

Qualitative observation on mangrove forest ecosystems degradation in East Java Indonesia: exploitation of clungup Mangrove forest

Roni Alim BK*, Budidjanto**, I. Komang Astina** and Syamsul Bachri**

**Ph.D Students, Geography Education, Malang State of University, Malang, Indonesia*

**Universitas Kanjuruhan Malang, Malang, Indonesia*

***Faculty of Social Science, Malang State of University, Malang, Indonesia*

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ABSTRACT

This research aimed at describing (1) the condition of the mangrove forest ecosystem in Indonesia, (2) the condition of the mangrove forest ecosystem in East Java, and (3) the factors that reduce the mangrove forest ecosystem in East Java qualitatively. This research used a qualitative approach with a phenomenological perspective to determine the understanding of the Sendangbiru community regarding the condition of Clungup Mangrove Forest. This research was conducted in communities that are directly in contact with Clungup Mangrove Forest. Primary data concerning factors that cause a decrease in the area of mangrove forest ecosystems were collected through three procedures, namely (1) interviews, (2) participant observation, and (3) documentation. The results of the research show that the area of Indonesia's mangrove forests, especially in East Java, has narrowed. Based on studies and in-depth observations, it is known that the damage of Clungup Mangrove Forest was caused by (1) the dynamics of social life and agricultural activities, (2) natural factors, and (3) political factors. These factors are discussed in this research.

Key words: Phenomenology, Social life, Exploitation of mangrove ecosystem

Introduction

The development of social life that is not balanced by the knowledge of the community about the benefits and functions of mangrove forests has become one of the triggers for the destruction of mangrove forests in almost the entire world. Research on mangrove forest ecosystems in foreign countries has linked the damage to the mangrove forest ecosystem with the pressure of the population. Because of the increase in population, the ecosystem of the mangrove forest is converted into residential land.

The area of the world's mangrove forests is around 16,530,000 hectares. The largest mangrove forest is in the Asian region, which is an area of

7,441,100 hectares. The second largest mangrove forest is in America, with an area of 5,831,000 hectares. Meanwhile, the area of mangrove forests in Africa is in the third rank, with an area of 3,258.00 hectares (FAO, 1994). Referring to data from The World's Mangroves 1980-2005, Indonesian mangrove forests are the largest in the world reaching 49% of the total area of mangrove forests in the world (Ditjen NTAG, 1993). However, from year to year, the condition has declined both in terms of quality and quantity (Saparinto, 2007; Giri *et al.*, 2011).

Mangroves are plants that grow on the coast. Mangroves have unique potential and uniqueness. Mangroves can also be called mangrove forests or

*Corresponding author's email: roniabk@unikama.ac.id

coastal forests. Mangroves can grow and develop well even in inundation conditions and surface water circulation which causes continuous exchange and replacement of sediments (Dahuri, 2013). Circulation that continuously increases the supply of oxygen and nutrients used for respiration and production by plants. Mangroves can grow well on a variety of substrates, such as sandy soil, mud soils, clay soils, and rocky soils (Harahab and Setiawan, 2017).

Mangrove forests are tropical forest types consisting of biotic and abiotic environments that interact each other. Some experts put forward the definition of mangrove. Soerianegara (1987) said that mangrove forests are forests that grow on alluvial muddy soil in coastal areas and river estuaries which are directly affected by tides. In addition, FAO (in Tuwo, 2011) said that mangrove forests are plant communities that grow in tidal areas. In general, mangroves are resistant to various environmental disturbances and pressures. However, mangroves are very sensitive to sedimentation, water level, washing, and oil spills. Mangrove forest is a natural resource that has the characteristics of shared resources. The meaning of shared property causes everyone to have the same opportunity and access to utilize mangrove forests (Susilo, 2017), and it causes damage to mangrove forests.

The destruction of mangrove forests is due to logging of mangrove trees for timber, activities that convert mangrove forest areas into plantation areas, fish / shrimp farming, settlements, and changes in mangrove forest areas to industrial areas. Exploitation of mangrove forests also occurs due to external factors, such as damage to watersheds. Damaged watersheds can occur due to high river estuary sedimentation or accumulation of pollutants in watersheds (Bratasida, 2002; Kusmana, 2002).

As a maritime country, Indonesia has a wealth of coastal and mangrove forests. Mangrove forests in Indonesia have a high diversity of species, namely 47 species of plants that are specific to mangrove forests (Nontji, 2002). The classification of mangrove types is divided into three groups, namely the major group, the minor group and the mangrove association group. The structure of the mangrove forest is very simple because it consists of one layer of trees with relatively few species. Meanwhile, species of animals commonly found in the waters of mangrove forests are glodok fish, crabs and shrimp. The spread of mangrove plants both by type and number is influenced by several environmental fac-

tors (Tuwo, 2011). The area of mangrove forest ecosystem in Indonesia is decreasing from various secondary data sources. Therefore, this research seeks to, (1) describe the condition of mangrove forest ecosystems in Indonesia, (2) describe the condition of mangrove forest ecosystems in East Java, and (3) explain qualitatively the factors causing the reduction of mangrove forest ecosystems in East Java, Indonesia.

Methodology

Study Area

The location of this research was Sendangbiru Hamlet, Tambakrejo Village, Sumbermanjing Wetan Subdistrict, Malang Regency, Indonesia. This research was carried out intensively in the community that was directly in contact with Clungup Mangrove. People who live around the Clungup Mangrove Forest as the subject of the research showed complex phenomena in accordance with the focus of the research. Meanwhile, the object of this research study was Clungup Mangrove Forest. The interaction between individuals and the environment explored a meaning in the life of the community itself which is based on cause and purpose to a form of their behavior.

Geographically, Sendangbiru Hamlet, Tambakrejo Village, is located on the South Coast of Malang Regency. The distance from Malang City is about 60 km to the south. The astronomical location of Sendangbiru Hamlet, Tambakrejo Village is at coordinates 08°37'-08°41' LS and 112°35'-112°43' BT. Administratively, Tambakrejo Village, located on the South coast of Malang Regency borders on various regions as follows. The west is bordered by Sitarjo Village, the east is bordered by Tambakasri Village, the north is bordered by Kedungbanteng Village, and the south is bordered by the Indian Ocean. Meanwhile, geographically, the research area is located at 122° 38 ' - 122° 43' East Longitude and 8°26 ' - 8° 30' South Latitude. Sumber Manjing Wetan Sub-district is at an altitude of about 500 meters above sea level (Hermawan, 2002).

Sendangbiru Hamlet has a large wealth of mangrove forests, which is around 81 hectares. However, in 2010, only 40% of Clungup's mangrove forest was in good condition, the rest was in a damaged condition. The subjects of this research were individuals in coastal communities who live around

Clungup Mangrove Forest.

Method

This research used a qualitative approach with a phenomenological perspective to determine the understanding of the Sendangbiru community on Clungup Mangrove Forest conditions.

Profile data on the location of the research were obtained from various secondary data sources. The geographical conditions of the research location were obtained from the Tambakrejo Village Office, Central Bureau of Statistics (BPS) of Malang Regency, and Agriculture and Forestry Service of Malang Regency. Dynamics data of mangrove forest was obtained from FAO, Perum Perhutani, Indonesian Ministry of Environment and Forestry, and the Ministry of Maritime Affairs and Fisheries. Primary data regarding the factors that influence the decline in mangrove forest area that occur from time to time, were collected through three procedures, namely (a) in-depth interviews, (b) participant observation, and (c) documentation.

In-depth interviews were conducted with 12 participants as the main informants. The results of interviews was recorded using the help of tools such as (1) notebooks, (2) recorders, and (3) digital cameras. Interviews were used for data retrieval carried out through oral communication activities in structured, semi-structured, and non-structured forms. Observations were made on the daily activities of the population at the research site.

In this observation, the presence of researchers was very important. This was caused by the function of researchers as the subject of research, where researchers also participated directly in the activities of a particular group to obtain accurate data. Researchers carried out activities and lived with the group within a certain period of time until the data was fulfilled. In this case, the researchers took part in carrying out activities directly with the coastal communities of Sendangbiru around the Clungup Mangrove Forest.

When the researchers came to the research site in Sendangbiru Hamlet, Tambakrejo Village, Sumbermanjing Wetan Sub-District, Malang Regency, the researchers came to the house of the chairman of the Sendakti Bakti Alam Foundation, namely Mr. Sty. The researchers explained the purpose and submitted the research permit from National and Political Unity Agency. Furthermore, Mr.

Sty suggested that the researchers requested permission in advance to the Village Head of Tambakrejo.

After receiving advice, the researchers headed to the house of the Tambakrejo Village Chief, Mr. Yts. However, the Village Head of Tambakrejo was not at home. The researchers met with the village head's son and then submitted a research permit from National and Political Unity Agency. The next day, the researchers came back to the village head's house, but could not meet with him because the village head was attending an official meeting in Sumbermanjing Wetan Subdistrict. Then, the researchers asked for the village head's telephone number and contacted him. After knowing the intention of the researchers to come to the village, the village head advised the researchers to come to the village office and meet the village secretary. Arriving at the village office and meeting the village secretary, Mrs. Fbn, the researchers explained the purpose of her arrival in the village.

The village secretary gave permission for the research with a note that after the research ended, the researchers must contribute constructive thoughts, including the presentation of the research results. The researchers agreed to the agreement. Next, the researchers were given some data related to village profile data. Then, the researchers went directly to the Sendangbiru community who lived around Clungup's Mangrove Forest to conduct in-depth interviews with them.

Results and Discussion

This section discusses (1) the condition of mangrove forest ecosystems in Indonesia, (2) the condition of mangrove forest ecosystems in East Java, and (3) the causes of the decreasing area of mangrove forest ecosystems in East Java, Indonesia.

The Condition of Mangrove Forest Ecosystems in Indonesia

Indonesia is a country that has the largest mangrove forest in the world. The Food and Agricultural Organization (2007) shows that 19% of the world's mangrove forests are in Indonesia. In 2000, the area of mangrove forests in Indonesia was three million hectares of 15.7 million hectares in the world. Meanwhile, compared to the area of mangrove forests in Southeast Asia, Indonesia has 2.9 million hectares of mangrove forest out of 4.9 million hectares of the to-

tal area of Southeast Asian mangrove forests. This shows that Indonesia has mangrove forests covering almost 60 percent of the total mangrove forest in the Southeast Asia region.

In the last 10 years (1990-2000), there has been a decline in the area of mangrove forests in Indonesia by 17%. In 1990, the area of mangrove forests in Indonesia reached 3.5 million hectares. In 2000, the area of mangrove forest in Indonesia was reduced to around 2.9 million hectares. Until now, there are around 1.9 million hectares of mangrove forests in Indonesia. The reduction in the area of mangrove forests in Indonesia was also explained by Noor (2006). In 1982, Indonesia's mangrove forest had an area of 4.25 million hectares, while in 2013 it was estimated to decrease to 3.2 million hectares or 22.6% of the total mangrove area in the world (Noor, 2006). The exploitation of mangrove forests in Indonesia has increase significantly. The exploitation of Indonesia's mangrove forests has the largest rate in the world (Campbell and Brown, 2015).

The Condition of Mangrove Forest Ecosystems in Clungup, East Java

One of the mangrove forests in East Java is Clungup Mangrove Forest, which is located in Sendangbiru Hamlet, Tambakrejo Village, Sumbermanjing Wetan Subdistrict, Malang Regency, about 60 km to the south of Malang City. It is specifically located at 08°37'-08°41' South latitude and 112°35'-112°43' East longitude coordinates. Clungup Mangrove Forest is a vast mangrove forest, which is around 81 hectares. However, in 2010 only 40% of mangrove forests were in good condition while the rest were in damaged condition.

The exploitation of mangrove forests in East Java is not much different from the exploitation of mangrove forests in Indonesia. Exploitation of mangrove forests in East Java was caused by human activities, such as logging of mangrove trees, the construction of residential areas, industrial activities, recreation and marine tourism, as well as the conversion of forests into aquaculture and plantations (Dahuri, 2013). Half of the mangrove forests on the coast of East Java have been exploited. Of the 18,500 hectares of mangrove forests in East Java, the exploitation rate reaches 45%. Meanwhile, the mangrove forest in Malang Regency is around 340 hectares or about 0.11% of Malang's land area which is 3,347.8 km². Mangrove forests in Malang Regency are in good condition, only around 38.67% or

around 131.50 hectares.

Damage to Clungup's Mangrove Forest is theoretically motivated by the existence of a "cause" motive and "purpose" motive. Schutz explained that a person's actions do not just appear, but through a long process and are evaluated by considering social, economic, cultural and ethical norms. The actions taken by a person are not only driven by "goal" motives, but also because of various "causes" motives (*because motives*) of the actors themselves (Waters, 1994).

Factors Affecting Mangrove Degradation in East Java Indonesia

Based on in-depth studies and observations made by the researchers, the damage to Clungup's Mangrove Forest was caused by several things. The causes mentioned are (1) the dynamics of social life and agricultural activities, (2) natural factors, and (3) political factors.

Dynamics of Social life and Agricultural Activities

There are several things that have caused the exploitation of mangrove forests in Indonesia. Most are related to the conversion of mangrove forests to agricultural and plantation land as well as low awareness of the Sendangbiru community of the functions and benefits of Clungup Mangrove Forest.

The development of the social life of the community was one of the triggers for the destruction of the environment. The behavior of people who did not care about the environment causes the exploitation of natural resources and the environment. Environmental cases are now of special concern that must be addressed together. The environmental exploitation that occurs in various parts of Indonesia is largely caused by human behavior. One of the concerns of the world is the exploitation of mangrove forests in Indonesia.

In the last thirty years, around 40% of mangrove forests in Indonesia have been lost due to the conversion of shrimp farming (Sumatra, Sulawesi, and East Java), agriculture or salt farming (Java and Sulawesi), degradation due to oil spills (East Kalimantan), and pollution (FAO, 2007). In addition, the exploitation of mangrove forests in Indonesia is also caused by the taking of local communities. In addition to timber extraction, there are also people who change the mangrove forest area into plantation areas, fish / shrimp farming, settlements, and as industrial areas.

Natural Factors

Damaged mangrove forests occur because of natural factors. One of the natural factors is the destruction of watersheds (DAS). Damaged watersheds can occur due to high river estuary sedimentation or accumulation of pollutants in watersheds (Bratasida, 2002; Kusmana, 2002). This accumulation of pollutants occurs due to human activities, such as the disposal of toxic substances into the watershed.

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Meanwhile, the area of mangrove forests in Malang Regency is around 340 hectares (Satriya, 2010) or around 0.11% of Malang's land area (3,347.8 km²). Mangrove forests in Malang Regency which are in good condition are only around 38.67% or around 131.50 hectares (DKP Malang Regency).

Political Factors

Apart from being influenced by natural factors, the decline in the area of mangrove forests was also influenced by political factors. The era of reform has a very fundamental impact on the economy of the community. This has also been felt by the Malang Sendangbiru Coastal Community, whose daily work is as fishermen. A loose control of reform has an impact on the social, economic and political life of the Malang Sendangbiru Coastal community. One of the damages that occurred during the reform period was the exploitation of Clungup Mangrove Forest. This was caused by human activities, such as illegal logging of mangrove trees. In addition, the exploitation of Clungup's Mangrove Forest was also caused by the construction of residential, industrial, recreational and marine tourism, aquaculture, and plantation areas (Dahuri, 2013).

The socio-economic conditions of the Sendangbiru community can be elaborated in three periods, namely the New Order, the reform, and

present. During the new order, the economic conditions of the Sendangbiru Coastal community tended to be stable. Meanwhile, during the reform era, there was an economic crisis that had an influence on the prevailing social, economic, cultural and norm conditions. The era of reform had a very fundamental impact on the economy of the community. This had also been felt by the Malang Sendangbiru Coastal Community, whose daily work was as fishermen. A loose control of reform had an impact on the social, economic and political life of the Malang Sendangbiru Coastal community. One of the damages that occurred during the reform period was the exploitation of Clungup Mangrove Forest. This was caused by human activities, such as illegal logging of mangrove trees. In addition, the exploitation of Clungup's Mangrove Forest was also caused by the construction of residential, industrial, recreational and marine tourism, aquaculture, and plantation areas (Dahuri, 2013).

Based on the results of interviews with several key informants, the exploitation of Clungup's Mangrove Forest occurred during the reform era. The exploitation of Clungup's Mangrove Forest was carried out by the Sendangbiru community, both immigrants and indigenous people. After the Clungup Mangrove Forest was damaged and the impact could be felt by the Sendangbiru community, they had an initiative to reforest the Clungup Mangrove. The current condition of Clungup Mangrove Forest has begun to recover. Recovering of Clungup Mangrove Forest conditions occurred after conservation in 2012 by the supervisory community group and in 2014 by the Bhakti Alam Sendangbiru Foundation. The Chairperson of the Bhakti Alam Sendangbiru Foundation has an initiative to green the Clungup Beach area. The reforestation activities are carried out slowly by involving local communities. Greening is done by planting mangroves and other types of plants. Clungup Mangrove Forest Conservation is carried out with group members totaling 105 people and is able to plant 10,000 mangrove seedlings with a 3 × 3 meter spacing every year.

Conclusion

The results of the research show that the area of Indonesia's mangrove forests and East Java has narrowed. International mangrove ecosystem researchers link the exploitation of mangrove forest ecosystems with population pressure. Population increase

causes forest areas and mangrove forest ecosystems to be converted into residential areas. Based on in-depth research and observation, damage to Clungup's Mangrove Forest was caused by three main factors, namely (1) the development of social life and agricultural activities, (2) natural factors, and (3) political factors. These three factors are inter-related.

The development of the social life of the community which is not matched by the knowledge of the community about the functions and benefits of mangrove forests is one of the triggers for the destruction of mangrove forest ecosystems in almost all the world. Mangrove forest damage is also caused by external factors. One external factor is the destruction of watersheds. The damage of watersheds can occur due to high river estuary sedimentation and accumulation of pollutants caused of the exploitation of the population in the watershed. Exploitation of mangrove forests is also caused by human activities, such as logging of mangrove trees, the construction of residential areas, industrial activities, recreation and marine tourism, as well as the conversion of forests into aquaculture and plantations. Besides being influenced by natural factors, the decline in the area of mangrove forests is also influenced by political conditions. Based on the results of interviews with several key informants, the exploitation of Clungup's Mangrove Forest occurred during the reform period. The era of reform has a very fundamental impact on the economy of the community. One of the damages occurred during the reform period was the exploitation of mangrove forests due to human activities, such as illegal logging of mangrove trees, the construction of residential areas, industry, recreation and marine tourism, aquaculture, and plantations.

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