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Community understanding and attitude levels on the implementation of illegal sand mining on the Induk Beach, West Lombok

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Abstract. Taman Ayu Village in Gerung, West Lombok District, has a prospect as an upcoming tourist area. It is unfortunate if the coastal sand mining activities damage the coastal regions. The research conducted aims to describe the level of understanding and attitude of the community towards the impact of mining illegally. This research method is descriptive, with a qualitative approach by using observation, in-depth interviews. The results of the study show that mining is carried out by the community, because of the need for beach sand for building materials, especially as the final content for making ornaments or home decorations. Coastal sand mining caused a decrease in the beach surface, potential disasters, and coastal abrasion. The positive impact of these activities is increasing the income of the mining community. The community has understood that sand mining activities cause damage to coastal areas, but due to economic demands, the community continues to carry out these activities. In tackling illegal mining on the central coast, the role and responsibility of the Government is integral. Banning and giving warnings in the form of installing warning boards around the mining site as well as providing specialized training for mining officials to provide an understanding to stop the mining activities.

1. Introduction

Abundant coastal resources with good quality are essential in biological processes and support living creatures, in terms of biodiversity (biodiversities) [1]. Indonesia's vast coastal and marine regions contain the potential resources for coastal and marine ecotourism development. Unfortunately, the potential has not been optimally coordinated [2]. To date, Indonesia is only known for several resorts and beaches in maritime tourism. Increase of population has increased the need for clothing, food, board, clean water, and energy. This results in the exploitation of natural resources and tends to ignore environmental aspects. The increasing population with all consequences will require extensive land to conduct its activities and utilize natural resources to meet the needs of its life. Sand exploitation has so far been seen as one of the potentials that are quite beneficial for economic enhancement, but in the process emerged resistance from society [3].

Excessive exploitation of natural resources will impact the decline in the sustainability of natural resources and environmental functions. The natural resources damage continues to increase, both in number and in its territory. Physically the damage is caused by the high exploitation, not only in production areas that are restricted by the carrying capacity of natural resources but also occurs within the designated protected and conservation areas. Environmental damage because of land



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exploitation also occurred in West Lombok Regency. The increase need for building materials resulted in the mining of quarry (sand) without any considerations to land conservation. This is, for example, happening in one village in West Lombok Regency.

Taman Ayu Village in Gerung of West Lombok District, whose areas are mostly located on the coast, has a prospect as an up-coming tourist area. It is therefore unfortunate if these coastal sand mining activities damage coastal regions. Thus, coastal area must remain preserved and protected from production activities or human activities that can reduce or even damage its natural beauty. Induk Beach is a beach located close to the capital of West Lombok. This beach has a vast stretch of black beach sand, and a mangrove forest that stretches to the south. The local communities use the presence of the beach as a source of livelihoods such as fishing, selling, sand mining, and recreation places. This natural richness is utilized by the local community, mainly the beautiful black sand contained on a stretch of coastline [4].

The existence of this black sand is mined for building materials, so this situation causes coastal surface and coastline on the coast of the Induk beach continues to decline annually due to the impact of mining [5]. Environmental damage is an action that poses a direct or indirect change to the physical nature and or its life resulting in the environment does not work anymore in supporting sustainable development [6]. Sectoral development has continued to enlarge the exploitation of natural resources, while the need for conservation and protection of natural resources cannot be carried out correctly. As a result, there are environmental damage: flooding, landslide, and water contamination.

Beach sand mining which is not managed correctly will disturb the balance and function of the environment such as causing erosion of soil humus, forming large holes and result in abrasions [7]. Beach sand mining activities that occur at Induk Beach could potentially cause disaster, destroy the natural beauty and the balance of coastal and sea ecosystems. Beach sand mining activities are steadily increasing due to increasing demand for the raw materials for infrastructure development [8]. The research conducted aims to describe the level of understanding and attitude of the community towards the impact of mining illegally.

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2. Method

The method used in this research is a qualitative approach by using observation methods, interviews, and documentation. The interview is done by using a propulsive sampling technique with village head, hamlet head, religious figures, public figures, local community, and tourists.

In qualitative data analysis, data could mostly be described as a form of words or sentences [9]. Data analysis in qualitative passed 3 (three) steps:

- a. Reduction of data.
- b. Data presentation
- c. Withdrawal conclusion

3. Result and Discussion

3.1. Research site overview

Geographically the area of Taman Ayu village in Gerung District over a ⁹ has an area of 320,365 hectares. The geographical location of Taman Ayu Village is strategically located at an altitude of 0-200 m above sea level, with an average rainfall of 827.3 mm/year. Land use in Taman Ayu village is dominated by agriculture and plantation land, as shown in Figure 1.

Residents of Taman Ayu village amounted to 6,272 people [10]. According to the monograph of Taman Ayu village in 2012, the livelihoods of the majority of residents of Taman Ayu village are farmers, farm laborers, merchants, cart-driver, and beach sand miners. There are also entrepreneurs, private employees, and teachers in small percentage. Taman Ayu Villager's education has different levels, ranging from elementary school, junior high school, and college.

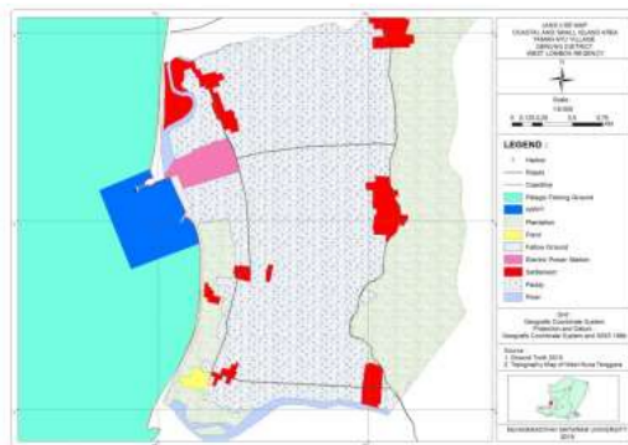


Figure 1. Taman Ayu village's land use

3.2. Causes of illegal sand mining

One of the reasons Taman Ayu Villager remains to mine on Induk beach is there is a high demand from ornament entrepreneurs for a solid black color and texture of Induk beach sand. Sand beach in Induk beach is soft, and it is good for ornaments. The sand beach quality and village economic needs are the main reason for the villager to do beach sand mining in Induk beach. Based on the research, it can be concluded that the cause of beach sand mining that is done by the community at Induk beach, Taman Ayu Village as follows:

- The need for black sand by the ornament entrepreneurs so that the community with a low income such as labor will do mining.
- Black sand has a high price.
- The difficulty of finding a job, especially for old women.
- The economic level of Taman Ayu villagers are classified poor.
- Low level of education and lack of information about the environment so that the villagers do not pay attention to environmental conservation.

3.3. Environmental impacts of illegal sand mining

3.3.1. Impact on coastal and marine ecosystems

Coastal community awareness in Taman Ayu Village to a healthy and clean environment is still lacking. This is due to several factors because of the high level of poverty of coastal communities, low levels of education, inadequate facilities, and lack of information about the clean and healthy lifestyle in coastal communities. These factors that affect the activity of people who have a low income do not pay attention to the surrounding environment so that the mining activities in Induk beach. Taman Ayu villager tend to do coastal sand mining regardless of the environmental impact of coastal sand mining itself, so that the coastal and sea ecosystems become damaged and even impact the frequent Seawater overflow and tidal waves because the sand of beaches and mangrove plants that are properly functioning to withstand the tide of tidal waves have been damaged due to the mining of excessive beach sand by the people of Taman Ayu village.

The coastal ecosystem will be disturbed by the mining of sand, although the villagers do mining in a small amount but continuously so that the coastal surface decline and narrowing the coastline in the cause by beach abrasion. Mining activities resulted in various environmental changes, such as changes in landscapes, changes in the habitat of flora and fauna, changes in soil structure, changes in the flow patterns of surface water and groundwater and so on. These changes have an impact with varying

intensity and properties. In addition to changes in the physical environment, mining has also resulted in changes in social, cultural, and economic life. The impact of mining activities on the situation is not only sourced from waste disposal, but also because of changes to environmental components that change or eliminate ecological functions. The larger the scale of mining activities, the higher the impact area is inflicted. Ecological changes due to mining activities can be permanent, or cannot be returned to their original state. The topographical variation of the land, including the shift in river flows, the shape of lakes or hills during the mining period, was difficult to restore to its original state. Mining activities also lead to changes in the social, economic, and cultural life of society changes in land use, changes in land tenure, the inclusion of workers, and others.

3.3.2. *The impact of illegal sand mining on disaster potentials*

The illegal beach sand mining is a form of destruction to the coastal ecosystem, which in the next day will directly impact the communities that settled and depend on the seaside life and have a terrible impact. The mining activities that have been carried out wildly will undoubtedly have a severe impact to the fishermen. This also happens to, not only the fisherman from Taman Ayu hamlet who have been experiencing the direct effects of the sand mining activities. For instance, the present condition of the beach has caused the fishermen to have unsettling fishing. Also, their boats are often carried away by high tide. The fishermen also feel unsafe because the boats carried by seawater are severely damaged. Therefore, identifying the potentials of natural disasters in addition to inherent resource potentials is one of the critical aspects in consideration of the formulation of regional development policies. The tidal waves that occur each other not only threaten the fishing boats but can also endanger the houses of the residents close to the beach. In addition to the threat of tidal waves for potential disasters, another issue is that abrasion can also happen that causes the sand of the beach to be brought to the sea and threatens the land around the main beach. Based on the potential understanding of natural disasters that may occur, quick steps and preparedness before the accident are required, as well as a countermeasure system when it happens to the coastal ecosystems.

3.3.3. *The impact on coast tourism*

Induk Beach tourism is a significant choice of tourist attraction by the surrounding community because the place is close to the city of Gerung. Visitors always crowd every weekend, making it a potential place for Taman Ayu community to trade. When the researchers do the monitoring on the Induk beach, many visitors came with their families to picnic. On the contrary, the impact of mining activities that cause many holes and steep coastal edges make visitors afraid to bath on the beach. Sand mining at the Induk beach carried out by the local community has brought impact on the number of visits to the village and income of the traders around the coastal line of the Induk beach. Based on some respondents from local communities and visitors, Induk beach visitors continue to decline due to the condition of the beach. Also, lack of supporting facilities around the beach makes the appeal of the beach decreased. From an interview with village's head, lack of attention from the local government in facilitating coastal tourism has influenced the number of tourists visiting the area.

3.3.4. *Government efforts in handling illegal beach sand mining*

Based on the Decree of the Minister of Marine and Fisheries on the general guidelines of integrated coastal management planning, coastal areas are defined as a transitional area between interfacing land and sea ecosystems, where the direction of the sea is 12 miles of the coastline for the province and one-third of the territory of the sea (provincial authority) for the district/city and the land direction of the district/city administrative boundary.

Community based coastal and sea damage is expected to respond to the issues that occur in areas based on natural resources and human resources in the region. In this case, a community has the right to be involved or even authorized directly to make management planning of its territory adjusted to the capacity and support of the region to the variety of community activities in surrounding. Community involvement in the management of mining impacts on the environment is crucial. Public participation

should start since the planning of space and the process of determining the area for mining. Local communities are involved in the planning and implementation of mining business as well as adverse impact mitigation efforts and successful impact enhancement efforts. The provincial government is responsible for supervising the implementation of community involvement. With the impact of sand mining activities in the form of physical impact and socio-economic impacts both positive and negative, it is necessary for an environmental management effort to reduce the negative impact. The physical effect of environmental damage must be promptly addressed under the Government's responsibility through the relevant service so that the beach is recovered accordingly. Preserving the environment is a necessity and not just the responsibility of the Government or the leaders of the country, but the responsibility of every human being on earth. Everyone should make an effort to save the environment around us according to their respective capacities. The slightest effort we do is a massive benefit to the realization of a livable earth for the generation of our posterity someday. The most principal challenge or obstacle in environmental preservation is from the human being itself, i.e. lack of community understanding about the environment.

The steps should be taken by the Government to handle mining activities are as follows:

- a. Encourage the community about the environmental impact of sand mining activities on the coastal area. There are three essential awarenesses, namely:
 - 1) The knowledge of the ecological values of coastal and marine ecosystems and the benefits of environmental damage mitigation,
 - 2) The recognition of the conservation of the awareness of economic sustainability if ecological damage mitigation efforts can be implemented prudently and wisely.
- b. Necessary skills trainings need to be arranged for the local communities for the effectiveness of ecological damage mitigation efforts, namely:
 - 1) Training on the planning of damage mitigation efforts,
 - 2) Skills on the fundamentals of organizational management,
 - 3) Community participation in monitoring and surveillance,
 - 4) Basic training on resource observation

4. Conclusion

The sand mining activities on Induk beach have an impact on the physical environment and socio-economic society. The effect on the physical environment is the potential for disaster and beach abrasion that resulted in damaged coastal and sea ecosystems and potentially tidal waves and tsunami. The positive impact of the socio-economic aspect of the people of Taman Ayu village, especially for miners, is the increase in revenue and reduce unemployment because they become workers in sand mining. The Government's efforts in tackling illegal mining are a must to preserve the environment and maintain the coastal ecosystem for the future. It is necessary for an environmental management effort to prevent the adverse impacts that occurred or worsened by the impact of sand mining activities. Preserving the environment is a necessity and not just the responsibility of the Government, but the responsibility of every human being on earth. Everyone should make an effort to save the environment nearby according to their respective capacities. The most fundamental challenge in environmental preservation is lack of community understanding about the environment, so improving environmental knowledge for the community is a must.

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