Mangrove Ecosystem Development on North Coast of Java

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Abstract. The condition of northern coast of Java is in a high risk due to human activities
(fishing, agriculture, industry, settlement, tourism, and transportation). Mangrove ecosystem
has an ability to protect the coastal area and it can be used also as a mangrove-based tourism
area. The development of ecotourism must be able to truly keep up its principles in maintaining
environmental sustainability, providing benefits to community and containing education for the
visitors and maintaining local wisdom. However, the development of ecotourism itself still
encounters various obstacles in its implementation. The objectives of this study are to analyze
the condition and management between 5 different mangrove-based tourism ecotourism
locations namely Jembatan Pelangi (Banten), Karangsong and Sumber Mas (Indramayu),
Pandansari (Brebes) and Tunggulsari (Pati). Descriptive analysis was conducted based on in-
depth interviews with managers, communities and local governments. Several
recommendations as a result of this study given to improve some infrastructure and waste
management to be more environmentally friendly, a working group supported by local
governments should be taken into account for facilitating coordination both local governments
and central government so that the ecotourism area can be properly promoted.

Keywords: mangroves, ecotourism, north coast of Java, local government, recommendations.

1. Introduction

The condition of the northern coast of Java is at high risk due to natural processes from indirect human
activities (land subsidence and erosion) and aggravated by human activities (fishing, agriculture,
industry, settlement, tourism, and transportation). Mangrove ecosystem has an ability to protect the
coastal area and it can be utilized also as a tourist area, known as ecotourism area. Based on Halpenny
and Elizabeth (2002), Ecotourism means responsible travel to natural areas that conserves the
environment and sustains the well beings of local people.

It is expected that ecotourism can provide additional values to mangrove ecosystem, not only to
protect the coastal area but also to improve the local community welfare by utilizing the tourism
activities without damaging the nature but giving the conservation function to the area.

Several essential elements of marine ecotourism that should be taken into consideration (Halpenny
and Elizabeth, 2002) are:

1. Travels to a marine or coastal setting (this may include some cultural attractions)
2. That benefits local communities, including involvement and financial returns,
3. Helps to conserve the local environment (both cultural and natural),
4. Minimize its negative impact on natural environments and local communities,
5. Emphasizes learning and interpretation of the local environment to visitors, and
6. Motivates the visitors to reexamine how they impact the earth and how they can aid local communities and the environment.

The development of ecotourism must be able to truly keep up its principles in maintaining environmental sustainability, providing benefits to community and containing education for the visitors and maintaining local wisdom. However, the development of ecotourism itself still encounters various obstacles in its implementation.

Inadequate infrastructure, poor management skill, lack of concern in environmental sustainability and the absence of monitoring and marketing activities are the major problem for every ecotourism location with different characteristics. Therefore, the obstacles from five different tourism locations were obtained to be studied in order to find the best solutions to solve the problems.

2. Methods

2.1. Location and time of the research
This research was conducted in 5 tourism locations that utilizing the mangrove ecosystem to protect the coastal area and give additional value of mangrove ecotourism for tourism destination that was expected to improve local community welfare so the local community has a willingness to protect the mangrove. The study was conducted on April and May, 2019.

The research location were taken place along the north coast of java by choosing 5 tourism locations with each of them has different characteristic as follows (figure 1):

1. Mangrove “Jembatan Pelangi”, Kampung Berangbang, Lontar Village, District of Tirtayasa, Regency of Serang
2. Mangrove Tourism Object “Karangsong”, Indramayu
3. Lestari “Sumber Mas” Mangrove Forest Conservation Area, Ilir Village, District of Kandanghaur, Regency of Indramayu
4. Pandansari Mangrove Tourism Village, Dukuh Pandansari, Desa Kaliwlingi, Brebes, Jawa Tengah
5. Mangrove Tourism “Desa Wisata Tunggulsari”, Pati

![Inset Map](image)

**Figure 1.** Observation Sites (Source: Modified from Google Earth, 2019).

2.2. Method
Those 5 tourism locations were chosen based on the different characteristics of each place, including the difference of management system and the existing situation which by the end of the research any obstacles that might be found can be solved to develop ecotourism with ecotourism principles and sustainable development implementation.
2.2.1. Data Collection. The primary data were collected by conducting In-dept interview with the local government namely Marine and Fishery Office of Indramayu Regency, Regional Development Planning Agency of Central Java Province, Marine and Fishery Office of Pati District) as well as the manager of tourism locations. Meanwhile, the secondary data were collected by conducting literature review both online and offline to see the existing policies as well as the related studies about ecotourism that have been conducted previously.

2.2.2. Data Analysis. The analysis conducted in this research is descriptive analysis technique, by conducting in-depth interviews with several local governments and ecotourism actors. Several ecotourism components used for detailed discussion based on research by Mauro, Santarossa, and Pigliacelli (2014) in the Mediterranean Experience of Ecotourism (A Survey of Ecotourism Best Practices in The World). Categorizing several components was used as products and activities by an ecotourism in accordance with the principle of prioritizing the sustainability of both nature and culture. (Table 1)

| Component | Description |
|-----------|-------------|
| a | Management | Plans and programs that affect natural areas or parts of them, as well as specific standards and regulation. |
| b | Facilities, services and infrastructures | All the services and the infrastructures available for tourists that facilitate their enjoyment, such as transport infrastructure and mobility services, information services, guide services, and services related to catering and accommodation. This component is directly connected with the economic criteria that are included in the “eligibility criteria” section of the description sheet. |
| c | Conservation, Local communities, Cultural Heritage, Monitoring, Marketing | Activities that bring benefits in terms of nature conservation such as environmental education or volunteer programs. This component is directly connected with the environmental criteria that are included in the “eligibility criteria” section of the description sheet. |
| d | Local communities | Both as “participants in” and “beneficiaries of” the BP-related activities. This component is directly connected with the social criteria that are included in the “eligibility criteria” section of the description sheet. |
| e | Cultural Heritage | Preservation and the promotion of tangible and intangible cultural heritage |
| f | Monitoring | Monitoring of tourism, of the tourists profile and of the impact of tourist visits on natural areas. |
| g | Marketing | Commercialization, promotion and sale of eco-tourism activities and products to different targets. |

Source: Mauro, Santarossa, dan Pigliacelli (2014)
Table above is used as a basis for analyzing the actual conditions at each location, whether it is in accordance with ecotourism principles or if there is a need for changes to improve the components. This research uses the term “Good/good enough” for tourist locations that already use ecotourism principles in general terms and the term “Need to be developed” for several locations that still need improvement in their management so that development can be carried out while still holding ecotourism principles.

3. Result and Discussion
3.1. Eco-Tourism Components
The results from in-depth interviews conducted show mostly of ecotourism sites have fulfilled the components needed to develop ecotourism, more efforts are required to maximizing the utilization of existing products and activities through comprehensive planning of ecotourism development.

An example of a tourist attraction with a complete ecotourism component is illustrated in Karangsong-Indramayu, there is Mr. Eka Tarika as the ecotourism manager who is also the key person when doing the interview. The components from each of the site study sites can be seen in table 2 below.
### Table 2. Eco-Tourism Components in 5 Ecotourism Locations.

| No | Component                                      | Jembatan Pelangi, Serang | Karangsong, Indramayu | Sumber Mas, Indramayu | Pandansari, Brebes | Tunggulsari, Pati |
|----|------------------------------------------------|--------------------------|-----------------------|-----------------------|--------------------|--------------------|
| 1  | Management                                     | ✓                        | ✓                     |                       | ✓                  | ✓                  |
| 2  | Facilities, services and infrastructures       |                          | x                     | x                     | ✓                  | x                  |
| 3  | Conservation, Local communities, Cultural Heritage, Monitoring, Marketing | ✓                        | ✓                     | ✓                     | ✓                  | ✓                  |
| 4  | Local communities                             | x                        | ✓                     | x                     | x                  | ✓                  |
| 5  | Cultural Heritage                             |                          | x                     | ✓                     | ✓                  | ✓                  |
| 6  | Monitoring                                    | x                        | ✓                     | x                     | ✓                  | x                  |
| 7  | Marketing                                     | x                        | ✓                     | x                     | ✓                  | x                  |

Note: ✓ good/good enough X need to be developed

### 3.1.1. Management
An advanced cooperation between government, tourism managers and private sector which is also supported by a good management process will result to the superior ecotourism development in the future. Local government has the authority over their coastal area, as a protected area, in which mangrove ecosystem lies and has a function to protect the coastal area. Good management will be achieved if there is also a support from the local community. The assistance from private sector can also support the success of ecotourism development, especially in providing infrastructure obtained from Corporate Social Responsibility (CSR) grants.

Models of good management can be seen from four ecotourism objects (Jembatan Pelangi-Serang, Karangsong-Indramayu, Pandansari-Brebes, Tunggulsari-Pati), where the local government give full management of the area to local community and also provides some supports such as provide mangrove seeds, mangrove tracking, toilets, segregated trash cans and also construction of road infrastructure, which can be done by working together with private sector. However, the condition is different in “Sumber Mas” (Indramayu), where there are still conflicts between local government and local community, which hampers the development of the ecotourism.

### 3.1.2. Facilities, services and infrastructures
Diverse and complete facilities and services offered can be found in "Karangsong" Indramayu and Mangrove Tourism Village "Pandansari", Brebes. The mangrove area is quite large, providing space for managers to be able to add various facilities in it such as mangrove tracks, photo spots, educational boards, trips to mangrove locations by boat, as well as public facilities such as prayer rooms, canteens, toilets and the availability of trash bins. In general, the condition of road infrastructure needs to be improved in all observed areas, small road and far from the main road and rarely road sign make it difficult for the visitor. Some examples of the condition describe can be seen in figures 2 below.
3.1.3. Conservation. The ecotourism concept must be emphasized on conservation in its development in which the main goal of developing ecotourism is to add to the economic value of the mangrove ecosystem, in order to improve the welfare of local community so that people are willing to participate in maintaining its sustainability. Thus, it can be seen from the results of satellite data processing, the condition of mangrove ecosystem in all sites has larger over years (figure 3).
Figure 3. Changes in Mangrove Ecosystem Area in 5 Research Objects
((a) Pelangi Bridge, Banten; (b) Tunggulsari, Pati; (c) Pandansari, Brebes; (d) Sumber Mas, Indramayu; (e) Karangsong, Indramayu)
(Source: Modified from Google Earth, 2019)
3.1.4. Local Communities. Ecotourism is expected to protect mangrove ecosystem as well as improve local community welfare, in which local community has a priority to participate in supporting ecotourism in their area, either as managers, workers or on consignment as stated in Law No.9(2009) about tourism. From the area observed, it can be seen that there is huge role of local heroes in the development of ecotourism such as Jembatan Pelangi-Serang (Mr. Ropin), Karangsong-Indramayu (Mr. Eka Tarika), Sumber Mas-Indramayu (Mr. Wartam), Pandansari-Brebes (Mr. Mashadi), and the Tunggulsare-Pati Tourism Village (Mr. Karnawi). They started the development from scratch, even though they were initially underestimated by society and lack of support, but they can show others that what they do were not in vain. By preserving the mangroves, the coastal area in which the fishermen utilized for their livelihood can still be well maintained. In addition, by making this mangrove ecosystem as an ecotourism area, it will open new job vacancy for local community and also offer alternative livelihood for local fishermen, for instance, the opportunity to open a culinary business or produce local products for those who have an interest in entrepreneurship. They can also work as employees in tourism sector.

3.1.5. Cultural Heritage. Indonesia famous with its diverse of culture, one of the local wisdoms that Indonesia has around coastal area is Nadran Laut, such a traditional ceremony to show grateful for fishery products and also as a petition of protection from danger. This kind of traditional ceremony can attract tourists to visit the area.

The extensive mangrove tracking area in Pandansari Brebes allows for music performances to entertain the visitors. This can also be used to introduce local culture to tourist visitors by showing musical instruments, folk songs and traditional dances that can remind the visitor about local culture and initiate them to take part in preserving local culture to public.

3.1.6. Monitoring. The observed areas have a lack of monitoring program, and it needs to be improved, from the interview results, monitoring has not been carried out routinely and consistently both at the local government level and ecotourism managers. This condition might be happened due to several reasons, such as limited budget owned by local government. Meanwhile, from the management side, apart from limited funds, there is also a lack of human resources in doing the monitoring.

3.1.7. Marketing. Some managers have utilized online and offline media to promote their tourism activities. Online marketing activity is done through posting on social media accounts owned by each ecotourism object. Advertisements on regional television were also carried out to invite the participation of local people to come. In addition, offline media is also used by making flyers to be distributed to the public as well as tourism exhibitions that are usually held before pandemic situation are also help to promote the sites.

3.2. General Problems
One of the general problems found in all object researched is the transportation issues in which difficult to be attained, both due to defective road infrastructure and inadequate public transportation so that the tourism sites can only be accesses by private vehicles. In addition, waste problem, which has now become a global issue, is also obstacle that should be faced together, considering that waste generated from tourism activities contribute much in increasing waste volume. Another problem is the lack of clean water as the main aspect needed to support tourism activities such as washing needs in the culinary area, toilet and other operation needs.
3.3. Recommendation

A comprehensive planning in managing ecotourism area and improve local communities welfare is needed to achieve the ecotourism development along with the sustainability principle. From the interview results, conducted with several key persons (local government and ecotourism manager), there are several things need to be taken into consideration related with ecosystem components.

Local governments that have full authority in coastal areas can provide considerable support for the ecotourism development, for instance in terms of land use licensing processes, infrastructure provision, and capacity building of ecotourism business actors through national programs launched by the central government. The role of local government is needed as a liaison with the central government as well as support in promoting ecotourism in the area.

In accordance with the Act No. 10/2009 about Tourism, the role of local governments to carry out trainings for ecotourism business actors can be applied by holding technical trainings such as administrative systems, hospitality, training on waste management and how to recycle it, which supports ecotourism activities in terms of managing the natural environment and visitor management.

The formation of an ecotourism coordination team is very much needed for the success of ecotourism development in an area, both a team work between local government officials (UU No 10/2009), as well as an internal team work by ecotourism actors. Within this team work, it is expected that a good cooperation between local government institutions will be achieved and together with ecotourism actors can build a cooperation that can be mutually beneficial for all stakeholders, including the private sector. This form of partnership is important to be planned so that the
management process can operate better and more professional. The role of each stakeholder must be clear to minimize future conflicts.

The facilities and services offered must be unique and have their own characteristics in order to attract visitor interest. The uniqueness offered can be in the form of facilities that prioritize environmentally friendly elements in their construction, such as wooden buildings for prayer rooms with natural lighting designs and good air circulation to minimize the use of Air Conditioners (AC) or even building an ecobrick stage or building. Other services provided can be cultural performances typical of the region, both dances and other artistic performances on the stage arena. In addition, the supporting infrastructure also greatly determines the success of an ecotourism, such as a road infrastructure, transportation and communication network by utilizing the latest technology that is currently available while emphasizing environmentally friendly principles.

**Table 3. Recommendations for Physical Development in Ecotourism Areas**

| No | Area | Road Signs | Vegetation and Biota Information Board | Instagramable Photo Shot | Desalinator Pyramid Technology |
|----|------|------------|----------------------------------------|--------------------------|-------------------------------|
| 1. | Jembatan Pelangi, Serang, Banten | Minim | Minimal | Need to be added | Can be developed |
| 2. | Mangrove Eco-Tourism “Karangsong”, Indramayu | Minim | ✓ | ✓ | Can be developed |
| 3. | Mangrove Beach Forest Lestari “Sumber Mas” Indramayu Regency | Not Seen | Not Seen | Not Seen | Can be developed |
| 4. | Mangrove Tourism Village Pandansari Brebes | Minim | ✓ | ✓ | Can be developed |
| 5. | Mangrove Tourism “Desa Wisata Tunggulsari”, Pati | Minim | Not Seen | Not Seen | Can be developed |

(Source: Data Processing, 2019)

The involvement of local communities is very decisive in the success of ecotourism development. Within the participation of local community, a more effective management and monitoring process can be carried out. The existence of local heroes also possess an important role in community involvement by providing motivation, examples and better approaches to the local community so that they have willingness to protect existing mangrove ecosystem, considering the function of the mangrove ecosystem which is not only to protect the coastal area but also can increase their welfare by making it for business and alternative livelihoods. Besides being able to participate as workers in the ecotourism area, local community may also open a culinary business, either for a restaurant or a business providing souvenirs for visitors within always considering environmentally friendly packaging such as using leaves or bamboo baskets. Banana leaves are good for an alternative packaging besides plastic. This uniqueness of serving food within taken into consideration of local wisdom in earlier times makes the experience is memorable for the visitors and encourage them to be more concerned about environmental issues.
Figure 5. Activities to preserve Local Wisdom and Save the Environment ((a) The Use of Eco-Friendly Packaging to preserve Local Wisdom; (b) Steps to make An Ecobrick; (c) Stage from Ecobrick; (d) Eco-Friendly Building from Ecobrick; (e) Recycling The Unused Tires into Table and Chair; (f) Performing Cultural Art in Sites)
Apart from unique serving, collaboration with cultural actors to perform art performances in ecotourism areas will also be able to attract visitors and give a different impression after visiting mangrove tourism. In this case, an educational process of introducing culture to visitors will also be achieved apart from the mangrove education itself.

Another problem that needs to be considered is waste management, especially plastic waste which often accumulates in landfills and difficult to be recycled. For this reason, it is also necessary to provide training to local community to be able to re-use, reduce and recycle the plastic waste, such as making eco-bricks which can then be used in ecotourism areas as environmentally friendly buildings, or making plant pots, and others.

In addition, monitoring is needed to analyse the profile and tourist behaviour so that managers can determine strategies that can be taken to attract tourists when visiting, such as providing beautiful scenery spot, providing unforgettable experiences, and providing new knowledge gained about the importance of mangrove conservation, as well as how to participate in maintaining it, and the cultural diversity presented in the ecotourism area.

Moreover, the marketing strategy is also important to promote the ecotourism object in which offers not only beautiful natural scenery, but also memorable experiences after visiting these ecotourism objects. In promoting it, an effective and efficient marketing strategy is needed. Currently, internet technology is not a rare thing, especially when people are faced with pandemic condition, the internet starts to be used by many people around the world including in hinterland of Indonesia.

Therefore, the effective way of marketing to be used nowadays is using social media and website publishing, apart from previous way usually applied by the manager through advertisements on television, making flyers, and promoting in tourist exhibitions. But of course, during this pandemic situation, the most effective promotional media is to post on social media, so that it attracts the interest and curiosity of tourists to be able to visit within strict health protocol that they offer so the visitor still feel safe during the visit. Currently, ecotourism managers can be more active in promoting by utilizing social media accounts that can be easily created on their own, as well as being able to cooperate with the government through the official website of the Ministry of Tourism and Creative Economy (Kemenparekraf) or visiting the https://www.indonesia.travel/id/en/partnership-opportunity to collaborate, in order to be known by the tourist around the world.

In line with the Indonesian Tourism Promotion Board mandated in Law No. 10 of 2009, local governments can facilitate the establishment of Regional Tourism Promotion Boards so that they can coordinate with the Indonesian Tourism Promotion Board established by their regional heads within 2 main elements, namely policy makers and implementing elements. The task of this promotion agency is to improve the image of tourism in the region, to increase tourist visits, to raise funding sources other than the State and Regional Revenue and Expenditure Budgets in accordance with statutory regulations, and to conduct research in the context of business development and business tourism.

Furthermore, there is also Regulation of Minister of Home Affairs (In Bahasa Indonesia called as Permendagri) No. 33/2009 concerning Guidelines for Ecotourism Development in the regions which mandates the formation of an ecotourism coordination team and its secretariat in the context of developing ecotourism which is also a mandate from the Regional tourism development master plan (In Bahasa Indonesia called as RIPPARDA) of each province/district/city based on the 2010-2025 National Tourism Development Master Plan. (Figure 6)
Thus, well coordination needs to be carried out from the central government level to local government level and ecotourism managers as well as program alignment from national programs to regional programs, so that ecotourism development obtains a lot of support and all stakeholders can be involved according to their own responsibilities.

4. Conclusion

The development of ecotourism activities in mangrove ecosystem can increase the economic value of mangrove ecosystem, therefore, it is also necessary to increase local community awareness about the importance of mangrove ecosystem in protecting coastal areas, where they usually utilized for their daily livelihood. In addition, tourism development also provides additional income and alternative livelihoods that can improve the welfare of local community.

However, in its management, several important things need to be achieved including partnerships and physical development management, procurement of facilities, services and infrastructure emphasizing on environmentally friendly principles and maintains its conservation. The most important of all is local community involvement which is the most determinant factor in the successful of an ecotourism area development, so the government and local community must be able to work together, as well as the presence of local heroes that plays a major role. Cultural heritage offered by which can be exhibited in art performance or other small things such as unique packaging used by business owners around the ecotourism area should attract the visitor.

Otherwise, routine monitoring also needs to be carried out by both central and local governments to ensure the ecotourism areas being fostered already right on target as well as monitoring carried out by business actors to see the behaviour of tourists in monitoring trends. In addition, media promotion is also important to introduce ecotourism areas to public, whether carried out by ecotourism managers, or carried out in collaboration with central and regional governments coordinated through an ecotourism coordination team. It is expected that if all elements can be accomplished properly, all existing problems can be resolved and management runs efficiently, then ecotourism development emphasizing in sustainable development can be carried out properly.
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