

# Mangrove Forest Development Determined For Ecotourism In Mangunharjo Village Semarang

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**Abstract.** Mangrove forest which has a primary function to prevent abrasion, protection against wind, sea water intrusion prevention, and as an energy producer, in the last few years many have been converted to non-forest land, such as agriculture and fisheries. Therefore it is necessary for an attempt to save mangrove forests one of them is by developing environmental concept based mangrove forest ecotourism. This research aims to develop the potential ecotourism of mangrove forests in Mangunharjo Village, through mangrove condition and interest of the people in Mangunharjo. The methods used were vegetation analysis, ecotourism suitability analysis, interviews, observation, and literature studies. The results of the research shows that Mangunharjo Village mangrove forests have the potential of tourist sites such as fishing, boating and enjoying the natural beauty of the mangrove forest with an ecotourism suitability index of 74.36%. The potential of flora Mangrove Mangunharjo have low biodiversity as it is an artificial mangrove ecosystem, but has the potential of abundant bird diversity that can be done for birdwatching Perception of some of the community supports the tourist development of mangrove forests in Mangunharjo Village because there motivated to improve people's welfare. This research is expected to be an information material about the ecotourism which will be expected as a mangrove conservation management

Keywords: **Mangrove, Ecotourism, Mangunharjo**

## 1. INTRODUCTION

Mangrove ecosystem belongs to complex ecosystem consisting of various types of biological resources. According to Duke (1992) referred to in Hasibuan (2011), that is because the forest always has sufficient water influenced by the salinity and water level fluctuations due to the tide. Mangrove ecosystem can be utilized for human welfare both ecologically and economically. Ghufuran and Kordi (2012) [1] stated the ecological advantages of mangrove are as habitat biota, transit for the migrant fauna, coastal protection, sediment corner, and as the spawning, caring and places for the fauna to eat. The potential, both in biological resources, stand structure and processed products from mangrove forests, can be an attraction for tourists. The benefit of ecotourism, according to Saporito (2007) [2] can produce foreign exchange for country.

Coastal areas as transitional areas between land and marine ecosystems have unique physical, biological, social, and economic characteristics that are feasible to maintain. The potential variety of the natural resources in coastal areas is grace from God Almighty with very significant role in economic, social, cultural and environmental development (Soerianegara 1987) [3]. With the consideration that the condition of coastal area has high complexity, so the development of coastal area involve the related components, such as central government institution, local government, and other stakeholders by

considering the environmental support and capacity. The area of mangrove in coastal area in Semarang is 84.47 ha, with the largest area is in Kecamatan Tugu, while the area of aquaculture is 1,030.21 ha (Department of Marine and Fisheries of Semarang City, 2010) [4]. Because of those potentials, there are some problems in marine and coastal resources in Semarang including:

1. The increased coastal area affected by coastal abrasion, especially in Kecamatan Tugu along 1.7 km and Kecamatan Genuk along 2.54 km.
2. The decreasing mangrove area in river bank and around aquaculture area in Kecamatan Tugu and Genuk.
3. The tendency to the decreased aquaculture area in Kecamatan Tugu and Genuk due to the increasing of coastal abrasion.

The aquaculture area tends to decrease because of the conversion of land for settlements and industries and the occurrence of coastal abrasion due to the rising sea levels, affecting the non-optimal use of aquaculture areas. Mangrove rehabilitation and management should be conducted to overcome the damage of mangrove forest by involving some parties: community of Desa Mangunharjo, local government, private party, and other stakeholders. The forest condition depends on the economical social condition of the around community. The perception, attitude, and behavior of the community determine the forest condition in present and future. Private party can help the mangrove rehabilitation and management through mangrove management is

the mangrove ecotourism management and development. Mangrove ecotourism in Desa Mangunharjo has potential to be managed and developed because mangrove forest in Desa Mangunharjo, there is interesting natural scenery to attract people and there are many kinds of birds and the location is near to Semarang. Mangrove forest ecotourism in Desa Mangunharjo can be developed by the management and plan of systematic program, so that the Mangrove Forest in Desa Mangunharjo is developed to be a environmentally friendly-tourist object in Semarang. Thus, it requires conducting research to identify the mangrove potential value as the tourist object in Desa Mangunharjo.

## 2. MANGROVE ECOUTORISM

### 2.1 Definition of Mangrove

Mangrove forests are tropical coastal vegetation communities, which are dominated by several species of mangrove trees that are able to grow and develop in tidal areas of muddy beaches. This vegetation community is generally grown in intertidal and supratidal areas with sufficient flow of water, and is protected from strong waves and strong tidal currents. Therefore, mangrove forests are found in shallow bay beaches, estuaries, delta and sheltered coastal areas [5]. According to Bengen (2004) in Feronika (2011)[6], the characteristics of mangrove forests are as follows:

- a. Generally grown in intertidal areas of muddy, clay and sandy soils.
- b. The area is inundated periodically, either daily or only flooded during full moon. The frequency of inundation determines the composition of mangrove forest vegetation.
- c. Receive sufficient fresh water supply from land.
- d. Shielded from strong waves and strong tidal currents.
- e. Brackish salinity (2-22 per mil) to saline (38 per mile).

### 2.2 Definition of Ecotourism

Ecotourism is defined as a form of tourism that suppresses responsibility for nature sustainability, benefits the Corporate Social Responsibility (CSR). One of the economically and maintains cultural integrity for local communities. If examined, this definition emphasizes the importance of the conservation movement. Along with the growing conservation intention and improving the welfare of the community, the new definition of ecotourism is a form of tourist trip to the natural area that is done with the aim of conserving the environment and preserving the life and welfare of the local people [7].

## 3. METHODOLOGY

### 3.1. Time and place

This research was located in the coastal area in Kecamatan Tugu, Semarang. The field survey was conducted on March 12 and 14, 2018. The research method consisted of vegetation analysis method, ecotourism suitability index, observation, interview, and literature study. The unstructured interview was done with the related parties (The Administrator of Mangrove Forest in Mangunharjo). The observation was conducted to observe the condition of Mangrove Forest in Mangunharjo and literature study was used to support the research. Respondent selection was done by using purposive sampling methods, in which the samples were chosen randomly for a certain purpose. Priority determination applied in the development of ecotourism in Mangrove Forest Area in Mangunharjo, Semarang was done based on professional judgment, according to the result data of the research and researcher's knowledge based on the literatures and documents that can support ecotourism development. The research location can be seen in Fig 1.



Fig 1. Research Study Location in the district Tugu, Semarang (Source: Google Earth Image Pro 2018)

### 3.2. Materials and tools

The tools used in the research were stationary, camera, Global Positioning System (GPS), field guide, rope, meter, and materials including secondary data. The material used in this research was Citra Google Earth Pro from 2018. That data was then given layout using software ArcGIS 10 4.

## 4. RESULT AND DISCUSSION

### 4.1. The Condition of Mangrove Forest Area

Mangrove Forest Area in Mangunharjo is located between rivers that become its ecological border: Sungai Beringin is a unique ecosystem. Mangrove Forest Area is associated with salty waters ecosystem in Coastal Area of Mangunharjo. Physically, it consists of coastal land and the sedimentation result of Sungai Beringin. Ecologically, it consists of mangrove forest area, aquaculture area, flora and fauna habitat, and a lot of social economical and cultural activities of the people in Mangunharjo coastal area. Those

environmental components interacts with each other to make a unique ecosystem with great potential to develop as the income source of the people in Mangunharjo coastal area.

#### 4.2. Potential of Mangrove Forest

##### 4.2.1. Flora in Mangrove Forest in Mangunharjo

One component of mangrove forest that has a significant role in maintaining its sustainability is the various types of flora contained in there. Besides as a protector of the coastline and embankment of the aquaculture area, the various types of flora also increase the aquaculture productivity associated with it. Therefore, the flora should be given attention to maintain the ecological sustainability of mangrove forests, taking into account their ecological functions for short time and long time. Because it is located in the border between land and sea, mangrove forest ecosystem is a complex ecosystem and mutually associated with land and coastal ecosystem. The flora composition contained in the mangrove ecosystem is determined by several important factors such as soil type and tides. Some of mangrove trees in Mangrove Forest Area in Mangunharjo are *Rhizophora mucronata*, *Rhizophora apiculata*, *Bruguiera*, *Sonneratia ovata*, *Sonneratia alba*, *Avicennia alba*, and *Avicennia marina*.

##### 4.2.2. Fauna in Mangrove Forest in Mangunharjo

Mangrove Forest Area in Mangunharjo is a good habitat for various types of fauna, especially water bird species. During the observation, the researcher looked at several bird species using the modified point count method from Bibby et al. (1992) who are doing various activities. 89 individuals were obtained from 12 species of birds are: Sikatan besi (*Muscicapa ferruginea*), Bangau bluwok (*Mycteria cinerea*), Belibis Batu (*Dendrocygna javanica*), Trinil ekor kelabu (*Tringa brevipes*), Tekukur biasa (*Streptopelia chinensis*), Cangkak laut (*Ardea sumatrana*), Srigunting kelabu (*Dicrurus leucophaeus*) Kuntul Besar (*Egretta alba*), Burung Kowak malam kelabu (*Nycticorax nycticorax*), Bambang hitam (*Dupetor flavicollis*), Blekok sawah (*Ardeola speciosa*), Walet sarang-hitam (*Collocalia maxima*) and others. Types of herpetofauna found are lizard (*Dasia olivacea*) and biawak (*Varanus albigularis*). The existence of these fauna can be the potential for the other mangrove tourist alternative development. The examples of the alternative are bird watching and photography. Types of mangrove trees associated are Cemara laut (*Casuarina equisetifolia*), Ketapang (*Terminalia cattapa*), Trembsi (*Samanea saman*), dan Burahol (*Stelechocarpus burahol*). Based on the result of vegetation analysis using Point-Centered Quarter (Muller-Dombois dan Ellenberg, 1974).

##### 4.2.3. Attraction (Tourism resources)

Tourism is closely related to attraction, because attraction is a factor that makes people want to go to a place to visit. What becomes the attraction includes natural beauty, the alternative of recreational activities, and the diversity of natural resources. Natural beauty of mangrove ecotourism in Mangunharjo includes the mangrove forest landscape giving the refreshing impression and attracting visitors to explore it. The atmosphere inside the mangrove area is quite impressing at some points between the trees the sunlight only comes between the leaves and combined with the birds humming make the natural impression. The visitors can also see some types of mangroves and roots and fruit of the mangrove. The attractions in ecotourism mangrove can be seen in **Table 1**.

**Table 1.** Attractions in Mangunharjo Mangrove Forest

No	Tourism classification	Attractions
1	Nature tourism	-Boating down the river -Wisata Education (Observation mangroves, -Bird Watching)
2	Artificial tourism	- Cottage retreat -Tracing a pond and watching the fishermen catch fish

Natural scenery in mangrove ecotourism in Mangunharjo is a major tourist attraction, along Sungai Beringin, the tourists will see various types of mangrove plants, associated biota, and green river water and many other attractions, it is an education for tourists who visit the ecotourism mangrove area in Mangunharjo.

##### 4.2.4 Amenity

Tourism industry includes all matters relating to the needs of tourists. These include lodging, restaurants, shopping and souvenirs, arranging trips, tourist objects management, tour guides, performance packages, brochures and information dealing with the beauty and richness of the culture, and others. Based on survey of ecotourism condition of mangrove in Mangunharjo about the supporting facilities was presented in **Table 2**.

**Table 2.** Procurement of facilities, facilities and infrastructure mangrove Mangunharjo

No	Regional Information	Facilities and Infrastructure
1	Region Promotion	- Internet (Social media, website) - Travel Guide Book, Brochure - The annual event in Semarang City
2	Ecotourism tariff	- Weekday Package= Rp.100.000,-/Person - Weekend Package= Rp. 150.000,-/Person

<b>3</b>	Facilities in the Mangrove Area	- Tourist Gate - Parking Area - center of souvenirs - Culinary stalls - Mushola - Toilet - Observation tower
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The facilities and infrastructure as well as the complementary services of tourism activities in order to satisfy the tourists are necessary, such as culinary store, it is a resting place for tourists and they can also enjoy seafood such as crab and fish and squid, the availability of souvenir markets also help visitors to buy souvenirs after tourism activities. On the markets, there are some souvenirs such as t-shirts, hats, bags and knick-knacks such as hanger and pen with ecotourism mangrove design, and also there are other souvenirs such as snacks coming from Central Java.

#### 4.2.5. Accessibility

Good access for tourist object is one of the factors considered in conducting tourism activities. When it is easy to reach the place, it will affect the potential value of the region, in order to ensure good visit by the tourists, it requires some conditions that must be fulfilled, such as comfort, time and cost. Assessment of the level of the accessibility of a tourist area is influenced by several components, including the condition of the road to the area, the type and number of transport and departure frequency and service convenience. The transport with good service, and is available in sufficient quantities with a high frequency of departure will facilitate tourists in visiting tourist destinations, To visit mangrove ecotourism areas in Mangunharjo, there are several ways, among others: for those coming from Jakarta can directly go by plane to Semarang (Ahmad Yani Airport), then they should go to the west direction to Mangkang (about 8 kilometers).

#### 4.3 Index of Conformity of Mangrove Tour

Tourism activities to be developed should be tailored to the potential resources and allocation. Each tourism activity has the requirements of resources and environment that fit the tourist attraction to be developed [8]. Analysis of the suitability of mangrove ecotourism adopted the method of Yulianda (2007). Yulianda (2007) method was adopted with mangrove biology approach such as thickness, species density, mangrove species group, tidal and biota association. The analysis of the suitability of mangrove ecotourism is shown in table 4 of the following matrix:

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$$IKW = \frac{\sum Ni}{Nmaks} \times 100\%$$

IKW : Tour suitability index  
 Ni : Parameter Value I (weight x score)  
 Nmaks : Maximum value of an ekowsiata category

Based on the calculation, the suitability index value for ecotourism travel Mangunharjo mangrove village is 29. From the results of calculations based on a matrix score of conformity ecotourism suitability index by 74.36%. Overall, mangrove forests enter the appropriate criteria (S2) for development.

### 5. CONCLUSION

Mangrove ecotourism of Mangunharjo is potential to be managed and developed by its natural beauty of mangrove forest with bird diversity, wavy plank roots, and Beringin river for fishing and boating around the mangrove. Moreover, Other potentials that can be developed such as culinary stalls, tour packages, souvenir shop and mangrove educational tour in planting seeds of Rhizophora sp. community group should be developed to support mangrove tourism in the form of making mangrove unique crafts and various foods from Mangrove Forest. The result of vegetation analysis shows that the value of mangrove diversity in Mangunharjo was low (0-0.0143) because the mangrove ecosystem in this area is artificial with the type and number of plants mostly consisting of Rhizophora mucronata and Avicennia marina. Therefore, local government of Semarang and environmental communities should give big attention to improve both its biodiversity and its number of mangrove plant. In addition, planting mangrove trees in vacant pond. Aims to overcome the low density level of mangrove. The improvement of mangrove ecosystem will encourage the quality of aquaculture in Mangunharjo Region. The analysis of tourism suitability index with parameter of mangrove thickness, density, mangrove species, tidal, and mangrove biota object is 74,36%. it can be conclude that Mangrove forest in Mangunhrjo includes the appropriate category (S2) for ecotourism development. Thus, it is necessary to calculate carrying capacity to develop mangrove ecotourism in Mangunharjo on how region can accommodate newcomers or visitors in the calculation of other limiting factors. Furthermore, developer can also build educational tour in inappropriate areas by planting mangrove trees and others. To maintain and improve the economic value in the region, it requires better management, additional facilities and the increased advertising to promote number of tourists in Mangunharjo, according to its carrying capacity for the sake of mangrove sustainability.

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