Mapping Coastal Ecotourism Potential in Panggul District, Trenggalek, East Java

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Abstract. Coastal eco-tourism has become the concept of sustainable tourism development for marine areas on the southern coast of Java. This study aimed to map coastal eco-tourism potential in the coastal area of Panggul Sub-District, East Java, so that it could be evaluated for sustainable development. Data were collected through interviews with people around the coastal of study area, field observations, and literature studies. Component of eco-tourism potential was evaluated seen from aesthetic value, scientific value, economic value, social and cultural value. The results showed that tourist attraction area in Panggul District consisted of Konang Beach, Pelang Beach, Njorok Beach, Taman Kili-kili Beach, Djoketro Beach, and Kuyon Beach. Each of the beaches has an aesthetic value to be a tourist attraction. Konang Beach, Djoketro Beach and Kuyon Beach as fishing beaches, well known with the lobster, seaweed, and shrimp. The beaches also have cultural events "larung sesaji" or “Baritan, traditional music, and dance performance. Taman Kili-kili Beach as sea turtle conservation. Meanwhile, Pelang Beach is well known with beachside waterfall “Grobogan Sewu”. Njorok beach located in one gate with Pelang Beach. However, Njorok Beach does not have social and cultural values because it is uninhabited and the access to that beaches is too dangerous. Based on the component used for analyzing, the results showed that 5 of the beaches have all values, namely aesthetic, educational, economic, social and cultural values, except Njorok Beach and potential to be developed into eco-tourism.

1. Introduction

Panggul Sub-district is one of the 14 sub-districts in Trenggalek Regency in East Java, Indonesia. Trenggalek Regency is a Regency located in the southern part of the East Java Province, which is located at 111° 24' - 112° 11' East and 7° 53' - 8° 34' LS. The regional boundary to the north is bordered by the regions of Tulungagung and Ponorogo Regencies, Tulungagung District in the east. The districts of Ponorogo and Pacitan are to the west, and the south is directly connected with the Indian Ocean [1]. Meanwhile, the Subdistrict of Panggul is at east longitude 8,2490 South Latitude and south latitude 111.4546 East, it has an altitude of 13 m sea level with a total area of subdistrict covering 131.56 km². Panggul Subdistrict consists of 17 villages with a population of 70,892 in 2018, has a growth rate of around 0.17% from 2017 to 2018. Panggul Subdistrict has several villages that directly intersect the sea so that they located in the coastal zone. These villages include Wonocoyo and Nglebeng [2]. The distance to the Regency Capital from the District of Panggul is around 52 km, which can be taken in about 2 hours using a four-wheeled vehicle [1].

Because it is located in the coastal zone, Panggul Sub-District has the potential for coastal tourism. Panggul sub-district has more potential in coastal tourism compared to marine tourism because located directly to the Indian Ocean, the seawater is high seas so that the waves are endangering marine tourism activities. Coastal ecosystem from the ecology aspect for recreation and tourism is the use of the natural environment for leisure activities which include beaches, estuaries,
mangroves, coastal lagoons, seaweed forests, rocky beaches, coral reefs [3]. However, from the potential of coastal tourism, the Subdistrict of Panggul is less popular compared to the Subdistrict of Watulimo. If you look at the development of the Panggul Subdistrict, it is now part of the main South Cross lane that connects Central Java and the Special Region of Yogyakarta with East Java so that many drivers from various regions can be passed by and have the potential to become tourists in Panggul Sub-District.

Tourist visit data recorded statistically is only recorded at Pelang Beach because it is the only beach managed by the tourism and cultural department of the Trenggalek Regency. Pelang Beach in 2015 recorded 48,805 visitors [4]. While other beaches in the Panggul have not yet identified specific potential related to the attractiveness of tourism that can be offered to prospective tourists. Tourism in the coastal areas is not only associated with positive impacts but also negative impacts such as decreased welfare of residents with increased conflict-related to economic competition and unequal wealth distribution, and abuse of protected coastal areas for tourism businesses [5] Besides there are also Coastal tourism able to influence climate change and in the Coastal region in developing countries including Indonesia has a low adaptive capacity to climate change [6] Environmental Change that can protect Coastal and Coastal Environment that is important for the welfare of its population. [6] Tourism is one of the actors responsible for environmental depletion in a coastal area due to the construction of buildings and tourist activities. [7] Tourism destinations, especially coastal tourism destinations are vulnerable to increased environmental changes; land use can make the beach disappear due to erosion. [8] Coastal environmental systems are very valuable to protect cultural heritage or to sustain the process of recreational tourism activities, but both are threatened by the modernization of the human lifestyle [9] so a sustainable coastal tourism system is needed. Coastal areas need to be preserved to be able to maintain tourist arrivals [8]

Therefore, with the strategic location of Panggul area, it is necessary to map the potential of coastal tourism and more specifically to be based on ecotourism or can be called coastal eco-tourism by finding the identity as the distinguishing factor. Eco-tourism is a responsible tourism activity in a place that is calm, natural, and not polluting, trying to protect the natural environment and improve the lives of local people sustainably. [10] Eco-tourism is also part of a strategic element for coastal areas in creating sustainable livelihoods for coastal residents. [5] Coastal eco-tourism must also provide a residential environment for coastal communities by providing aspects of the conservation of the natural environment, waste treatment and recycling, and efficient use of energy; social aspects in the provision and improvement of public facilities ranging from worship, entertainment, education and health; spiritual aspects which include protection of local cultural customs sustainably; and economic aspects with the presence of marine products and coastal environments that can provide economic value to coastal communities [11]. Tourism must have an identity as a distinguishing value for tourists that can be identified through aspects of identity consisting of social, cultural and spatial (landscape) aspects [12]. The potential of sustainable Coastal tourism is also seen from a combination of economic aspects and the potential for natural disasters that often occur in the Coastal areas that have the potential to damage the environment, sustainable sustainability and the existence of the livelihoods of its people. The combination will affect the independence of the community in managing and improving until the financial and tourism continues [13] Mapping the potential of coastal eco-tourism is needed because currently in the Indonesian tourism industry has a focus in the development of sustainable tourism to encourage a positive impact on economic, socio-cultural and environmental aspects of the community around the area of tourist attraction. This study aims to identify and map the
potential of eco-tourism-based coastal tourism for sustainable development in the Panggul District area.

2. Methodology

2.1 Study of Area

Panggul sub-district was chosen as the object of research because of its strategic location as part of the main route which is connected directly with the southern crossing of Central Java and the Special Region of Yogyakarta to East Java. Also, this area has 6 (six) beaches but the famous coastal tourism is more on Pacitan Regency or the beaches in Watulimo District, Trenggalek Regency. Each of the beaches has never been explored in more detail in previous studies related to the potential of coastal tourism specifically on each beach. The beaches in Panggul are located side by side starting from the Westside to the Eastside, there are Njorok Beach, Pelang Beach, Taman Kili-kili Beach, Konang Beach, Djoketro Beach and Kuyon Beach. The coastline appears on the geographical map viewed from Google Earth as follows:

This research was conducted by field observations, interviews with residents in the coastal, documentation, and literature studies. Image interpretation is also carried out for geographical mapping obtained from Google Earth to illustrate tourist location boundaries. Primary data were taken from field observation and interviews, meanwhile, secondary data were taken from documentation and literature studies. The selection of informants is done by snowball sampling. Snowball sampling was chosen because researchers did not significantly know the informants involved so that by observing in the field researchers could find relevant information sources. Interviews were conducted with relevant informants in coastal tourism activities on the six beaches consisting of traders, fishermen, managers, and the village government. Data sources are as follows in Table 1.
| No. | Beach               | Number | Status                             |
|-----|---------------------|--------|------------------------------------|
| 1.  | Kuyon Beach         | 2      | Fisherman                          |
| 2.  | Njoketro Beach      | 4      | 3 Fisherman + 1 Food Seller        |
| 3.  | Konang Beach        | 9      | 3 Fisherman + 1 government of Nglebeng Village |
| 4.  | Taman Kili-kili Beach | 5    | 4 Pokmaswas members + 1 government of Wonocoyo Village |
| 5.  | Pelang Beach        | 5      | 4 Seller + 1 Community Organizer   |
| 6.  | Njorok Beach        | 3      | 3 Fisherman                        |
|     | Total               | 28     |                                    |

Field observations focus on seeing the potential of coastal ecotourism by using components in eco-tourism. Field observations were made in the geographical area of Panggul Subdistrict located in the coastal area of Nglebeng Village and Wonocoyo Village. Ecotourism has three main components: natural-based, educational, and sustainable management which covers economic, social, cultural and ethical issues [14]. The mapping of tourism potential can be seen from 4 criteria; aesthetic value, scientific value, cultural value, and economic values [15]. The protection of the ecological environment is a major goal in eco-tourism, which places more emphasis on conserving natural landscapes to consider the balance of the ecosystem. Besides, to protect the natural environment, eco-tourism also protects the culture of local communities and improves the living standards of residents. [16] Threats and risks in the coastal and marine environment are managed based on the principle of sustainability which consists of environmental, economic and socio-cultural dimensions. This dimension created the value of benefits that can be offered to the public and prospective tourists. The value of the three can be seen from the perspective of the value of community participation, biological contribution and natural beauty, cultural heritage, traditional values, consumption values, and the potential for the viability of the business [17]. Coastal ecosystems include ecology, economic aspects and human resources in coastal areas [18].

Based on the previous study, the eco-tourism component which is used to identify and map the potential of coastal eco-tourism in Panggul District consists of aesthetic values, scientific values, social and cultural values, and economic values. Aesthetic value is a value that is owned by the results of art or natural environment that can make the subject get pleasure or disappointment depending on the subject's experience of the objects they experience or enjoy [14]. Based on these theories, the aesthetic value in this study lies in the uniqueness of each tourism potential that can be given in the form of experience on tourists. Scientific values include educational issues and conservation values. Social value is the value of the structure of human relations in an area that can be seen from the interaction and polarization of structural changes [10]. Relating to social systems, protection of local culture and
improvement of living standards of residents can be seen from social and cultural values and economic values.

Figure 2. The framework of Component of Coastal Eco-Tourism Potential

3. Result and Discussion

3.1. Coastal Tourism Attraction in Panggul Sub-District

The level of tourism attraction becomes a big role. Tourism resources that offer natural tourism can be seen in the contribution of infrastructure and the level of damage to the natural conditions required by the area. However, infrastructure can be created by humans, in addition to inviting nature as tourism that is suitable for nature creations, what challenges the natural tourism potential is finding unspoiled natural beauty combined with geological uniqueness that is capable of producing tourist attractions [19]. Therefore, before exploring the potential of managed Coastal tourism, researchers first describe the potential of Coastal tourism on each coast which is then mapped in the category of coastal ecotourism. It is important to map in advance at potential tourist sites for visiting tourists. The following are tourist attractions in this coastal area:

a. Konang Beach

Konang Beach is included in the Nglebeng Village area from the village center about 3.1 km and can be reached in only 7 minutes by car or motorcycle. Konang Beach is a fishing beach but it is also included in the entertainment zone because tourists often visit it. Tourism activities that can be done include eating and drinking along the beach, especially seafood, playing sand, cycling along the beach, enjoying the sunset, playing kites, children's games, taking pictures with the background of fishing boats. Along the coast, there is fish market many local people who sell sea fish, the result of fishermen, but the uniqueness is the tourist not only can buy the fish to bring it at home but also choose to be eaten directly in that place.
Konang Beach is famous for its smoked fish. Tourists can also join the fishermen pulling the nets on the beach and buy the results directly by bargaining the price to fishermen or boat owners. Konang beach has a river that has a length of 2.8 km [2] not only used as a fishing road for fishing but also used as a tourist attraction by attracting tourists to take a boat and enjoy the views along the river or it is called boating tourism. Boating tourism can only be done if there are several components including a flow that is constantly changing and multi-directional; enough water quota to drive the boat; there must be the availability of human resources; and adequate tourists and boats [20].

The flow of the river that empties into Konang Beach during the dry season decreases the water debit but never dries because it continues to receive water reservoirs from the sea, the water route also turns with a multi-directional flow to be able to provide tourists with a variety of sights and destinations along river because of the Konang river, the flow is long and connects between villages in the Panggul District. The number of boats also reached 340 and the number of fishermen was also numerous by joining 11 fishing farmer groups with a total of nearly 262 fishermen [21]. Also supported by visits to Konang Beach on an average day 51 people who will increase by almost 145% on national holidays [21] There are mangrove plants around the river. Visitors are not allowed to bathe in the beach because Konang Beach has high waves.
b. Djoketro Beach

Djoketro Beach is a fishing village, located in the Nglebeng Village, 3.1 km from the village center and can be reached in 10 minutes by motorbike and car for a maximum of 30 minutes with difficult road terrain above the sea cliffs. Djoketro Beach is next to Konang Beach which is separated by a small headland. Because of the fishing village, along the beach, there are many boats owned by fishermen who become a beautiful sight for visitors. Djoketro beach has a tourist attraction on the waves of seawater is the calmest compared to other beaches because it is surrounded by two mountains so it is still safe if used to play water for visitors but still must be under supervision.

Djoketro Beach is unique because it is the only beach in Panggul sub-district that is a breeding ground for “Benur” or baby lobsters so the beach produces lobsters and there are many floating houses in the sea for fishermen catching lobsters. Every morning fishermen at Djoketro Beach always serve and produce some sea fish products and can be directly bought by visitors. Lobster becomes its interest for visitors because they can buy lobster that is still fresh and cheaper than in shopping centers. Coastal tourism activities include playing water by the sea, playing with sand, taking pictures, buying sea products directly, fishing on the rocks along the beach.

Figure 5. Fishing Vessels are along the Djoketro Beach and Reserving Floating Houses for Catching Lobster and Other Sea Fish Products

Figure 6. Fisherman Activity and Lobster Product at Djoketro Beach
c. **Kuyon Beach**

Kuyon Beach is one lane after Djoketro Beach still in Nglebeng village, located 2.1 km and can be reached by car or motorcycle for about 7 minutes. Kuyon Beach is also a fisherman village with many ships along the coast. However, Kuyon Beach also has a unique tourist attraction, the beach is directly connected to the rice fields of residents. It has the same coastal tourism attractions as Djoketro Beach because it is located in the same bay flanked by two mountains along the mountain line filled with rocks suitable for fishing. In addition, tourists can enjoy the sunset, fishing, take pictures and enjoy the view of coral islands and fishing activities for directly can buy fish catches from local fishermen. Kuyon Beach is still rarely heard by the local people itself because it is further than other beaches from the village center. Kuyon coastline is smaller than Djoketro beach. The type of wave is as calm as Djoketro Beach so that tourists can play water and sand.

![Figure 7. Rice fields which are directly connected to Kuyon Beach](Source: Pambudi, Kukuh A., 2018)

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d. **Taman Kili-kili Beach**

Taman Kili-kili Beach or often known simply as "Kili-kili" located in Wonocoyo Village area precisely located 6.1 km from Konang Beach and can be taken 15 minutes by car. The dotted line shown in Figure 9 shows that to reach this beach location only by motorcycle. However, in 2018 access roads for cars from the Pelang Beach line have opened. So, for the car to enter must pass through the gate to Pelang Beach and then there is a left turn through the side of the shrimp ponds to get into the Kili-Kili Beach. The condition of the road is still sandy so visitors must be careful in both lanes because if it is not balanced it can cause an accident. Kili-kili Beach is a Turtle Conservation Beach that has existed since the end of 2010. the most common type of turtle in Taman Kili-Kili Beach is "Sisik", hawksbill turtles (Eretmochelys imbricata). Other types that also lay eggs at these locations are “Lekang” turtle (Lepidochelys olivacea) and the green turtle (Chelonia mydas). Time from turtles lay eggs from May-August.

Coastal tourism activities include removing hatchlings; feeding hatchling; taking pictures with turtles as well as hatchlings; enjoy views of the sea, the coral islands, floating house, sunset, and play sand. Kili-Kili Beach is the same as Konang Beach which is directly
connected to the high seas, Indian Ocean, so bathing is not allowed because the sea waves on
the Kili-Kili Beach are as high and dangerous as those of Konang and Pelang. Taman Kili-
coli beach is managed by the Community Watch Group or it is called “Pokmaswas” under the
management of the Trenggalek District Fisheries Service and assisted by the Wonocoyo
Village Government for the budget of development.

Figure 8. The entrance of the turtle conservation location and conserved hatchlings

Figure 9. Take off the turtle

e. Pelang Beach
Pelang Beach is located in Wonocoyo Village, next to Taman Kili-kili Beach. The exact
location is 900 meters, you can walk from Taman Kili-kili Beach. Pelang Beach is under the
management of the Department of Tourism and Culture of Trenggalek Regency. Coastal
tourism attraction include to take pictures, see the beach view from the top of the seaside hills
or viewing post, hermitage caves, waterfalls named Grobogan Sewu, swimming pools, and
there are evergreen forests that lined neatly along the beach and writing icons "Pelang Beach"
which is suitable for taking pictures while enjoying the sunrise.

However, it is still not allowed to bathe in the sea. Pelang Beach has a unique
characteristic because it has an icon on its beach there is a small island in the middle of the
sea that is similar to Tanah Lot, Bali. The island is also a tourist attraction because it is also a
gathering place for cranes in the afternoon. There are some food vendors on the beach, but
they do not offer special seafood because there are no seafood products from Pelang Beach.
Pelang Beach has very high waves and geographically it is very dangerous to play even
bathing.
Njorok Beach

Njorok Beach is an uninhabited beach and access to this beach must take the hills from Pelang Beach. Njorok Beach is also located in Wonocoyo Village area. It is located at the one gate with Pelang Beach because the location is next to it and the access road can only be reached through the entrance of Pelang Beach. Njorok Beach can be an additional tourist attraction for Pelang Beach. The location when viewed from Google Earth is only 1 km but if it is taken on foot can be taken more than 10 minutes because to get to the beach visitors must climb the steep hills first. If the water is high tide the path is usually closed. Njorok Beach has the same high waves as Pelang Beach. Njorok Beach is more specific to visitors who only like nature and challenges because of difficult and dangerous road access. It has the same tourist attraction with others; they can play on the beach, see the sunrise, and take a picture. In addition, visitors can enjoy the view of the open sea from the top of the mountain which is one point in Njorok Beach area. There is a branching line towards Njorok beach and towards the spot to enjoy the view of the high seas. The spot also offers views of Broken Beach like in Nusa Penida, Bali. The path is dangerous because it requires concentration to pay attention, the track is slippery and visitors must walk through into a cliff. The most important tourist attraction, this beach area offers adviser tourism include mountain climbing and hilly experiences. There are even fishing activities from the former cliff's edge. In
addition, there are many rocks on Njorok Beach that grow Green Algae, Ulva Lactuca type and shellfish former that stick to its uniqueness on Njorok Beach.

Figure 12. Broken Beach, Offshore Scenery, Green Algae and Shells on Rocks on the Njorok Beach

3.2. Mapping of Coastal Eco-Tourism Potential in Panggul Sub-District

The beaches of Kecamatan Panggul are in a strategic location because they are located in the Southern Cross lane which is directly connected to Pacitan, Special Region of Yogyakarta and Solo which is already well-known to domestic tourists and even foreign tourists related to tourism, especially Pacitan with its beaches. Because of its strategic location, each beach has economic values. Based on the potential of coastal tourism above, it can then be analyzed in terms of its eco-tourism from 4 components as Table 2 follows:

![Table 2: Mapping Coastal Eco-Tourism Potential in Panggul Sub-District](image)

| Beach Name   | The Component of Coastal Eco-Tourism                                                                 |
|--------------|-----------------------------------------------------------------------------------------------------|
| Konang Beach | Aesthetic Value: a river landscape which empties into the beach and; mangrove plants; sunset views  |
|              | Scientific Value: The Marble Mountains along the coastline; the growth of marine products which     |
|              | offer offerings to the sea “larung sesaji or Baritan” conducted every 1                              |
|              | Economics Value: 20 food stalls that sell raw fish, fish grilled, and serve seafood                   |
| Beach                  | Attractions                                                                 | Activities                                                                 | Notes                                                                 |
|-----------------------|------------------------------------------------------------------------------|----------------------------------------------------------------------------|----------------------------------------------------------------------|
| Djoketro Beach        | Producing Lobster and Sweet Shrimp; sunset views; the scenery of the high seas between Djoketro and Konang beach; challenging road access bypassing the open sea cliffs | Marble Mountains along the coastline; growth of baby lobster and lobsters, sweet shrimp, squid, tuna, mackerel tuna, and crabs; embraced by the rocks on the beach, floating houses | The development of boating tourism in the river area empties into Konang Beach |
| Kuyon Beach           | A rice field landscape in front of beach; sunset views; open sea views; access roads that pass through the open sea cliffs; fishing spot in the rocks | Coral islands; sea fish and seaweed growth; the rocks by the beach; brackish water among rocks | Selling lobster and sea fish every day and then sent to Panggul market, Pacitan and several cities in East Java, even export to some countries such as Singapore, Thailand, and Vietnam |
| Taman Kili-kili Beach | Sunset View; the coastline surrounded by sea pandanus plants; the view of small coral islands in the middle of the sea; clean of plastic trash; floating house view | Turtle and hatchling conservation | Changing the local community beliefs from hunters, eaters and sellers of turtles and their eggs makes turtles as endangered animals that are purified and need a protection |
| Pelang Beach          | Sunrise views, iconic islands such as Tanah Lot in Bali; viewing post from | There are several caves in several hills and mountain spots as well as in the | Developing into an educational destination for tourists with the workforce of the surrounding community |
|                       |                                                                              | As a venue for local community art events "Gebyar Seni" consisting of        | About 20 food stalls offer staple food and snacks |
Based on the table above, Konang Beach, Djoketro Beach, and Kuyon Beach have educational value as they are located in the mountains along the coast with potential marble; famous for marine products, like lobster, sweet shrimp, and seaweed. Kuyon Beach and Djoketro Beach also have coral islands and natural stones along the beach which can be a place for fish spots. Meanwhile, the educational value of Pantai Kili-Kili Beach is a place for sea turtle conservation. The same scientific values of Pelang Beach and Njorok are coral islands and karst stones. In addition, Pelang Beach with evergreen forests that grow neatly on the beach, while Njorok Beach with rocks covered with small clams and green algae plants that have economic value is also for sale and consumption.

In terms of socio-cultural values as well, Konang Beach, Djoketro Beach and Kuyon Beach already have socio-cultural values as a fishing beach with the main livelihood of going to sea using traditional boats and having cultural values of the annual tradition of offerings the sea “Larung Sesaji” or “Baritan” as gratitude for the results and as a form of prayer that the sea continues to be abundant. In addition, changes in social and cultural values initially only used traditional boat tools to go to sea, but now fishing communities on the three beaches have built floating houses in the middle of the sea that use floating nets to help capture marine products. Taman Kili-Kili beach is culturally successful in shaping the thinking of the local community for the protection of turtles and hatchlings with a customary approach to karma in the act of catching and selling turtles and their hatchlings. Pelang Beach is socio-culturally found in various traditional art performance activities held at the beach.

As for Njorok Beach, it still has no social and cultural value because Njorok Beach is an uninhabited beach and access roads to reach it are also hilly and steep so that it is never used for
local community activities. Actually, in Njorok Beach there are former buildings on the cliff but not included in the evidence of historical relics because the building is a building intended for development such as the Gazebo but not completed so that it does not have historical values. In addition, on the beach, there were also found broken boat marks indicating that there had been a sea trip but at this time there was no more fishing activity because the waves were as high and dangerous as Pelang Beach. The economic value is owned by all the beaches with the potential of each beach to have the potential of natural wealth to be used, managed and used as a sustainable tourist attraction so that it can encourage an increase in the standard of living of the local community.

4. Conclusion
Based on the results of the study, it can be concluded that for mapping the potential of coastal eco-tourism from 4 components including aesthetic value, scientific value, economic value, social and cultural value, five beaches of the six beaches; Konang Beach, Djoketro Beach, Kuyon Beach, Taman Kili-kili Beach, and Pelang Beach has four component values. As for Njorok Beach, despite its unique natural tourist attraction that can attract tourists, Njorok Beach still has no social and cultural value because of its location that is difficult to reach so there are no cultural activities that can be conducted on the beach.

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