Social Economic Influence of Community on Mangrove Ecosystem in Paguyaman Beach District

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ABSTRACT

This study aims to determine the socio-economic influence of the community on the mangrove ecosystem. The method used in this research is the field survey method and direct interviews with the community. Analysis of the data usedto calculate the significant value index (INP) of mangroves andthe matrix calculates the socio-economic influence of the community on mangroves.The results of the study obtained that the types of mangroves in the Paguyaman Pantai sub-district are:*Rhizopora mucronata, Rhizopora apiculata, Rhizopora stylosa, Sonneratia alba, Ceriops decandra, Ceriops Tagal,*and Avicennia Lanata. With the highest IVI, Rhizopora mucronata for the seedling and tree category and Ceriops Tagal for the sapling category.the total value of all indicators of the socio-economic influence of the community in Paguyaman Pantai District is 125 which indicates that socio-economic factors have less effect on the damage to mangrove areas.

Keywords: mangrove, socio-economic, ecosystem

INTRODUCTION

Mangroves are the most important link in maintaining the balance of the biological cycle in a waters, because mangroves have various functions, namely as a spawning ground, nursery ground, and feeding ground for various types of aquatic animals that have important economic value. which is very complex for human life today and in the future (Kordi, 2012).Given the importance of the function of the mangrove ecosystem, it is necessary to have management to maintain the balance of the coastal ecosystem.

The mangrove ecosystem is one of the coastal resources that are widely used by the community. To fulfill their life, many people depend on their lifeusing the mangrove ecosystem. However, at this time the potential of the mangrove ecosystem is decreasing, this is due to the conversion of mangrove forests into ponds, settlements, industries and excessive logging by the community for various purposes.

Gorontalo Province has the potential of mangrove resources with a total area of about ± 12.74 Ha (North Gorontalo Forestry Service, 2005 in Usman, 2013). One of the coastal areas of Gorontalo that has potential for mangrove resources is Boalemo Regency. BP-DAS Bone Bolango (2007) in Sahami (2008) reported that the original mangrove habitat area of Boalemo Regency is 2762.60 Ha, while based on BPS data in 2016 according to Regency/City of Gorontalo Province, Boalemo Regency has an area of ±1706.02 Ha.

According to Davinsy et al (2015), that Paguyaman Pantai sub-district is one of the sub-districts in Gorontalo Province which has good potential for mangrove ecosystems, but this does not rule out the possibility of mangrove damage in Paguyaman Pantai sub-district, seeing the activities and work of the community, which are mostly fisherman. For this reason, it is important to look at the potential of mangrove

species and the socio-economic influence of the community on the mangrove ecosystem in Paguyaman Pantai District

RESEARCH METHODS

This research was conducted in August-November 2022 in Paguyaman Pantai District, Boalemo Regency. This research uses survey and interview methods.

The procedure for observing mangrove biophysics consisted of observing mangrove species, number of stands and environmental parameters. This observation uses the line transect method by setting a quadrant at each observation station, by setting a line transect from the sea to the land (perpendicular to the shoreline) and community social data collected through observation data, interviews/questionnaires, discussions and searches of various libraries/documents. Sampling was carried out by purposive sampling, namely villages located in mangrove areas, while socio-economic data were collected through interview techniques (Hartoko et al., 2014). Data analysis usedTo calculate the value of the mangrove important index used the formula:

$$INP = KR + DR + FR$$

Information :
  INP : important value index
  KR : relative density
  DR: relative dominance
  FR : relative frequency

INP is useful for determining how big the role or influence of a species on the environment. The more the number of individuals found, the higher the frequency of finding, and the larger the diameter of the stem, the higher the INP value. If fewer species are found, the greater the INP value of a species (Antu, 2020).

Socio-economic analysis using a score of 1-3 on the variables, for each variable is given a weight with a total weight of 100. Then a range of scores will be obtained with a weight between 100-300. The determination of the amount of weight for each variable is based on the probability of the variable, where the variable gives direct contribution to the damage to mangrove forests, to calculate the damage to mangroves caused by socio-economic factors of the community. The matrix for calculating the socio-economic community can be seen in Table 1 below.

Table 1. The matrix calculates the socio-economic influence of the community on mangroves

No	Variable	Weight	Score
1	Main livelihood	40	1. Fisherman 2. Farmer 3. fisherman
2	Location of business	30	1. <1 km away from Mangrove land 2. Distance 0.5 – 1 from mangrove land 3. Located >1 km from mangrove land
3	Mangrove land use	20	1. Forest 2. Intercropping plantations/ponds

			3. Settlements, and non-intercropping ponds
4	Community perception of mangrove	10	1. For environmental conditions 2. To maintain the survival of aquatic animals 3. To use the wood

(Source: Directorate General of Land Rehabilitation and Social Forestry and Ministry of Forestry and Plantations of the Republic of Indonesia, 2000).

1. Score 100–160: Socio-economic factors have less effect on the damage to mangrove areas
2. Score 161–200: Socio-economic factors affect the damage to mangrove areas
3. Value 201–300: Socio-economic factors are very influential on the damage to mangrove areas

RESULTS AND DISCUSSION

Types of Mangroves

Based on the results of research conducted in Paguyaman Pantai District, Boalemo Regency, found 7 (seven) mangrove species, namely Rhizopora mucronata, Rhizopora apiculata, Rhizopora stylosa, Sonneratia alba, Ceriops decandra, Ceriops Tagal, and Avicennia Lanata. The types of mangroves found at each station can be seen in Table 2.

Table 2. Types of Mangroves in Paguyaman Beach

No	Type	Category		
		Seedling	Stake	Tree
1	*Rhizopora mucronata*	+	+	+
2	*Rhizopora apiculata*	+	+	+
3	*Rhizopora stylose*	-	+	+
4	*Sonneratia alba*	-	+	+
5	*Ceriops decandra*	+	+	+
6	*Tagal Ceriops*	+	+	+
7	*Avicennia Lanata*	+	+	+
	Number of types	5	7	7

(Source: Data processing of research results, 2022).

The types of mangroves found for the seedling category are:*Rhizopora mucronata, Rhizopora apiculata, Ceriops decandra, Ceriops tagal,*and Avicennia Lanata, while the tree species found were Rhizopora mucronata, Rhizopora apiculata, Rhizopora stylosa, Sonneratia alba, Ceriops decandra, Ceriops Tagal, and Avicennia Lanata. Looking at the characteristics of different substrates from sandy, muddy, and muddy sand, this showsThis shows that this type of mangrove is able to grow on sandy to muddy substrates. As stated by Utina and Ibrahim (2012) that the mangrove growth rate is influenced by the substrate.

Mangrove Significance Index

The Important Value Index is an index that provides an overview of the importance of the role of mangrove vegetation in the research location. INP is used in interpreting the composition of a plant community (Fachrul, 2007 in Usman, 2013). The results of the analysis of the important value index of mangroves at the research site can be seen in Table 3 below.

Table 3. Mangrove Significance Value Index in Paguyama Beach District

No	Type	INP		
		Seedling	**Stake**	**Tree**
1	*Rhizopora mucronata*	70.52	11.40	63.72
2	*Rhizopora apiculata*	37.93	18.91	25.43
3	*Rhizopora stylose*	0	7.40	36.01
4	*Sonneratia alba*	0	18.80	55.56
5	*Ceriops decandra*	21.90	42.93	21.78
6	*Tagal Ceriops*	51.90	80.31	51.65
7	*Avicennia Lanata*	17.76	20.25	45.85
	Total	**200**	**200**	**300**

*Rhizopora mucronata*is one of the mangrove species found in Paguyaman Pantai District and has the highest INP for the seedling category and the tree category. The results of this INP I illustrate that the mangrove species Rhizopora Mucronata has a greater role in the environment than other mangroves. According to Noor et al, (1999) that the ecology of mangrove saplings, Rhizophora mucronata, is able to grow on sandy substrates and is protected from waves and inundated by water at high tide. This is in accordance with the environmental characteristics of the mangrove species found in the research location. Meanwhile, for the sapling category, the highest INP is Ceriops tagal.According to Kordi (2012), Ceriops tagal likes clay substrates, as well as according toWinarno (2016), thatCeriops tagal grows in areas that are inundated by high tides with soils having a good drying system, and grows on clay substrates, this is very suitable for the conditions where the species is found.*Ceriops tagal.*

Socio-Economic Society Against Mangrove Ecosystem

Mangroves are one of the ecosystems that have an important role for humans and the environment. Judging from the very high benefits, the existence of the mangrove ecosystem greatly affects the socio-economic conditions of coastal communities. The use of mangrove ecosystems by the community includes settlements, ponds, timber extraction, and fishing. The socio-economic influence of the community on the mangrove ecosystem in the Paguyaman Pantai sub-district can be seen in Table 4 below.

Table 4. Socio-Economic Influence of Community on Mangrove Ecosystem

No	Indicator	Weight	Average score	Score
1	Main livelihood	40	1	40
2	Location of business	30	1.5	45
3	Mangrove land use	20	1	20
4	Community perception of mangrove	10	2	20
	Total			**125**

According to Kordi 2012, said that the damage to the mangrove ecosystem was caused by many factors, both standing alone, overlapping and supporting each other. Several factors causing mangrove damage related to the damage caused by human activities are community poverty, population density, capital expansion, excessive consumption, weak law enforcement and low community knowledge and understanding.

According to Asbi and Rouf (2019), indicators that measure the socio-economic influence of the community on the existence of the mangrove ecosystem are livelihoods, business locations, mangrove land

use, and community perceptions of the mangrove ecosystem. Based on the main livelihood of the people in Paguyaman Pantai District, most of them are fishing. Judging from the location of the business area, the community has business land that is far from the mangrove ecosystem. For the use of mangroves by the Paguyaman Pantai community, most of them are still used for forests, while the community's perception of mangroves is that the community has the perception that mangroves have a major function on the environment and maintain the survival of aquatic animals.

CONCLUSION

It can be concluded that the types of mangroves found in Paguyaman Pantai District are:*Rhizopora mucronata, Rhizopora apiculata, Rhizopora stylosa, Sonneratia alba, Ceriops decandra, Ceriops Tagal,*and Avicennia Lanata. With the highest IVI, Rhizopora mucronata for the seedling and tree category and Ceriops Tagal for the sapling category.the total value of all indicators of the socio-economic influence of the community in Paguyaman Pantai District is 125 which indicates that socio-economic factors have less effect on the damage to mangrove areas.

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