

Sustainability life of lobster (*sp. Locusta*) in the coral reef NRF Sancang Area

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Abstract. Lobsters are shallow water organisms and are often caught by fishermen traditionally. The aim of the research is to analyze natural lobster catching, the sustainability of lobsters (*sp.locusta*) and baby lobsters (*sp.infantem locustam*) and forms of coral reef conservation in the NRF Sancang area. The method used is descriptive with qualitative interviews. Mapping of the NRF of Sancang coral reef area by analyzing Landsat 8 images in 2023, ground checks and interviews. Tracing is done at night using boats, nets and petromak or LED lights with the aim that the lobsters (*sp.locusta*) will get closer to the center of the light. Lobster (*sp.locusta*) has a high selling value, so it attracts fishermen to catch both baby lobsters (*sp.infantem locustam*) and their mothers. Adult lobsters are sold for consumption, while baby lobsters (*sp.infantem locustam*) are sold outside the region and even abroad to be kept, which threatens the sustainability of lobsters (*sp.locusta*) in the HCA Sancang coral reef area. Because of this, conservation is needed by implementing strict regulations.

1 Introduction

Sancang Forest includes the Sancang Nature Reserve Forest (NRF) which is located in Cibalong District, Garut Regency. This NRF area includes lowland forests, mangrove forests and abrasion plains based on limestone rocks that have risen to sea level. So the uplifted limestone is abraded by sea waves, so that it becomes a plain. These abrasive plains are known as coral reefs. The influence of waves during high tide occurs when abrasion occurs and when low tide appears as a plain, this (NRF) forms a balanced ecosystem, but will experience changes if there is human activity. Human factors have a greater impact on the ecological environment [1]. Coral reefs are sedimentary rocks with a depth of less than 30 meters and these rocks are raised to sea level. This sedimentary rock experiences dissolution so that there are many cavities in the rock. Coral reefs are shallowwater ecosystems that consist of reefs made of calcium carbonate which is mostly secreted by reef building corals and encrusting macroalgae [2]. This situation forms a unique ecosystem, so that many coastal animals thrive on coral reefs. Coral reefs are some of the most diverse ecosystems in the world. Coral polyps, the animals primarily responsible for building reefs [3]. With coral reef habitats and ecosystems, they are a typical habitat for a diversity of animals. Habitat characteristics and biodiversity of nekton [4]. While [5,6]. states that Coral reefs are one of

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the most diverse marine ecosystems on Earth and one of the richest in terms of species interactions.

Coral reefs were one of the most important ecosystem throughout the world ocean, and home to a rich biodiversity and one of the most diverse ecosystems on the planet [7]. Benthic communities in coral reef ecosystems are very dynamic and influenced by environmental conditions and human factors [8]. Coral reefs are found in a wide range of environments, where they provide food and habitat to a large range of organisms and Coral-associated fauna predominantly consists of invertebrates and constitutes an important component of coral reef biodiversity [9, 10]. Coral reefs are the most diverse ecosystems on the Earth and ecosystems are intricate and diverse collections of species that interact with each other and the physical environment. Coral is a class of colonial animal that is related to hydroids, jellyfish, and sea anemones [11]. Animals that breed and live in coral reef areas have the ability to adapt to their environment. This group of animals is known as the megabenthos group. Megabenthos that have high value are; Lobster (sp. *Locusta*), sea cucumbers, clams and Lola shells [12]. The 4 megabenthos animals that have high value and are bought and sold are lobsters (sp. *locusta*). Lobster fisheries also hold a very important social, economic and ecological role. This study aims to identify lobster species in South Sea of Java [13]. Large-bodied *Panulirus ornatus* lobsters are economically important and spiny lobsters (sp. *Locusta*) have non-extractive economic value [14,15].

In the Sancang Nature Reserve Forest Area (NRF) there are abrasion plains with basically coral reefs which are the breeding habitat for Lobsters (sp. *locusta*). Coral reefs located in the HCA area have beauty and biological resources, so they will attract the activities of fishing communities and tourists. Coral reef areas have aquatic resources such as crabs, lobsters (sp. *locusta*) and so on. Lobster (sp. *locusta*) which has high economic value has an impact on fishermen. Lobsters are important resources throughout the world's oceans, providing food security, employment, and a trading commodity [16]. The demand for lobsters for consumption is quite high, thus encouraging intensive lobster fishing in coral reef areas, especially fishing using boats and nets. Facts show that fishermen catch lobsters (sp. *Locusta*) that are still not worth catching or catch lobsters (sp. *Locusta*) that are laying eggs [17]. Local governments need to enforce regulations. The behaviors of local governments can affect the enforcement of environmental regulations [18]. The American lobster fishery in the Northeastern United States is one of the most valuable fisheries in the country [19]. Meanwhile, Simeulue Regency has quite high lobster (sp. *Locusta*) export products. Lobster (sp. *locusta*) commodity commands a high economic price in Simeulue Regency [20]. Meanwhile, catching lobsters and baby lobsters is done using boats and nets. The high market demand for baby lobster (*Panulirus spp.*) has so far been only met by natural catches [21]. This means that catching lobsters (sp. *Locusta*) needs to be limited. The forms of conservation employed were tree planting, fishing restrictions and the size of fish caught fishing restrictions [22]. Catching lobsters (sp. *Locusta*) naturally using boats and nets will disrupt the preservation and sustainability of lobsters (sp. *Locusta*). Therefore, this research aims to:

1. Analyze the natural fishing of lobsters by fishermen on the coral reefs of the Sancang NRF area
2. Analyze the sustainability of lobsters (sp. *Locusta*) and baby lobsters (sp. *infantem locustam*) in the Sancang HCA area.
3. Analyze the form of lobster (sp. *Locusta*) conservation in the Sancang (NRF) Area.

2 Methods

2.1 Study Area

Coral reefs are part of the Sancang NRF which is located in the south of Garut Regency. The Sancang HCA covers land with an area of 2,157 Ha and coastal waters in the form of coral reefs with an area of 1,150 Ha [23]. Minister of Environment and Forestry Regulation, (2018). Geographically, it is located at coordinates 108° 01'15.66" E – 109° 00'00" E and 7° 01'12.96" S – 7° 46'44.4" S. Topography Coral reefs are limestone rocks that have been lifted and abraded by sea waves.

2.2 Datasets

Data source from coral reefs resulting from Landsat 8 and Google Earth 2024 image analysis through the steps of Cropping Coral Reef Areas, geometric and atmospheric correction. Mapping of the area was carried out by field surveys by observing the location of fishing settlements and fishing boat ports.

2.3 Data Preprocessing

For mapping coral reef areas using Landsat 8 imagery in 2023. Steps in interpreting the image are as follows;

1. Digital image analysis
 - a Cropping to select the area to be studied
 - b Perform radiometric, atmospheric corrections, radiance corrections, Reflectance corrections, and TOA Reflectance/at surface reflectance corrections
 - c The formula used is;
$$\rho\lambda' = M\rho.Qcal + Ap$$
2. Red Green Blue (RGB) Visualization
Select Band from RGB color (Red, Green, Blue)
3. Supervised digital analysis
 - a Sampling
 - b Classification
 - c Interpretation
4. Validate Interpretation

2.4 Field survey

The survey was carried out by observing coral reef areas, fishing boats, fishing nets, settlements and interviews with 14 fishermen who live in the Sancang NRF area, because their residence borders the coral reef area. The results of the interviews were conducted qualitatively.

3 Results and discussion

3.1 Traditional lobster fishing

Coral reefs were formed through a long process during the Pleistocene. Clear shallow sea organisms with low sea waves breed organisms known as megabenthos. These organisms die and settle into hard rock and form limestone. Limestone sedimentary rocks freeze to form coral reefs. The Sancang coral reef is part of the Nature Reserve Forest (NRF) of Sancang, which is a protected area with an area of 1,150 Ha. Coral reefs have a special ecosystem, so

living creatures adapt to their conditions. Coral reefs are formed from the long and complex sedimentation of coral organisms since the Preistocene era. Coral reef organisms are the result of massive sedimentation of coral organisms, such as; phylum cnidaria, groups of corals such as hermatific and ahermatific, hermatific with symbiotic plant cells known as zooxanthellae. These organisms die and settle to form rocks. This hard rock rose to sea level due to the shift of the Indo-Australian plate. These rocks are hit by sea waves and abraded, so that these coral rocks form abrasion plains and are known as coral reefs. The coral reef area is shown in figure 1.

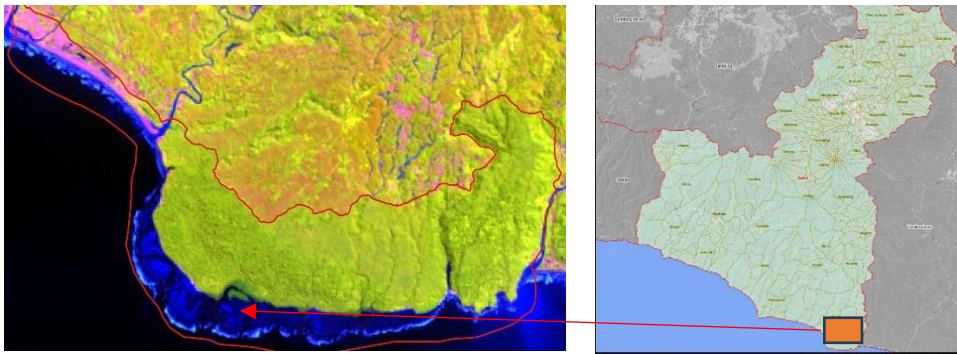


Figure 1. Sancang coral reef area

This coral reef is easily dissolved by sea water, so there are many cavities, which provide shelter for coral organisms. Coral reef ecosystems are rich in biological resources for the reproduction of lobsters (sp. *Locusta*). Lobster (sp. *Locusta*) is an animal that is classified as a crustacean. Lobsters have high economic value, thus encouraging fishermen to catch them and make them into food for people who like lobsters. Lobster catching is done naturally by fishermen using boats and nets. Catching is always done at night, because lobsters search for food at night. The coral reef area is shown in figure 2.



Figure 2. Boats (a) and coral reefs (b) in the Sancang NRP area

At the beach in the coral reef area, Sancang is carried out by fishermen. The fishermen leave at around 16.00 to reach a location not too far from the coral reef and return home at 08 in the morning. When the fishermen arrive, the fishermen turn on lighting devices, such as petromaks or LED lights. This lamp is used as an attractant for lobsters (sp. *Locusta*) to get closer to the center of the light. Next, the fisherman lowers the net 8 – 12 meters below the water surface with a net hole size of 2 cm. In this way, large and small lobsters can be

caught. Even though the aim was to catch baby lobsters, the mother lobster was caught in the net. Large lobsters (sp. *Locusta*) are sold for consumption by tourists at quite high prices, while baby lobsters that are caught are sold to buyers from various regions and abroad. The sale of baby lobster catches disrupts the sustainability of lobster life (sp. *Locusta*).

3.2 Sustainability of the lobster ecosystem

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3.3 Forms of Conservation

Coral reef organisms, especially lobsters, have high economic value and have an impact on the lives of fishing communities, but if all sizes of lobsters will experience extinction. The conservation required to maintain sustainability is carried out by paying attention to meeting the needs of the community. To maintain the sustainability of coral reef ecosystems and organisms, it is necessary to implement a strict ban on catching lobsters (sp. *Locusta*). This is in accordance with regulations regarding fishing and tourist visits in the Sancang NRF area, because the NRF includes a coral reef ecosystem. This NRF is a nature reserve as a conservation area for vegetation, animals, birds and marine organisms, especially lobsters (sp. *Locusta*). For the benefit of the community, it is necessary to provide training in raising baby lobsters. With community skills, coral reef ecosystems are maintained and community needs are met. With this effort, lobster (sp. *Locusta*) breeding will be sustainable without disturbing the HCA ecosystem or coral reef ecosystem.

4 Conclusion

Traditionally catching lobsters (*Locusta*) using boats and lighting equipment with nets is quite good, but if baby lobsters are caught they should be returned to their habitat unless they are kept by fishermen. Although fishermen should be prohibited from catching baby lobsters, because it will disrupt the sustainability of lobsters (*Locusta*), especially coral reefs, this is done in the Sancang NRF area.

Catching baby lobsters by fishermen on the coral reefs of the Sancang NRF Area is no longer in accordance with the function of the Sancang NRF as a conservation area and catching baby lobsters is prohibited. The attractiveness of the high economic value of catching baby lobsters (infantem *locustam*) for fishermen's needs can be met, but it will cause the sustainability of lobster breeding to be disrupted and perhaps lobsters (*Locusta*) in the coral reefs of this area will become extinct.

Preserve coral reefs by conserving the physical environment and life of coral reefs. The prohibition needs to be implemented strictly, while the fishing community needs to carry out socialization and training in raising baby lobsters (*locustam infantem*) and breeding adult

lobsters (locusta). With this form of conservation, fishermen's needs are met and coral reefs become sustainable areas.

5 References

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