whitten, et al., 1996; Hakim, et al., 2015). This species has been used as flagship in Baluran and Alas

Purwo National park to attract tourist visits to parks. The population in Baluran has been reported to decrease, and is stable in the Alas Purwo National Park. Visiting Sadengan grassland, the habitat of banteng and other wildlife, are still favorite tourism programs among tourist in this national park.

Sandy beaches are the crucial habitat for sea turtle nesting. A total of four sea turtle species have been recorded using the sandy coastal area in East Java as nesting sites, including *Chelonia mydas*, *Eretmochelys imbricata*, *Lepidochelys olivacea*, *Caretta caretta*, and *Dermochelys coriacea* (Hakim and Nakagoshi, 2008). These species have been globally protected since the increase in the population decline trend. The water ecosystems adjacent to the coastal area have been identified as crucial habitats for marine creatures, including numerous invertebrates in the coral reef ecosystem, reef fish, sea turtles, and mammals. The Southern Java seas are the crucial habitat for sharks and dolphins, but there are few comprehensive studies about these species.

The significant value of southern coastal area as a hot biodiversity spot should be considered in any development, especially development programs which may destroy the natural ecosystem as wildlife habitat. Considering the situation of rapid southern coastal development, ensuring habitat integration of numerous biodiversity management programs into coastal development is crucial. Scholars point out that the capabilities to ensure habitat integration is key to enhance numerous ecological works of ecosystem to support biodiversity. The comprehensive planning of tourism destinations, which are able to accommodate biodiversity conservation into tourism development in the southern coastal area in East Java, is important.

Tourism in the southern coastal area

Beautiful sandy beach in many places from Banyuwangi in the east to Pacitan Regency in the west have been visited by tourist from various areas. Tourists come not only from the nearest city, but also from Central Java, Yogyakarta, West Java, and Jakarta. In addition, there are also tourist who come from overseas to visit relatively pristine habitats in the national park. Two national parks in coastal area, Alas Purwo and Meru Betiri National Park, are very famous for nature-based tourism destination. Furthermore, white sandy beaches are the favorite recreation sites. Many beaches have slow ocean waves (Periplus, 2014).

The mangrove has been developed by the local community as recreational sites. Although mangrove sites used to be numerous along the coast, only few sites have been developed as tourism sites. It includes Nagelan (Segoro Anak) in Banyuwangi, Clungup (CMC Tiga Warna) in Malang, and Cengkrong (Watulimo) in Trenggalek. Observing the mangrove ecosystem, boating, trekking, and observing the fishermen activity in the mangrove were the focus of tourism development. The Indian ocean wave in the southern area has been recognized as one of the best surfing sites. "G-land" in the Alas Purwo National Park and Lenggoksono in southern Malang are the favorites surfing sites, especially for international tourists (Whitten, et al., 1996).

One of the characteristics of tourism in the southern coastal area is a high number of visitors, known as mass tourism. A great number of tourists in limited places with poor visitor controls has been observed in many sites, especially beyond the conservation area. The economic benefits are the magnet for massive tourism infrastructure development. The local people also desire to increase the number of tourists through man-made attractions in many place. Without a caring capacity consideration, mass tourism contributes to the environmental degradation (Zelenka and Kaceti, 2014). So far,

the impact of mass tourism in southern coastal area is numerous, including solid waste, pollution, vegetation disturbance, and wildlife disturbance.

Although the southern coastal area has been visited by a great number of tourists, a complete and comprehensive statistical data related to the visitor number on each sites is rarely found. The poor management of ticketing and reporting lead to the scarce visitor data, representing the basic problems of visitor management. In the regency in the southern coastal area, Malang is the hot spot for recreations sites. Some points have been established as a coastal tourism destination in 1990s, following the improvement of accessibility of many coastal sites in the Malang Regency. It is especially relevant with the icon of Malang Regency being a “tourism barometer” in East Java. The domestic tourism of many visitor areas comes from Malang and its surrounding areas (Table 2).

Table 2. Domestic tourist arrivals in southern Malang Regency before the coronavirus pandemic. Since 2020, the recreation sites were closed to minimize the spread of pathogens.

No	Recreation sites	2017	2018
1	Pantai Sendang Biru	46,741	8,143
2	Pantai Clungup-Gatra-Tiga Warna	76,206	33,150
3	Pantai Teluk Asmoro	No data available	182,376
4	Pantai Goa Cina	189,418	107,944
5	Pantai Watu Leter	77,829	82,678
6	Pantai Ungapan	No data available	25.427
7	Pantai Bajulmati	125,299	13,834
12	Pantai Batu Bengkung	145,911	41,094

The development of infrastructure in the southern coastal area: potential impact to wildlife

With the low productivity in agriculture and few industrial clusters, the development of tourism in the southern coastal area is the potential sector in the south. It is relevant with the abundance of beautiful beaches. The development of tourist infrastructures is viewed as a strategy to increase tourist visitation to nature-based tourism destinations.

The most significant infrastructure development in the southern coastal area were national road corridors from east to west, connecting Banyuwangi in the east to Pacitan in the west. In the perspective of tourism, the development of infrastructure is crucial in facilitating and improving visitor's accessibility to access numerous natural tourism attractions. The road with high-quality hot-mix surface increases the satisfaction of visitors when visiting the southern coastal area.

Bridges with the advance technology and architecture have been established, including the Damas Bridge in Trenggalek, Grindulu, and Soge Bridges in Pacitan Regency (Fig. 2). The bridge development was not without potential environmental impact. The potential impact area includes the waste siltation, water pollution, and river erosion, which affect living creatures in the river ecosystem. There are also habitat fragmentation and wildlife migration outside the native habitat.



Fig 2. Infrastructure in the southern coastal area of East Java. The new developed road in the southern coastal area of Malang Regency (A), and Soge Bridge in Pacitan Regency (B) (sources: <https://jelajahpantai.com/>)

The environmental impact of tourism has been reported as significant. In East Java, tourism has been recorded contributes to the decrease of environment and biodiversity in the southern coastal area. Considering numerous research documents, the crucial impact can be classified as

- **Pollution.** Abundant waste on beaches is a crucial pollutant. Bad waste management and bad visitor attitudes lead to a lot of waste. There is an abundance of plastics and provides significant threats to marine creatures. Scholars point out that plastics is the main problem in marine ecosystem programs. There are also potential poisonous materials as a result of poor waste management (Savira, 2020; Ariyunita, et al., 2021).
- **Illegal collection of bio-resources.** The high number of tourist and poor control of visitor behavior lead to illegal collecting of plants and animals. Coral reefs and fish area the most targeted marine creatures illegally collected by visitors. The massive coral disturbance was reported and observed at the Bale Kambang Beach, southern Malang (Hakim, et al., 2014). There are also problems with the illegal harvesting of sea turtles and sharks.
- **Land use changes.** Land use changes was the crucial issue in the southern coastal area. There is some evidence for land use changes, including an establishment of many orchard for crops and palm oil cultivation and changes to rivers system flows (Fig. 3). There is also the development of tourism facility, including the rest area, parking area, restaurants, and settlements.
- **Changes to native vegetation.** The development of facilities leads to the vegetation degradation and changes. Exotic plant species have also been the crucial problem. Many exotic species have been introduced as ornamental plants (Hakim, et al., 2017). The introduction of oil palm in the coastal area poses a systematic threat to the native coastal vegetation (Fig. 3).
- **Threats to wildlife populations.** These threats include changes of animal behavior, habitat degradation, wildlife escaping from native habitat, injuries, and being killed. There is also death caused by poisoned food and polluted water, in addition to a potential decrease in the population reproduction availability.
- **Vandalism.** Vandalism has often affected rocks, rock cliff, tree trunks, and tourist infrastructure (bridge, building, toilets, park). High number of tourism with poor visitor controls lead to the vandalism in natural areas.

- **Forest degradation and land clearing.** The infrastructure development lead to the vegetation degradation (Fig. 4). Tall trees as crucial habitats for birds (i.e., *Nisaethus bartlesi*) were cut down, and shrub land as nesting areas for birds, reptiles, and small mammals was destroyed.

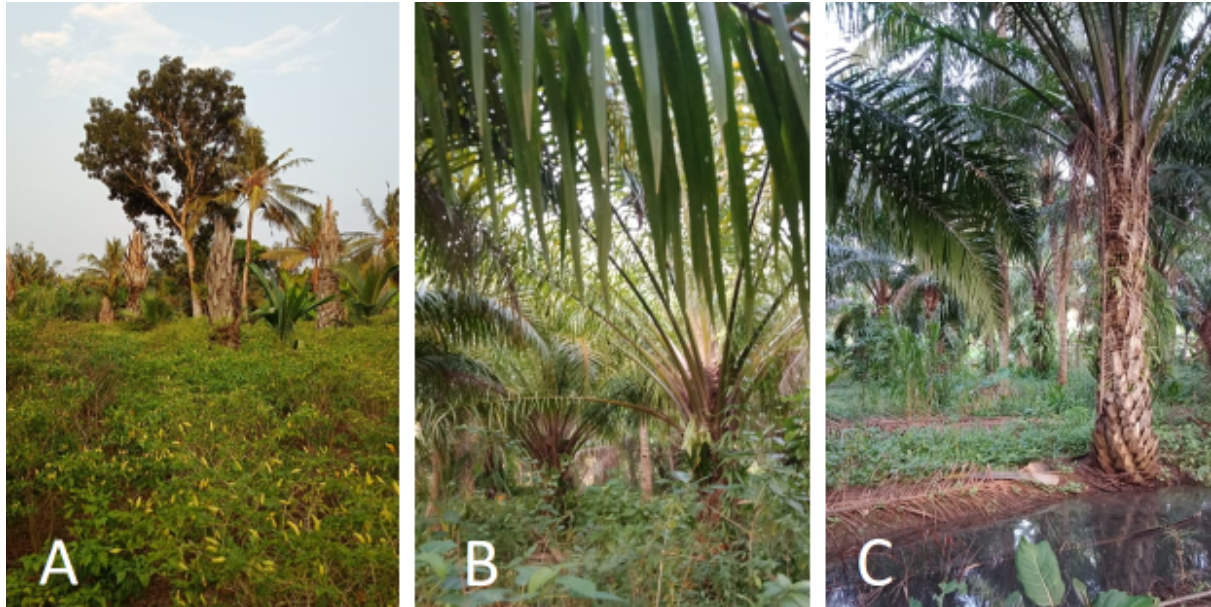


Fig 3. Disturbance of wildlife habitat in the southern coastal area, including the conversion of coastal forest into orchards (A), development of oil palm plantation (B), and river water exploitation as part of the irrigation on the oil palm plantation (C) (Photos by the author).



Fig 4. Forest degradation and land clearing in southern coastal area (Photo by A. Syaifuddin)

With a recent increase of tourism fever, strict nature reserves have been promoted by travel agents and visited by illegal tourists. Scholars point out that these actions pose potential threats to biodiversity conservation (Ghulam, et al., 2013). Principally, visiting strict nature reserves has been banned by national regulation. A low impact of humans to the strict nature reserve areas allows the strict nature reserve area is one of the pristine habitats. Such situation becomes

interested point of few among visitors to visit strict nature reserve area. Visitor enthusiasm to visit strict nature reserves is caused by beautiful landscapes, unpolluted white sandy beaches, lagoons, and solitude of the islands.

Sustainable wildlife tourism in southern coastal area

Wildlife in the southern coastal area has the potential to develop as a unique and interested tourism object. The tourist interaction with wildlife in recreation activity can be classified into two categories. First, tourists observe the abundant wildlife in particular habitat (i.e., wildlife observed in the Sadengan feeding ground). Second, tourists see it as special, in which object often in small population or single individuals (i.e. watching sea turtle, special birds such as *Nisaethus bartelsi*). Such a category of wildlife tourism is distinct in the tourist backgrounds. The first group includes a wide spectrum of tourists, ranging from students, family groups, and wildlife photography, and tourists with special interest to observe wildlife. The second type is especially dominated by students, researchers, and individual/small groups with special interest to observe wildlife.

The diversity and abundance of birds is a potential resource for tourism development. As far, wildlife tourism, including bird watching, has been growing slowly in the southern coastal area of East Java. The hot spot for birding includes Ngagelan, Sukamade, and Kondang Merak. Other sites have the potential as the bird-watching sites, but few have been assessed. As far, only the bird-watching groups, foreign bird watcher, and particular students participate in birding. The popularity of bird watching grows slowly, but there are prospects to be developed.

Watching and releasing of sea turtles is one of the potential wildlife tourism program development segments. Recently, releasing baby sea turtles gained popularity among domestic tourists. The programs, however, were limited to particular events. Some sites offering watching and releasing baby turtles are Ngagelan (Alas Purwo), Sukamade (Meru Betiri), Bajul Mati and Watu Leter (Malang), Serang (Blitar), Kili-kili (Trenggalek), and Taman (Pacitan). However, problems with the implementation of such tourism includes visitor management and the code of conduct in species handling.

An innovative partnership is crucial toward the success of wildlife tourism in southern coastal area. It is especially important because the wildlife habitat is of interest to local community, conservation agency, PERHUTANI, the private sector, and local government. So far, such collaboration and partnership have been poor, leading to the poor management of wildlife as tourism resources.

Ecologically sustainable wildlife tourism programs are the prerequisites in supporting sustainable and competitive wildlife tourism programs in East Java. It is especially relevant with the current issue pertaining to sustainable uses of biodiversity in tourism programs (Liu et al., 2004; Mkiramweni, 2014; Hakim, 2017). Thus, the establishment of ecologically sustainable wildlife tourism requires some crucial keys, including:

- Identifying and mapping biodiversity and crucial habitat comprehensively. Biodiversity identification is crucial for competitive and sustainable tourism implementation. It is especially important to minimize the human-wildlife conflict, protect the essential wildlife habitat, and provides suitable habitat for animal reproduction (Hakim, 2017).
- Designing wildlife programs as a special interest tourism in the coastal area. Wildlife programs should be planned and implemented following environmental standards, increase visitor satisfaction and experience through interpretation, and be able to increase visitor awareness of wildlife conservation.
- Defining carrying capacity of recreation sites to ensure the sustainability of resources. The coastal area with a great biodiversity is the fragile habitat and therefore requires strict control in tourism infrastructure development

and tourist numbers and behavior (Jurado et al., 2013).

- Strengthening the local community capacity to participate in wildlife conservation and wild tourism. The indigenous knowledge and local wisdom of local community are the crucial pillars for environmental conservation, including the development of sustainable tourism in the coastal area (Prasetyo, et al., 2020).

The potential market for sustainable wildlife in southern coastal East Java so far has been supported by a small number of wildlife-oriented tourist who are a distinct group of wildlife-oriented tourist characterized by some conditions:

- Being individual tourist or a limited group
- Often involving a professional guide
- Having a special interest and knowledge about the wildlife
- Appreciating nature and biodiversity conservation
- Learning is one of the reasons to join the wildlife-watching programs

Increasing numbers of wildlife-oriented tourists are crucial in stimulating the development of wildlife tourism in the southern coastal area of East Java. Scholars point out that such tourist are a group having high-quality experience and desiring to pay more for such experience (Cheung and Jim, 2014; Meleddu and Pulina, 2016). These segments of tourists are important not only considering the economical aspect, but also crucial to ensure the implementation of environmentally sustainable tourism practices. Specific additional facility to meet and increase the wildlife-oriented tourists are required, including tourist tract, observation spot, interpretation materials, and wildlife observation tools and equipment.

The success of sustainable wildlife tourism in the southern coastal area depends on the ability and commitment of stakeholders to integrate the environment and social and economic issues into tourism development. Socio-cultural aspects of local people should be appreciated and incorporated into wildlife tourism program. Design to involve local community participation provides opportunities for local community development, in which it contributes to the socio-cultural preservation and local economic development.

Conclusion

The southern coastal area of East Java has great biodiversity. The area is a crucial wildlife habitat, and therefore conservation and sustainable development issues are crucial. Tourism has been developed in the southern coastal area, especially sites with crucial habitat of wildlife. The rapid development of tourism in the coastal area, however, is not without environmental problems. With the recent increase of tourism in the southern coastal area, promoting sustainable wildlife tourism will provide continuous economic benefits, support the wildlife conservation issues, and strengthen the local community prosperity. In the southern coastal area of East Java, the participation of the local people in sustainable wildlife tourism is crucial.

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