www.bircu-journal.com/index.php/birci
Budapest International Research and Critics Institute-Journal (BIRCI-Journal)
Humanities and Social Sciences
ISSN 2615-3076 Online)
ISSN 2615-1715 (Print)
Budapest Institute

Community Behavior Patterns and the Relationship with the Profile of Vegetation Diversity of the Mangrove Ecosystem in Tamuku Village, North Luwu Regency

Muh. Yunus
STKIP PI Makassar, Indonesia
emyunusjale@stkippi.ac.id

Abstract

The research aimed to describe community behavior patterns and their relation to the diversity profile of mangrove ecosystem vegetation in Tamuku Village, Tulang-tulang District, North Luwu Regency. This research used qualitative research by survey method. The data collection techniques used interview techniques and quadrant line-transect surveys and the data analysis technique used a line of thought that is divided into three stages, namely describing phenomena, classifying them, and seeing how the emerging concepts are related to one another. The results of this study were the profile of mangrove vegetation in Tamuku Village, which is still found in 30 varieties of true mangrove vegetation and eleven types of associated mangrove vegetation in the coastal area of Tamuku Village, Tulang-tulang District, North Luwu Regency, South Sulawesi. The condition of mangrove vegetation in Tamuku Village is currently very worrying due to human activities that cause damage such as the flow normalization project, opening of new ponds, garbage disposal, water pollution due to chemicals, and exploitation of mangrove forests for the necessities of life. As a result, there was damage to the ecosystem as well as a reduction in the area of vegetated land as a place for mangroves to grow and develop.

Keywords
community behavior patterns; vegetation diversity profile; mangrove

I. Introduction

The mangrove ecosystem is one of the coastal ecosystems that is often under pressure by various human activities. Factors that cause the reduction of mangroves, apart from being converted into ponds, are the conversion of mangrove areas into agricultural land and commercial logging and overexploitation by local communities. This is due to the very rapid population growth accompanied by the increasing need to utilize mangrove resources by the surrounding community. In addition, damage to mangrove forests is also caused by heat pollution and chemical pollution that produce heavy metals, pesticides, and petroleum that can cause damage to mangrove habitats, waste from river flows that enter the mangrove environment, and waste pollution in mangrove forest areas.

Several previous studies have explained the status and situation of mangrove forest vegetation in Indonesia. The research of Senoaji & Muhammad (2016) states that the absence of mangrove vegetation on the coast of Bengkulu City, the distribution of mangrove ecosystems on the coast of Bengkulu City is ± 214.62 ha. The status of the area of 116.24 ha is in the forest area of the Panjang Beach-Bai Island Nature Tourism Park; and 98.38 ha outside the forest area. Only 9 species of tree vegetation and saplings that make up the mangrove ecosystem were found, namely Rhizophora apiculata, Sonneratia alba, Bruguiera gymnoriza, Xylocarpus granatum, Avicennia alba, Hibiscus tiliaceus,

Lumnitzera littoreae, Ceriops tagal and Acrostichum aureum. The carbon content stored in the mangrove ecosystem stands is 18.53 tons/ha. Tiarani's research (2012) states that as many as 52% of respondents from the community around the Bogowonto River Estuary, Kulonprogo Regency stated that the mangrove rehabilitation carried out in the last few years was not successful and 48% of other respondents stated that the rehabilitation was not successful. The indicator used in this research is the time of data collection, the mangroves are still growing. Further results, 22% of respondents stated that the factors of rehabilitation failure were land incompatibility and community behavior that was not acceptable to the efforts to develop mangrove ecosystems.

According to JC. Parmadi, et al. (2016) there are 6 types of mangroves found at the research site, namely: R. Apiculata, R. mucronata, R. Stylosa, Sonneratia Alba, Avicennia Lanata, and Acanthus ilicifolius. This study shows that the highest important value index at the tree level was found by R. apiculata at station 4, which was 300%, the highest important value index at the tiller level was found by R. apiculata at station 4, 191.97%, and the highest important value index at the seedling level found R. Mucronata at station 3 of 123.33%.

According to Ernawati et al. (2016) on the succession of macrozoobenthos in natural mangrove forests and rehabilitation in Sinjai Regency, South Sulawesi. Based on the identification of epifauna and infauna, it is known that the success of macrozoobenthos in the Tongke-Tongke mangrove forest continues to increase as the vegetation ages. Research conducted by Sabar (2016) regarding the biodiversity and adaptation of macrozoobenthos in mangrove waters is known; (1) Pannikiang Island has the highest macrozoobenthos at level IV, (2) Biota species in mangrove habitat in Barru Regency are still very varied in large numbers. Mangrove weakness analysis in the SWOT analysis of mangrove management (Sawitri, 2012) also stated that around the Bogowonto River Estuary, the carrying capacity of physical factors for optimizing the growth of Rhizophora and Avicennia species was low and Sonneratia species was moderate. These carrying capacity parameters include landforms, tidal currents, location of mangrove vegetation to rivers, soil texture, organic matter, pH, and salinity.

Perdana (2008) regarding the rehabilitation of mangroves in Belitung Regency showed that Tanjung Pendam Beach had a seedling survival rate of 6.67%, so it was said that the rehabilitation at Tanjung Pendam Beach was not successful, while at Pulau Bayan Beach the growth rate of seedlings was 58.89%. The results of the analysis of habitat parameters from these two locations with natural mangrove habitats on Air Saga Beach showed that the conditions of salinity, mud thickness, organic matter content (BO), temperature, and pH were significantly different. Uyamah (2016) stated that the damage to the mangrove forest ecosystem in Teluk Belitung Village, Meranti Islands Regency is caused by various human activities such as industrial activities, tree cutting, and coastal abrasion. Rehabilitation efforts need to be made to preserve the mangrove forest. The involvement of local communities has an important role in the success of mangrove rehabilitation. This study aims to determine the level of damage to the mangrove forest ecosystem based on the density and cover of the mangrove forest and to describe the level of community participation and understanding in the rehabilitation of the mangrove forest ecosystem. The results showed that the area had been damaged by mangroves with a total density value of 626.67 trees/ha and mangrove cover in all species <50%. At the level of community, participation is influenced by social status, planning, attitudes, and regulations together in Teluk Belitung Village.

One of the regencies in South Sulawesi Province where the condition of the mangrove ecosystem is apprehensive is North Luwu Regency. This district has a coastline

of 53 km^2. Data from the Department of Marine Affairs and Fisheries of North Luwu Regency in 2017 states that from the length of the coastline of North Luwu Regency, 24% of the mangrove ecosystem is in a damaged condition. The damage is spread over several points. One of the worst points was the coastline area of Tamuku Village, Tulang-tulang District, North Luwu Regency (North Luwu Marine and Fisheries Service, 2017).

The economic condition of the population is a condition that describes human life that has economic score (Shah et al, 2020). Economic growth is still an important goal in a country's economy, especially for developing countries like Indonesia (Magdalena and Suhatman, 2020).

The coastline area of Tamuku Village is known as Tanjung Gereng which is located in Tulang Bay. The coastline area is the mangrove ecosystem zone in Tamuku Village as shown in Figure 1. The area has a very vital function with the existence of its mangrove ecosystem for the survival of the people of Tamuku Village, especially those who live in coastal areas. Not only get economic benefits from these ecosystems, but mangroves also function as protection from various environmental impacts such as big waves or strong winds. Along with the development and increase in human needs, the condition of the mangrove ecosystem in Tamuku Village is increasingly concerning.

Figure 1. *Satellite Image of the Mangrove Zoning of Tamuku Village*

The exploitation of mangrove forests for various purposes such as building houses, building ships, clearing ponds, and so on is the main trigger for the damage. People are not aware of the importance of the existence and preservation of mangroves so that some of the problems experienced by many people are currently unresolved, such as abrasion of ponds, silting, winds that damage settlements, reduced marine products, and so on.

Figure 2. *Shows Mangrove Ecosystem Damage*

Data from 2000 – 2017 (Department of Marine Affairs and Fisheries, 2017) related to the mangrove ecosystem of the Tanjung Gereng coastline area located in Tulang Bay, Tamuku Village, Tulang-tulang District, shows a decrease in quality in several aspects such as the amount of vegetation, habitat conditions, and health mangrove vegetation. From the graph, it can be seen that from 2000 to 2002, there were 54 types of mangrove vegetation in the census. Then, in 2003, one vegetation was declared extinct, namely purtut or tenggel (Bruguiera gymnorrhiza), from 2004 to 2005 again one vegetation was declared extinct, namely, pandanus (Pandanus Odoratissima), in 2006 one vegetation was also declared extinct, namely Niri Batu (Xylocarpus moluccensis), From 2007 to 2009 one vegetation was also declared extinct, namely Baru-Baru (Osbornia Octodanta), from 2010 to 2011 as well as the Crocodile Eye Brush (Bruguiera Hainessii). So that from 2000 to 2011 there were five types of mangrove vegetation in Tamuku Village were declared extinct.

As a follow-up to the problems above, various efforts were then made to restore mangroves as production forests for the local population. The Regional Government of North Luwu Regency in collaboration with various NGOs, as well as residents has carried out various mangrove planting programs and activities from 2012 until now, such as the Thousand Batang Mangrove Program (PSBM, 2012 until now) and the Sustainable Mangrove Forest Restoration Program (PRHMB, 2016 until now). Unfortunately, however, most of these reforestation efforts have not been fully successful. This is because of the five vegetation declared extinct, only three have been successfully replanted and reproduced, namely Baru-Baru (Osbornia Octodanta), Crocodile Eye Brush (Bruguiera Hainessii), and purtut or tenggel (Bruguiera gymnorrhiza).

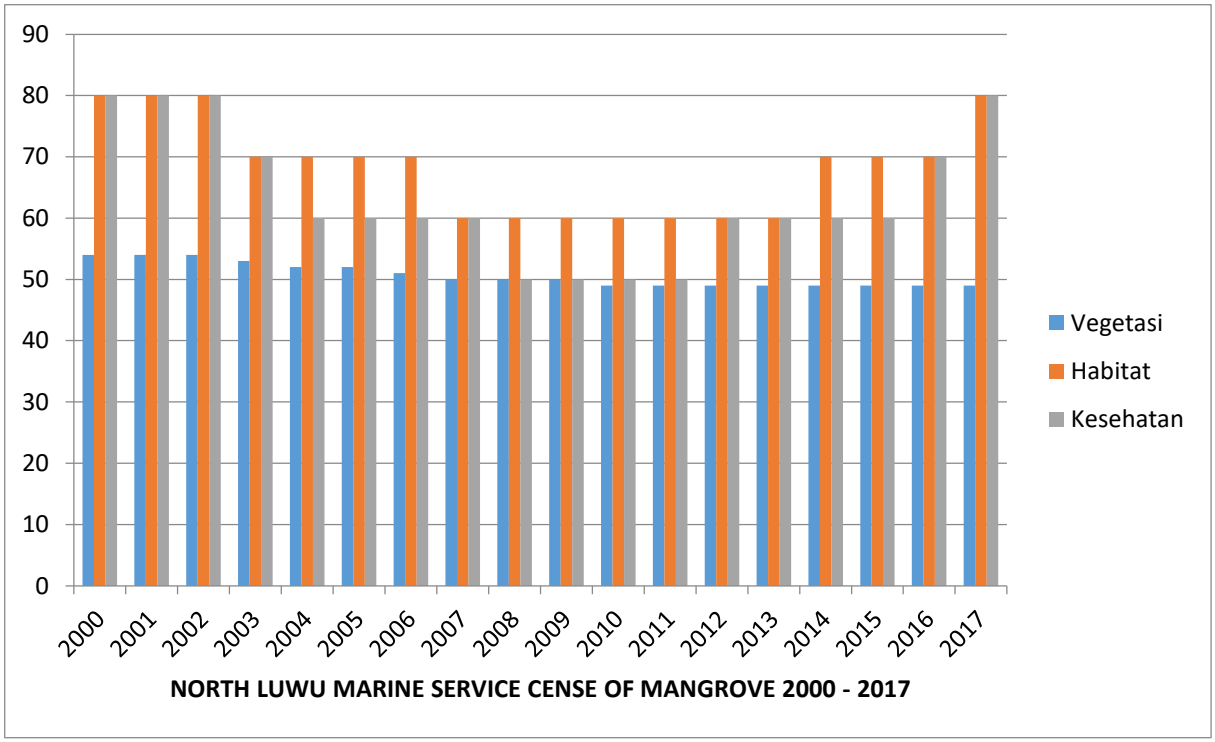

Figure 3. *Mangrove Census (2000 – 2017)*

Based on the description above, researchers are interested in conducting in-depth research on community behavior patterns and their relation to the vegetation profile of the mangrove ecosystem in Tanjung Gereng, Tulang Bay, Tamuku Village, Tulang-tulang District, North Luwu Regency. Therefore, the title was formulated as follows "Profile of Vegetation of the Mangrove Ecosystem in Tamuku Village, Tulang-tulang District, North Luwu Regency".

II. Research Method

2.1 Type of Research

This research is qualitative, namely research with an investigative pattern where data and statements are obtained from the results of direct interactions between the researcher, the object being studied, and the people or respondents who are in the research place (Creswell, 2015). The qualitative research method used is a survey method, namely a research method that requires researchers to make observations or direct observations of the object under study (Sugiyono, 2010). In this case, the researcher will conduct a survey or direct observation of the object under study, namely the behavior patterns of the community and the mangrove ecosystem on the coast of Tanjung Gereng, Tulang Bay, Tamuku Village, North Luwu Regency regarding the physical and non-physical conditions of the mangrove ecosystem.

2.2 Location and Time of Research

The location determined as the place of data collection in this study was in Tamuku Village, Tulang-tulang District, Luwu Regency, which focused on the community and mangrove ecosystems around the coastal coastline of Tanjung Gereng, Tulang Bay. The time of this research is designed to start from April to July 2021. The timing of the research refers to the consideration of the completeness and quality of the data to be collected.

2.3 Research Focus

The focus of this research is a survey of community behavior patterns and mangrove ecosystem vegetation on the coast of Tanjung Gereng, Tulang Bay, Tamuku Village, North Luwu Regency. The survey was conducted to determine community behavior patterns and how these behavioral patterns relate to vegetation conditions found in the mangrove ecosystem in Tamuku Village and their distribution. The data is used as a reference for the vegetation profile.

2.4 Data and Data Sources

a. Data

The data in this study are divided into two, namely primary data and secondary data; 1) Primary data is the main data (core) sourced from the results of observations of community behavior patterns and observational data on mangrove ecosystem vegetation covering the variety of vegetation and its distribution; 2) Secondary data is additional data or data supporting primary data. Usually, this data comes from the documentation. The documentation is either collected by researchers or documentation that has been provided by the relevant institution or agency.

b. Data Source

Based on the type of data, the data sources are also divided into two, namely primary data sources and secondary data sources. Primary data sources are the main data sources obtained directly by researchers from the object under study, namely the mangrove ecosystem vegetation in Tamuku Village. Meanwhile, secondary data sources or supporting data sources are obtained from documentation studies.

c. Data Collection Techniques

Data collection techniques in this study used observation, interviews, and quadrant line transect surveys. Observation and interview techniques were used to obtain data on community behavior patterns. The quadrant line transect technique is used to determine the diversity, density, and other important objects related to the condition of mangrove forests at a certain place and time. This method was adopted by Knight and Tighe (2003). Identification of tree species found in the mangrove forest was carried out using the Guide to Introduction to Indonesian Mangroves (Noor, 1999). Mangrove vegetation profile data collection was carried out at a specified point based on the representation of the condition of the mangrove forest ecosystem as shown in Figure 4. The method taken by researchers to obtain accurate data through this survey technique was that researchers directly traced the growth line of mangrove vegetation along with the river flow which was designated as a data collection point. So, the researchers went directly to the survey location and observed one by one the variety of existing vegetation and then identified the variety, saw its density, and analyzed its health condition. From the data obtained, the researchers analyzed to determine the dominant vegetation variety at each station. Furthermore, in addition to following the river flow line, the researchers also transected as far as 10 meters to obtain an overview of the vegetation of the mangrove ecosystem in Tamuku Village.

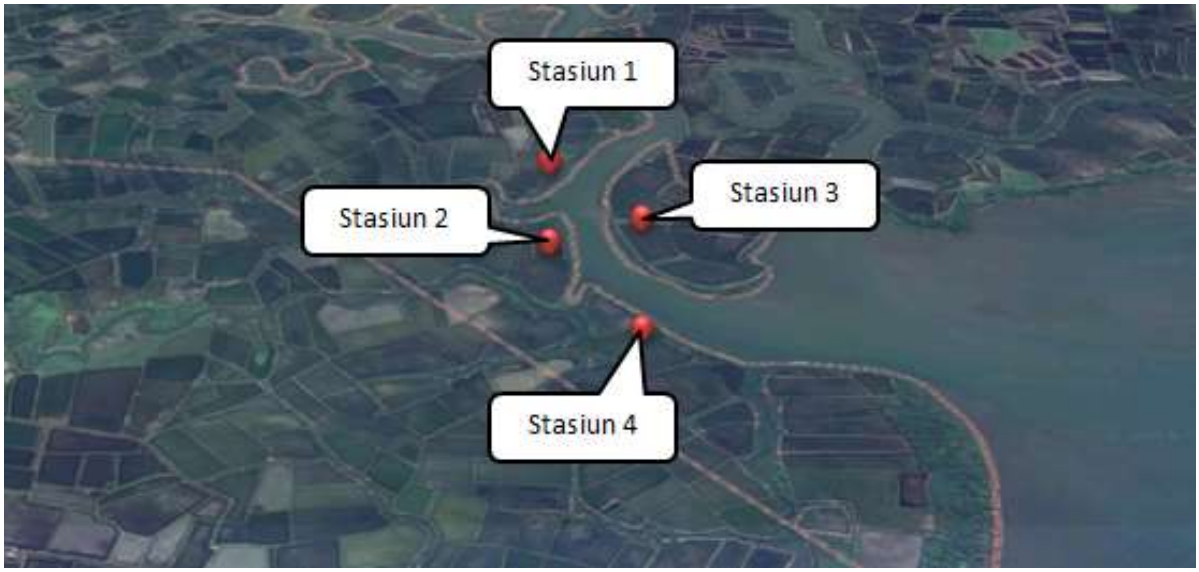

Figure 4. *Data Collection Points*

Based on Figure 3.1, the sampling area as far as 1.6 km is divided into four points or stations, namely Station 1 which is in the Tana Takko Mate area, Station 2 which is in the Nene' Biung area. Station 3 is in the Salo' Ba' area, and Station 4 is in the Tanjung Gereng area. Each point is divided into a radius of 200 meters on the right and left of the flow. The surveyed mangrove ecosystem transect is 10 meters away.

2.5 Data Analysis Techniques

The data analysis technique in this study uses a fixed comparison technique proposed by Ian Dey (1993) (Moleong, 2010) that in qualitative research, the analytical steps taken include three stages, namely describing the phenomenon, classifying it, and seeing how the concepts are used appear to be related to one another. The first step is to describe the phenomenon comprehensively and thoroughly from the research results. At this stage, the researcher enters information about the context of a symptom, its intensity and meaning, and its development. The second step is classification. Without data classification, there is no way of knowing what we are analyzing. In addition, we cannot make meaningful comparisons between each piece of data. So, data classification is an integral part of the analysis. In data analysis, we must be able to sort out the data and reassemble it. This problem would not arise if the description and classification did not end in that analysis. However, it must be remembered that in analysis, the researcher aims to produce something (conclusion) from the analyzed data. The third step is to link the concepts resulting from the classification to produce conclusions. At this stage, the data obtained are used as the main reference to conclude the purpose of this study. This third stage is the stage of proving or answering the research problem.

III. Results and Discussion

3.1 Results

a. Behavioral Patterns of the Coastal Community of Tamuku Village

Utilization patterns that tend not to pay attention to sustainability aspects have resulted in mangroves as one of the coastal resources experiencing a fairly high level of degradation. The results of this study indicate that the waters of Tamuku Village are experiencing ecosystem degradation, both coral reefs, seagrass beds, and mangrove forests. Thus, mangrove management efforts should be considered in the development of coastal areas.

In general, the attitudes and behavior of the community towards the mangrove ecosystem in the coastal area of Tamuku Village can be known through community activities that have an impact on the mangrove ecosystem. The results of this study indicate that the condition of the mangrove forest in the coastal area of Tamuku Village is under serious pressure due to human activities, such as the disposal of household waste, forest logging, and also due to the use of mangrove forests as traffic for people living around mangrove forests. In Tamuku Village in 2000-2017, most of the mangrove points have been cleared and made into pond areas, houses, and buildings intended for livestock and swallow business. Nevertheless, there are still community groups who are members of the Youth Lovers Community (KPPL) which are entirely led by youths who still have serious attention to the preservation of the village environment, especially mangrove or mangrove forest ecosystems or vegetation. Several activities have been carried out by KPPL as evidence of their concern for the preservation of the mangrove ecosystem in Tamuku Village, such as replanting, counseling, and installing warning information boards aimed at educating the public. This can illustrate that the attitudes and behavior of the community in mangrove management, some are not supportive, but some are supportive.

b. The Diversity of the Mangrove Vegetation of Tamuku Village

Mangrove vegetation in Tamuku Village is located in the coastal area of Tanjung Gereng, Tulang Bay, Tulang-tulang District, North Luwu Regency, South Sulawesi. Based on the survey results, it was found that some mangrove vegetation was still growing in the area. There are two types of mangrove vegetation, namely true mangrove vegetation and associated mangroves. The mangrove vegetation is presented in the following table;

Table 1. True Mangrove Vegetation of Tamuku Village

Station	**Vegetation Finding**
Station 1	Krakas, Sea Spikes (*Acrostichum Aureum*)
	Piai Lasa (*Acrostichum Speciosum Willd.*)
	Nipah (*Nypa fruticans*)
	Berus-Berus (*Kandelia candel*)
	White bars (*Acanthus Ebracteatus*)
	Tertuntun, Elephant Tooth (*Aegiceras corniculatum*)
Total	6 kinds of vegetation
Station 2	White bars (*Acanthus Ebracteatus*)
	White Flames (*Avicennia alba Bl.*)
	Broad Leaf Flames (*Avicennia officinalis*)
	Tengal (*Ceriops decandra*)
	Nipah (*Nypa fruticans*)
	Tertuntun, Elephant Tooth (*Aegiceras corniculatum*)
Total	6 kinds of vegetation
Station 3	White bars (*Acanthus Ebracteatus*)
	Mange-Poor (*Aegiceras floridum*)
	Flames, Vain (*Avicennia lanata*)
	Broad Leaf Flames (*Avicennia officinalis*)
	Burus, Tanjang *Bruguiera cylindrical*
	Nipah (*Nypa fruticans*)
Total	6 kinds of vegetation
Station 4	White Flames (*Avicennia alba Bl.*)
	Flames, Vain (*Avicennia lanata*)
	Brother's fire (*Avicennia marina*)
	Burus, Tanjang *Bruguiera cylindrical*
	Bakao (*Rhizophora mucronata*)
	Pedada (*Sonneratia alba*)
	Niri/Buli (*Xylocarpus granatum*)
Total	7 kinds of vegetation

Source: primary data after processing, 2021

Based on table 1 above, it can be explained that the findings of mangrove vegetation at the first station (Tana Takko Mate') consisted of 6 varieties, namely Krakas, Paku Laut (Acrostichum Aureum), Piai Lasa (Acrostichum Speciosum Willd.), Nipah (Nypa fruticans), Brushes (Kandelia candel), White Bars (Acanthus Ebracteatus), Teruntun, Elephant Tooth (Aegiceras corniculatum). At the second station (Nene' Biung), 6 types of mangrove vegetation were found, namely White Bars (Acanthus Ebracteatus), White Fires (Avicennia alba Bl.), Broad Leaf Fires (Avicennia officinalis), Tengal (Ceriops decandra), Nipah (Nypa fruticans), Teruntun, Elephant Tooth (Aegiceras corniculatum). At the third station (Salo'Bak), 6 types of mangrove vegetation were found, namely White Bars (Acanthus Ebracteatus), Mange-Kasihan (Aegiceras floridum), Api-Api, Sia-Sia (Avicennia lanata), Api-api Broadleaf (Avicennia officinalis). , Burus, Tanjang Bruguiera cylindrical, Nipah (Nypa fruticans). At the fourth station (Tanjung Gereng), seven types of vegetation were found, namely Api-api Putih (Avicennia alba Bl), Api-api, Sia-Sia (Avicennia lanata), Api-api Abang (Avicennia marina), Burus, Tanjang Bruguiera cylindrical, Bakao (Rhizophora mucronata), Pedada (Sonneratia alba).

Furthermore, in addition to the true mangrove vegetation above, the researchers also found several types of associated mangrove vegetation as shown in the following table.

Table 2. Mangrove Vegetation Follows Tamuku Village

Station	**Vegetation Finding**
Station 1	Camplung (*Calophyllum inophyllum*)
Total	variety of vegetation
Station 2	Camplung (*Calophyllum inophyllum*)
	Tulang Wood (*Clerodendrum inerme*)
Total	2 1 variety of vegetation
Station 3	Bintan (*Cerbera manghas*)
	Tulang Wood (*Clerodendrum inerme*)
	Bracelets/Chronicles (*Sesuvium portulacastrum*)
Total	3 kinds of vegetation
Station 4	Sea Waru (*Thespesia populnea*)
	Beach Batata (*Ipomoea pes-caprae*)
	Pandanus (*Pandanus tectorius*)
Total	3 kinds of vegetation

Source: survey result data

Based on table 2 above, it can be explained that a variety of accompanying vegetation was found in the mangrove ecosystem in Tamuku Village, namely as follows; At the first station, one type of associated vegetation was found, namely Camplung (Calophyllum inophyllum). At the second station, two types of associated vegetation were found, namely Camplung (Calophyllum inophyllum) and Kayu Tulang (Clerodendrum inerme). At the third station, three types of vegetation were found, namely Bintan (Cerbera manghas), Kayu Tulang (Clerodendrum inerme), Bracelet/Seruni Air (Sesuvium portulacastrum). At the fourth station, three types of vegetation were found, namely, Batata Beach (Ipomoea pes-caprae), Pandan (Pandanus tectorius), Waru Laut (Thespesia populnea).

c. Condition of the Mangrove Vegetation Habitat of Tamuku Village

The survey results show that the condition of the mangrove ecosystem habitat in Tamuku Village is in poor condition. The original habitat of the mangrove ecosystem is no longer natural due to human activities or the community itself. Several cases that marked the destruction of the mangrove ecosystem habitat in Tamuku Village are described as follows;

In 2017, a project to normalize river flow to the downstream coast in Tamuku Village was carried out to widen the flow and increase depth for the sake of the entry of large ships into the port. This effort does not seem to take into account the survival of the mangrove ecosystem because the normalization project further exacerbates the damage to the mangrove ecosystem's habitat itself. Not a few found mangrove vegetation that must be killed by excavating, burning, cutting, and so on. Examples of vegetation that are highly damaged through this project are the White Barn (Acanthus Ebracteatus), Nipah (Nypa fruticans). To prove the damage to the ecosystem and vegetation can be seen in the following pictures;

Figure 5. *Damage to mangrove habitat due to flow normalization (Station 1 & 2)*

In addition to the normalization project, the damage to mangrove habitat in Tamuku Village was also exacerbated by efforts to clear land for ponds (ponds) by the community. Data from the Department of Maritime Affairs and Fisheries (2017) North Luwu Regency states that there are about 5-20 Ha of new land each year that are cleared for pond purposes. The new land clearing also has an impact on the destruction and reduction of mangrove habitat in Tamuku Village. Through the clearing of this pond, hundreds or even thousands of mangrove trunks have to die. Not only that, the area of land for the mangrove ecosystem itself is drastically reduced every year, namely 5-20 Ha. If this continues to happen, then it is not impossible that in the next few years, the mangrove ecosystem will no longer be found in Tamuku Village due to the absence of living habitats left due to human greed.

Figure 6. *Clearing of ponds overgrown with mangrove vegetation (Station 3)*

Furthermore, damage to mangrove vegetation due to human behavior is environmental pollution with chemical pollution that produces pesticides, and other toxic substances that cause damage to mangrove habitats, waste from river flows that enter the mangrove environment, and waste pollution in mangrove forest areas. Chemical pollution that causes damage to mangrove habitats and ecosystems is something that cannot be avoided. Because it has become a habit for people to use chemical substances in various pond farming activities or activities outside the pond. Water that is polluted by chemicals used in pond farming or outside the pond is what continuously exacerbates the damage to the mangrove ecosystem. In addition, people's habits of littering such as plastic waste, bottles, cloth, and so on are also one of the causes of damage to mangrove habitats and ecosystems.

It has been explained previously that the flow normalization project aims to make it easier for large ships to enter the port of Tamuku Village. The entry of the large ship also harmed the habitat and mangrove ecosystem in Tamuku Village. This is because these

large ships contribute to the pollution of the mangrove ecosystem by producing waste such as used oil and diesel fuel.

Another cause of damage to the mangrove habitat and ecosystem in Tamuku Village is the attitude and behavior of the community who utilizes some mangrove vegetation to fulfill their daily needs, such as making houses, firewood, household equipment (chairs and tables), and equipment for boats or fishing boats. Utilization like this can be considered normal if it is accompanied by a culture of reforestation or conservation from the community itself. However, the findings show that the community is only consumptive and even tends to exploit the mangrove ecosystem to meet the needs of life, accompanied by awareness to replant, replant, or other efforts so that the mangrove ecosystem can continue to develop.

Based on the survey results, the data collection stations that assessed the mangrove vegetation habitat as experiencing severe damage were station 1, station 2, and station 3. Because, at these stations, the mangroves found tend to live in scattered, rare, and poor living conditions unwell. This can be seen from the level of fertility and greenery of the mangroves. Meanwhile, at station four, the mangroves found tend to be fertile, the growth is dense, grouped evenly.

Figure 7. *The condition of the vegetation of the mangrove ecosystem at station 4*

3.2 Discussion

Knowledge of coastal communities about mangrove ecosystems is some facts, information, principles related to mangrove ecosystems that they have obtained through a process of learning and experience. This knowledge affects changing attitudes about the conservation of mangrove ecosystems. Furthermore, attitudes about the preservation of mangrove ecosystems affect behavior in preserving mangrove ecosystems, so that people's attitudes and behavior as one of the social variables of the community need to be known in community-based management in Tulang-tulang District, Tamuku Village.

The problem of sustainable mangrove management is how to combine ecological interests with the socio-economic interests of the community around mangroves. The social, economic, and cultural conditions of the people of Tamuku Village around the mangrove ecosystem area have not fully supported the sustainable management of the mangrove ecosystem, mainly due to the lack of education, knowledge, and awareness in the preservation of the mangrove ecosystem. This factor affects the changes in people's attitudes and behavior in conserving the mangrove ecosystem. Management of the mangrove forest ecosystem in Tamuku Village shows that most of the respondents stated

that mangroves do not have important benefits so that community participation in conservation tends to decrease.

The problem of behavioral patterns of coastal communities in Tamuku Village is related to the decline in the environmental quality index and mangrove vegetation in Tamuku Village. Based on the data that has been displayed in the research results section, it can be explained that the number of mangrove vegetation identified in Tamuku Village is divided into two, namely 16 types of true mangrove vegetation and seven types of associated mangroves spread over four stations.

The growth pattern of mangrove vegetation in Tamuku Village is scattered. From four data collection stations, at the first station, six types of true mangrove vegetation were found and one variety of associated mangrove vegetation was found, at station two six types of true mangrove vegetation and two types of associated mangrove vegetation were found, at station three-six types of true mangroves and three associated mangroves were found and at station four found seven varieties of true mangrove vegetation and three types of associated mangroves. If seen from these findings, it can be explained that the stations that found the most mangrove vegetation in sequence were station four, station three, station two, and station one. However, based on the level of fertility and the level of growth density, respectively, namely station four, station three, station two, and station one.

Referring to the results of this study, it can be explained that the condition of the mangrove ecosystem vegetation in Tamuku Village is increasingly concerning. Efforts made by the government or the non-governmental organizations of a handful of people have not been able to stem the damage that has occurred. This is because awareness of the importance of mangroves has not been fully understood and understood by the community. Meanwhile, the necessities of life continue to grow and develop, so it is not surprising that damage after damage to the mangrove ecosystem continues.

Based on the results of this study, the researchers gave some suggestions as follows; For the community, they should realize the importance of the environment or mangrove ecosystem in Tamuku Village and then change their mindset and behavior to utilize or exploit mangroves that were previously consumptive to a more explorative mindset and behavior, prioritize sustainability through replanting for the realization of a progressive society and environment. . For the relevant government, efforts to conserve mangroves must be carried out more intensively with various efforts. Most importantly, every effort made to conserve mangroves must be accompanied by planning, implementation, and strict and simultaneous monitoring. So that the preservation of mangrove vegetation can be guaranteed for the better survival of the community.

IV. Conclusion

The Tanjung Gereng Coastal Area, located in Tamuku Village, Tulang-tulang District, North Luwu Regency, has natural potential in the form of attractive mangrove vegetation that thrives along the coastline. However, the bad behavior of the surrounding community has damaged the environmental conditions of the Tanjung Gereng Coast, including the mangrove vegetation. This is motivated by economic factors and social factors in the form of a low level of public education and efforts to increase income. This threatens the sustainability of the ecosystem and the lives of people living in the Tanjung Gereng Coastal area, which is located in Tamuku Village, Tulang-tulang District, North Luwu Regency in terms of economic, social, and environmental aspects. In addition, the destruction of the ecosystem also has an impact on increasing abrasion around the coast so

that it is disturbing community activities engaged in aquaculture, fishing, and tourism. This shows that human behavior affects environmental conditions. Coastal community activities without firm standards have the potential to cause large environmental damage. The poor pattern of community behavior is related to the destruction of mangrove ecosystems and vegetation in the Tanjung Gereng Coastal Area, which is located in Tamuku Village, Tulang-tulang District, North Luwu Regency. The data obtained show that the profile of mangrove vegetation in Tamuku Village is not as good and as much as in the past few years.

Based on the data and analysis results, the profile of the diversity of mangrove ecosystem vegetation in Tamuku Village, Tulang-tulang District, Tulang-tulang Regency, found 16 types of true mangrove vegetation and seven types of associated mangrove vegetation on the Tanjung Gereng Coast, Tamuku Village, Tulang-tulang District. The sixteen varieties of true mangrove vegetation are Krakas or Sea Nails (Acrostichum Aureum), Piai Lasa (Acrostichum Speciosum Willd.), Nipah (Nypa fruticans), Berus-Berus (Kandelia candel), White Bars (Acanthus Ebracteatus), Teruntun, Gigi Elephant (Aegiceras corniculatum), White Fire (Avicennia alba Bl.), Broadleaf Fire (Avicennia officinalis), Tengal (Ceriops decandra), Poor Mange (Aegiceras floridum), Fire or Sia-Sia (Avicennia) lanata), Burus, Tanjang Bruguiera cylindrical), Api-api Abang (Avicennia marina), Burus, Tanjang Bruguiera cylindrical), Bakao (Rhizophora mucronata), Pedada (Sonneratia alba). Meanwhile, 7 types of associated vegetation were found, namely Camplung (Calophyllum inophyllum), Kayu Tulang (Clerodendrum inerme), Bintan (Cerbera manghas), Bracelet/Seruni Water (Sesuvium portulacastrum), Beach Batata (Ipomoea pes-caprae), Pandan (Pandanus tectorius), Waru Laut (Thespesia populnea).

References

Bengen, DG. 2002. *Sinopsis: Ekosistem dan Sumber Daya Alam Pesisir dan Laut serta Prinsip Pengelolaannya*. Pusat Kajian Sumber Daya Pesisir dan Lautan. Bogor: Institut Pertanian Bogor.

Creswell, John. 2015. *Riset Pendidikan: Perencanaan, Pelaksanaan, dan Evaluasi Riset Kualitatif dan Kuantitatif*. Yogyakarta: Pustaka Pelajar.

Dahuri, Rochmin. 2003. *Model pembangunan Sumber Daya Perikanan Secara Berkelanjutan*. *Makalah Simposium Perikanan Indonesia 1*. [Daring] diakses pada 20 Juni 2018 di *www.bppp-tegal.com/.../533-indonesia-menuju-pembangunan-perikanan-berkelanjutan.com*

Dinas Kelautan dan Perikanan. 2017. *Luwu Utara dalam Angka 2017*. Buku Digital. Portal Dinas Kelautan dan Perikanan Kabupaten Luwu Utara (kkplutra.go.id).

Ernawati, SK., Andi Niartiningsih, M. Natsir Nessa, Sharipuddin Bin Andi Omar. 2016. Suksesi Makrozoobentos di Hutan *Mangrove* Alami dan Rehabilitasi di Kabupaten Sinjai Sulawesi Selatan. *Jurnal Bionature.* Volume 14, Nomor 1, 49-60.

Ghufran, M. 2012. *Ekosistem Mangrove: Potensi, Fungsi, dan Pengelolaan*. Jakarta: Rineka Cipta.

Parmadi JC, Eggy Havid., Irma Dewiyanti, dan Sofyatuddin Karina. 2016. Indeks Nilai Penting Vegetasi *Mangrove* di Kawasan Kuala Idi, Kabupaten Aceh Timur. *Jurnal Ilmiah Kelautan dan Perikanan.* Volume 1, Nomor 01, 82-95

Kementerian Kelautan dan Perikanan. 2017. *Kondisi Hutan Mangrove di Indonesia*. Portal Kementerian Kelautan dan Perikanan (KKP) (kkp.go.id).

Magdalena, S., Suhatman, R. (2020). The Effect of Government Expenditures, Domestic Invesment, Foreign Invesment to the Economic Growth of Primary Sector in Central

Kalimantan. *Budapest International Research and Critics Institute-Journal (BIRCI-Journal)*. Volume 3, No 3, Page: 1692-1703.
Moleong, Lexy J. 2010. *Metodologi Penelitian Kualitatif* (Edisi Revisi). Bandung: Remaja Rosdakarya.
Noor, Yus Rusila, Khazali M., Suryadiputra I N.N. 2006. *Panduan Pengenalan Mangrove di Indonesia.* Bogor: Ditjen PHKA
Nugroho, Iwan & Rochmin Dahuri. 2004. *Pembangunan Wilayah, Persfektif Ekonomi, Sosial dan Lingkungan.* Jakarta: Pustaka LP3ES.
Perdana. 2008. Rehabilitasi Mangrove di Kabupaten Belitung. *Jurnal Manusia dan Lingkungan*. Volume 23, Nomor 3, Halaman 334-340.
Sabar, Mesrawaty. 2016. Biodiversitas dan Adaptasi Makrozoobentos di Perairan Mangrove. *Jurnal Bioedukasi.* Volume 4, Nomor 2, Halaman 529-539
Sawitri. 2012. Analisis Kelemahan dalam Analisis SWOT Pengelolaan Mangrove di Muara Sungai Mogowonto. *Jurnal Elektornik Kelautan dan Perikanan.* Volume 6, Nomor 2, Halaman 45-62.
Senoaji, Gunggung & Muhammad Fajrin Hidayat. 2016. Peranan Ekosistem Mangrove di Pesisir Kota Bengkulu dalam Mitigasi Pemanasan Global melalui Penyimpanan Karbon. *Jurnal Manusia dan Lingkungan*. Volume 23, Nomor 3, Halaman 327-333.
Shah, M. M., et al. (2020). The Development Impact of PT. Medco E & P Malaka on Economic Aspects in East Aceh Regency. *Budapest International Research and Critics Institute-Journal (BIRCI-Journal)*. Volume 3, No 1, Page: 276-286
Sugiyono. 2010). *Metode Penelitian Pendidikan: Pendekatan Kuantitatif, Kualitatif dan R&D.* Bandung: Alfabeta.
Sulityo. 2010. *Mangrove dan Kesejahteraan Masyarakat* (Edisi II). Jakarta: Rineka Cipta
Sulistyo, Basuki. 2006. *Tinjauan Persfektif Hutan Mangrove* (Edisi II). Jakarta: Rineka Cipta
Tiarani, Ifati Rhoni. 2012. Kemanfaatan Ekonomi dan Ekologi dari Program Rehabilitasi Bakau di Kawasan Pesisir Pantai di Desa Bedano, Kecamatan Sayung, Kabupaten Demak. *Skripsi*. [Daring] diakses pada 12 Juni 2018 di www.digilib.uns.ac.id.
Utomo, Suyud Warno. 2012. Ekologi (Modul Perkuliahan). [Daring] diakses pada 12 Juni 2016 melalui laman http://www.pustaka.ut.ac.id.
Umayah, Sari, Haris Gunawan, Mayta Novaliza Isda. 2016. Tingkat Kerusakan Ekosistem Mangrove di Desa Teluk Belitung Kecamatan Merbau, Kabupaten Kepulauan Meranti. *Jurnal Riau Biologia.* Volume 1, Nomor 04, 24-30.