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To cite this article: A Akbar et al 2019 IOP Conf. Ser.: Earth Environ. Sci. 334 012020

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Coastal Conservation for Ecotourism Activity in Kiluan Island Coast Lampung Province

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Abstract. Kiluan island located in the waters area of the Kiluan bay, Kiluan Negeri Village, Tanggamus District, Lampung Province. Ecotourism is a development of tourism concept which based on nature conservation, and because of its magnificent natural potential and its beautiful scene, Kiluan Island coast has become a popular ecotourism spot. However, the conservation management never been better. The purposes of this research is to identify any Potentials, and every important aspects for Kiluan island coast’s conservation and ecotourism spot development. This research used survey methods, which is water quality measurements, and questionnaire. The condition of Kiluan island’s water qualities are still accordant with the standard of Indonesian constitutions specified by the Ministry of Environment Number 51 of 2004, section 1 about Sea Water Quality Standard for Marine Tourism, with the result that the water is very suitable to be used as marine ecotourism spot. Tourist perception about the condition of the Kiluan island coast are very good, that 67% scores good for the flora and fauna ecosystem, 73% scores very good for the potentials of natural tourism, 73% scores very good for the Natural Scenery, 63% scores good for the water activities enjoyment, and 53% scores very good for beach recreation tours.

1. Introduction
Indonesia is the biggest Archipelago country in the world, in an area 7.7 million km² wide, and consist of 17,504 islands with 95,181 km² coastal line, from Sabang to Marauke, [1]. Ecotourism concept is an integrated tourism concept which combine conservation, and empowerment of local communities, with the result that local communities can also acquire the benefits directly from the tourism activities, because they manage it by them self, and they develop and use all the potentials by themselves [2]. Kiluan Bay which located in Lampung Province, is one of the famous bay in Lampung and has been utilized as tourism spot with ecotourism concept. This area have many natural resources, and unique marine biota, which are Bottle nose dolphins (*Tursiops truncates*), long nose dolphins (*Stenella longirostris*), Hawksbill turtle (*Eretmochelys imbricata*), also coral reefs in the Kiluan Island [3].

Inside the Kiluan Bay area, there is a small but famous island, within 2 hectares, named Kiluan Island. This Kiluan Island coast has been utilized as an ecotourism area because of its fabulously beautiful Scenery, and it has coral reefs area that can be used as snorkeling spot. Until this moment, there are so many visitors that came to Kiluan Island for sightseeing for the Scenery, and doing recreation activities, such as beach recreation, swimming and snorkeling. Because of the ecotourism concept, is a tourism concept that empower the local communities, so the society in Kiluan Bay has established an organization called Tourism Awareness Society Group (Pokdarwis). This local communities organization has a role to manage all of the tourism activities and management in Kiluan Bay, Including Kiluan Island.
However, the ecotourism management in Kiluan Bay area which managed by Pokdarwis Kiluan still never been better, and has to be improved, especially in the Kiluan Island because its already popular. So, the purposes of this research is to identify any Potentials, and every important aspects for Kiluan island coast’s conservation and ecotourism spot development.

2. Materials and Methods

2.1. Formulation of the problem
Kiluan Island has been utilized as an ecotourism spot for a long time ago. However, the Pokdarwis’s management was still lack of attention in managing conservation in the Kiluan Island Coast. So, it needs to do a research to identify the potentials, and every important aspect that Kiluan Island have. Hopefully, this research can give an imaginary output for Pokdarwis to improve their ecotourism management and also have an attention in the conservation management.

2.2. Design of Research
this research were carried out by identifying the potentials by measuring the oceanographic conditions of Kiluan Island Coast, and assess the Visitor Perceptions using survey methods in descriptive and quantitative analysis.

2.3. Sample Selection and Data Retrieval
This research using primary data, or the data that taken directly from the research site, which is Kiluan Island Coast. The retrieval data is divided into 3 station that represent three section of Kiluan Island Coast, there are West section as 1st station, North section as 2nd station, and East section as 3rd station. The measurement of Oceanographic conditions was conducted by water quality data retrieval from 5 parameters, in accordance with sea water quality standard index specified by the Ministry of Environment, Indonesian constitutions number 51 of 2004, section 1 about Sea Water Quality Standard for Marine Tourism as in Table 1.

| No. | Parameters (Physics and Chemical) | Unit | Quality Standard |
|-----|----------------------------------|------|------------------|
| 1.  | Clarity                          | Meters | >6               |
| 2.  | Temperature                      | °C | Natural           |
| 3.  | pH                               | -  | 7 – 8.5           |
| 4.  | Salinity                         | °/oo | Natural          |
| 5.  | Dissolve Oxygen                  | mg/l | >5               |

Source: Attachment to Decree No. 51 / MENLH / 2004 concerning Sea Water Quality Standards for Marine Tourism

Besides that, also done a research about visitor perceptions about the conditions of Flora and Fauna Ecosystem, Natural Potentials, the Scenery, Water Activities enjoyment, and Beach Recreation tours. The visitor perceptions research were done using random sampling questionnaire methods, towards 30 visitors as respondent randomly in 12 may 2018. The scoring scores were divided into 5 scales, Very good, Good, Not good, Very not good, and do not know. Then, the scores will be presented in graphics.
3. Result

3.1. General Condition of Research Location

Kiluan Island is located in the middle of Kiluan Bay’s waters area, which belong to Pekon Village Kiluan Negeri, Tanggamus Distric, Lampung Province. Since a long time ago, this island is actually has been famous as coastal ecotourism spot among Lampung Province people. Thee visitor needs to rent a small boat (max. capacity 8-10 persons) to cross the Kiluan Bay through the Island, and the boat rentals were managed by Pokdarwis. There is only one family that live inside this small island as his livelihood, it’s a family of Mr. Dirham, also as a member of Pokdarwis.

The sector of tourism management in Kiluan Bay, were organized by local Communities organization, there are Pokdarwis and a NGOs called Yayasan Ekowisata Cikal that have a role to accompanying Pokdarwis Kiluan Bay, so they can stick to the Ecotourism Concept in every program. It has been said that empowering local communities, is the most fundamental principle to implement ecotourism concept [4]. This Pokdarwis establishment is a form of government effort in directing local communities to be independent in organize their own areas, by utilizing the area as an ecotourism spot. Its also been said that preservation of natural resources and local culture will ensure the sustainability of development [4]. Hopefully, with this independent Pokdarwis functionate can organized every utilizations, constructions, and protection of tourism in Kiluan Bay, including Kiluan Island.

One of the main ecotourism management in Kiluan Bay is Dolhins watching tour, because as the result of interview with the chair of Yayasan Ekowisata CIKAL NGOs, that the Kiluan Bay area is the only ocean area in West Indonesia that became dolphin habitat as dolphins seeking for food in this area. So there are plenty much of dolphins appeared on the sea. Besides that, another active activities that managed by Pokdarwis is an ecotourism activity in Kiluan Island, there are beach recreations, swimming, fishing, and snorkeling, with Pokdarwis managing the boat rentals to cross through the Island from the Bay. This island has a coral reef area within 250 m², that used to be snorkeling spot so the tourist can see corals and coral fishes.

Besides Pokdarwis, there were also formed a local communities Organization, that have a purpose to keep watch on, and controlling every activities that used and utilized natural resources in Kiluan’s area including the ecotourism activities, it called Supervisory Community Group (Pokmaswas). The implementation of pokmaswas’s control that makes them to take actions are handling of stranded mamals that often founds in Kiluan Island areas, such as Whales, Dolphins. If this happens, mr. Dirham as the residents and the member of Pokdarwis will report it to Pokmaswas so they will take actions to solve the problems.
The East part of the island is directly adjacent with Hindian Ocean, so the island positions blocking the ocean current from Hindian Ocean to the bay [5] said that. A coast that facing directly to the ocean will be marked with steep cliff, and the beach materials is rough because it received massive wave from the ocean huge current level. This geophysical illustrates the East part of Kiluan island that directly faced the Hindian Ocean. It has a wide range of Coral Platform along the coastal line in the east, with the big waves delivers coral shards, so the beach materials were rough sand. Otherwise, the west part of the island has a very low current level, with beach materials were fine white sand, without any coral shards. The north part of the island is very unique because it is the transitions area between east and west, so this area is the one that has beautiful coral reefs, with many kind of reef fishes. The south wart of the island has no beach, It is only a steep rocky terrain, with massive waves. The conditions of Kiluan Island can be seen in Figure 1.

Kiluan Bay is only accessible by 1 road from Bandar Lampung city within 2-3 hours, by car or motorcycle. Then, it needs 5-10 minutes to cross the bay through the island by rented boat. From the interview results with Mr Dirham as member of Pokdarwis, there are 90% of the visitors come to Kiluan Island, only to enjoy the beauty of Kiluan’s Scenery from the island and doing some beach recreations, swimming or snorkeling.

4. Discussion

There are 5 parameters according to the sea water quality standard index by Indonesian constitutions number 51 of 2004, section 1 about Sea Water Quality Standard for Marine Tourism, which is, temperature, salinity, pH, Dissolve Oxygen, and Water Clarity. The measurement result shows that the Oceanographic conditions in Kiluan Island coast has convenient score to be used as a marine tourism activity spot, as shown in table 2 below.

| Table 2. Oceanographic Measurement Result of Kiluan Island Coast |
|---|
| Station | Temperature (°C) | Salinity (ppt) | pH | DO (mg/l) | Clarity (Meter) |
| 1 | 28 | 28 | 7.57 | 7.63 | 100% (7m) |
| 2 | 28 | 29 | 7.33 | 7.67 | 100% (7m) |
| 3 | 28 | 28 | 7.4 | 7.60 | 100% (7m) |

The sea surface water temperature at all 3 data retrieval sections, using a thermometer range about 27 °C-29 °C. this range of sea surface water temperature s in accordance with the natural value of seawater quality standard specified by the Ministry of Environment Decree No. 51 / MENLH / 2004 on the Quality Standard of Sea Water is about 26 °C – 30 °C. Salinity of seawater at all 3 data retrieval sections taken using a refractometer ranged from 28 °/00-29 °/00. The range of salinity values is also in accordance with the standard natural value of seawater quality standards by the Ministry of Environment Decree No. 51 / MENLH / 2004, with permissible changes up to <5% of average seasonal salinity.

The waters clarity that measured using a secchi disk can be seen through the bottom of the waters, indicating that the water's brightness is 100%. This waters clarity is a very important aspect in coastal tourism activities, so that visitors may feel satisfied doing the water activities, such as swimming, and snorkeling. Besides, water clarity also has a high aesthetic value as ecotourism spot. The degree of acidity (pH) obtained using pH meter at all 3 sections of data retrieval ranged from 7.4-7.57. The value of the degree of acidity (pH) is included in the standard value of seawater quality standard by the Ministry of Environment Decree No. 51 / MENLH / 2004 regarding the Sea Water Quality Standard is
about 7-8.5. This condition allows the visitors swimming at the beach without getting hurt and irritation.

![CONDITIONS OF FAUNA ECOSYSTEM](image)

**Figure 2. Visitor Perceptions of Conditions of Fauna Ecosystem**

The Dissolve oxygen (DO) measured using DO meters ranged from 7.60-7.67 mg/l, has exceeded the standard value of seawater quality standard by Ministry of Environment Decree No. 51 / MENLH / 2004 concerning the Sea Water Quality Standard is >5 mg/l. This condition evidenced by the large number of coral fishes can be seen in the waters, because the Dissolve Oxygen is an important oceanographic factor for the survival of aquatic biota.

![CONDITIONS OF FLORA ECOSYSTEM](image)

**Figure 3. Visitor Perception Conditions of Flora Ecosystem.**

The percentage of visitor interviews about Conditions of Fauna Ecosystem shows 3% rate Very Good, 67% rate Good, 17% rate Not good, and 13% rate Do not Know as can be seen in Figure 2 below. The ecosystems in this area of Kiluan Island are the reef fish ecosystem, and the common pelagic fish are the target the visitors to do fishing. Visitors can see that there are still many fish and other animals such as Starfish in the coral reef ecosystem contained in Station II. Visitors can also see reef fish while swimming due to the clarity of the water that reaches 100%, so this condition became a special attraction for the visitors. The concept of Ecotourism ran by Pokdarwis are by selling the view of fauna that remain in its natural integrity, one of them to preserve the ecosystem of coral reefs with reef fishes.

In addition to Fauna, Flora also became one aspect that must be maintained and managed for its sustainability, while the management done by Pokdarwis, must be in accordance with the concept of Ecotourism. According to the percentage of visitor perceptions ratings, that 3% rate Very Good, 67% rate Good, 17% rate not good, and 13% rate Do not know, as can be seen in Figure 3. There is no mangrove trees in the area around Kiluan Island, only coastal vegetation, and other trees.

Tourism potential of Kiluan Island Beach to be an ecotourism destination is very magnificent, and of course, attract all of the visitors. 73% of visitors rated Very Good, and 27% of visitors rated Good.
In accordance with the statement [6], that coastal sand is one of the potential categories and the main selling power for a beach to become a tourism area. Coral reef at station 2 is also still occupied by various reef fish so it still has the potential to do snorkeling activity over there [7], that coral reef ecosystem is one of the main tourism potentials in coastal area. Fishery resources can be a potential factor for coastal tourism, and many visitors are fishing and directly roast the fish they catch and eat it in the Island [8]. The Scenery is one of the visitor attractions which is also one of the extraordinary potentials of the island of kiluan [9]. The beauty and aesthetics of the landscape, the clarity of the water, the mountain scenery, and the sunset [8], that all of those factors will be the memories for visitors who come to this Kiluan Island. The diagram of the result of visitor's assessment on tourism potential can be seen in Figure 4.

The aesthetics of a landscape is determined by the beauty of nature with its different forms of earth face, and there are 6 factors that affect it [10]. Among them are, Regularity, Texture, Familiarity with the environment, Widespread viewing space, excitatory plurality, and Value of confidentiality. The natural Scenery on Kiluan Island beach is very beautiful, because the natural beauty of Kiluan Island Beach contains 6 factors [10], so 73% of respondents give very good, and 27% of respondents give good. The Scenery on the beach of Kiluan Island is rated higher [11], which gets 42% Good, and 58% is very good at the beauty of Manalusu beach, Pangandaran. Diagram of the assessment results The coastal landscape of Kiluan Island can be seen in Figure 5 below.

![Figure 4. Visitor Perceptions of Tourism Potentials](image4)

![Figure 5. Visitor Perceptions of Natural Scenery](image5)
Swimming and any water activities included in the activities of marine tourism Contact Activities, because in direct contact with sea water [8]. Referring to the Ministry of Environment Decree No. 51 / MENLH / 2004 Concerning the Sea Quality Standards, Subsection 1, about Marine Water Quality Standards for Marine Tourism, tells that there are physical and chemical indicators of the sea water for visitors to do water activities and swimming. It has been discussed Previously, that the Kiluan Island’s sea waters conditions of has been in accordance with all the minimum parameters in the quality standard, so it can be concluded that water Contact Activities such as swimming, or snorkeling, are suitable and safe to do in sea waters in Kiluan Island. The results of the assessment show that 34% rate Very Good, 63% rate Good and 3% rate not good due to the geophysics condition in station 3 is not suitable for swimming activities, as the diagram shown in Figure 6.

![Figure 6. (A) View in Station 1 (B) View in Station 2 (C) View in Station 3(D) View in Station 4](image)

**Figure 6.** (A) View in Station 1 (B) View in Station 2 (C) View in Station 3(D) View in Station 4

| ENJOYMENT OF WATER ACTIVITIES |
|-----------------------------|
| very good | 30% |
| good | 34% |
| not good | 63% |
| very not good | 0% |
| do not know | 0% |

**Figure 7.** Visitor Perception of the Enjoyment of Water Activities.
Beach sand picnic activity is categorized as Litoral Activities, or activity on sand at low tides [8]. The basic material of sand beach beaches has a great affect to the amenities of beach sand picnic activities, such as sitting on the sand, playing sand, and sunbathing [11]. 36% of visitors rate Very Good, 57% rate Good and 7% rate not good as can be seen in Figure 7. 7% of visitors rate noy good because at station 3 there is a lot of coral shard that blend with the sands, so that visitors have less interest to walk in the station 3. unlike the station 1 as the most crowded spot, because of the beauty of white fine sand.

![SAND BEACH TOURISM](image)

**Figure 8.** Visitor Perceptions of the Enjoyment of Sand Beach Tourism

5. Conclusion
The oceanography condition of Kiluan Island is still in accordance with the quality standard according to the Ministry of Environment Decree No. 51 / MENLH / 2004 Concerning the Quality of Sea Water, Subsection 1 about Marine Water Quality Standards for Marine Tourism, so it is very safe for visitors to do water tourism activities, and this aspect becomes one of nature's potential that Kiluan Island coast have. Besides, other natural potentials owned by Kiluan Island Coast are the beaty white fine sands and the natural Scenery, because both of those elements is most precious selling power for a beach ecotourism destination, that 67% scores good for the flora and fauna ecosystem, 73% scores very good for the potentials of natural tourism, 73% scores very good for the Scenery, 63% scores good for the water activities enjoyment, and 53% scores very good for beach recreation tours.

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