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# Analysis of Perception and Participation of Coastal Community in the Utilization of Mangrove Plants as Abrasion Prevention in East Lampung

M Rizki Al Safar<sup>a)</sup>, Tubagus Hasanuddin, Indah Listiana

Department of Extention and Community Development, University of Lampung,  
Jl. Soemantri Brojonegoro No.1 Bandar Lampung 35141, Indonesia

<sup>a)</sup> Corresponding author: rizkialsafar@gmail.com

**Abstract.** One of potential natural resources found on the coast is mangroves. In general, people do not know about the potential of mangrove forests as an effective abrasion prevention. Community of Purworejo Pasir Sakti, East Lampung were not optimal in utilizing mangrove plants as a fortress to prevent abrasion. The purposes of this study were to find out the perception and participation of coastal community in Purworejo Pasir Sakti, East Lampung in utilizing mangrove plants as a fortress to prevent abrasion or coastal erosion by sea waves, and to find out the focus of empowerment expected by coastal community of Purworejo in utilizing mangrove plants as an ecotourism village. The results of the study indicated in general, the perception of community in Purworejo said that mangrove forests have many benefits for the environment and society. The existence of mangrove plants in Purworejo can prevent beach abrasion, breeding ground for fish, shrimp and crabs. Besides, it can be used for firewood, building materials and plants such as mangroves and avicennia can be consumed as food. About 10% of community in Purworejo, participate in conserving mangroves. The participation of Purworejo society in managing the mangrove area was quite good, there was a group of mangrove conservation farmer (Mutiara Hijau) who has been trained. The community and Mutiara Hijau actively participate in planting, caring for, and preserving the mangrove forest in Purworejo. A community-based empowerment is needed through outreach activities, skills training and assistance the society to optimize the use of mangrove plants as abrasion prevention that can improve family welfare and empowerment to maintain and preserve mangrove plants.

## INTRODUCTION

Indonesia is an archipelagic country known as a maritime country, a country that have ocean area larger than land area [1]. Indonesia's coastline is the second longest after Canada, which is  $\pm 108.000$  km [2]. Coastal ecosystems are potential resources for fisheries, mining, forestry, beaches, transportation, tourism, and land protection. Therefore, the importance of the role of coastal areas to support various activities must be accompanied by protection from various threats. One of threats in coastal areas is abrasion. People generally do not know about the potential of mangrove as an effective abrasion prevention.

Abrasion is the process of erosion of coastal areas because the ocean wave that occurs continuously and moves towards the shore which is destructive [3]. Damage to coastal ecosystems is always followed by environmental problems other than abrasion, including flooding, sedimentation, decreased fishery productivity, and the loss of several small islands [4]. The land area of Indonesia, especially the coastline is strongly influenced by the magnitude of the sea waves [5]. So, it is necessary to protect the coast from abrasion.

The coastal area of Lampung is a marine ecotourism area that has a potential to be developed, but has not been utilized and developed properly and structured because it has not received investor assistance [6]. East Lampung has great potential in terms of mangrove cultivation, because the location is located on the coast. The function of mangroves can be divided into two: physical function and ecological function [7]. Maintaining the coastline, protecting the beach from abrasion and strong winds from the sea towards the coast are physical functions of mangroves [8]. Meanwhile, as a places of feeding ground, spawning ground, nursery ground are the ecological functions of mangroves [9].

With the condition of the coast is directly opposite the high seas, East Lampung has a great potential for abrasion. One of efforts of the local community is using mangroves as prevention of abrasion. Nybakken (1992)

defined mangroves as a general term used to describe a variety of tropical coastal communities dominated by a number of distinctive tree or shrub species that have the ability to grow in salty waters [10]. However, the use of mangroves has not been optimally carried out by the community because the community's knowledge about mangrove plants as a prevention of abrasion is still limited, so that it will affect local community perception of the benefits of mangroves.

Mangroves management should not exclude local communities, open access to local communities for the distribution of benefits, either directly or indirectly it will improve community welfare. The opening of this access will make the community realize the importance of resource management and in turn will ensure the sustainability of these natural resources. The socio-economic aspect is realized in the form of multipurpose management [11].

Efforts to minimize the greater impact on the pressure of mangrove resources, it is necessary to empower coastal communities that are carried out intensively so that they can make the community the main component of participatory driving in the development of mangrove plants. On the other hand, the low level of public understanding of the function and role of mangrove plants can lead to a decrease in the environmental carrying capacity of coastal resources and the quality of life of the local community.

The lack of an accommodative process in empowering coastal communities to mangrove plants can lead to a low participation of coastal community in preserving mangrove plants. However, accommodative character will be more beneficial if a larger portion is given to people who are very vulnerable to mangrove resources [12]. Due to the lack of community participation, coastal communities are more likely to cultivate mangrove plants for business activities that have a direct impact in fill the needs of life such as aquaculture, agriculture and pay less attention to sustainable mangrove plant management so that mangrove plants do not grow and develop properly. Based on this background, research on community perceptions and participation in community-based mangrove forest management in Pasir Sakti, East Lampung need to be carried out. The purpose of this study was to determine the perception and participation of coastal communities in Purworejo, Pasir Sakti, East Lampung in managing mangrove plants as a fortress to prevent abrasion.

## METHODS

This research used case study with descriptive interpretative. In this research described about model, desires and attitudes of the community in managing mangroves. Interpretation was carried out on the data obtained through interviews, in the form of the level of community knowledge, the level of community support, the interests of the community being accommodated in the mangrove forest resource management program, the perception and participation of the community in the management of mangrove forest resources.

The data collected in this study were primary data and secondary data. The primary data in this study were in the form of information and information regarding matters relating to the object of research such as direct observations in the field and views from the community and local government. Secondary data in this study was in the form of data on aspects of resources, accessibility to the area, and management activities. Literature studies and field surveys were the first steps of this research, interviews and discussions was conducted with related parties and the community who were respondents in this research.

The population in this study as a whole was an aged community living on the coast of Pasir Sakti, East Lampung. The technique used in sampling was the Purposive Random Sampling technique, which was only community residents who have felt the existence of mangrove forests or who have lived around mangrove forest areas for at least 5 (five) years. The population in the village of Purworejo Pasir Sakti was 3352 people in 2019 [13]. The sample is 10% of the population living on the coast of Pasir Sakti Purworejo Village.

The data analysis technique used in this research was descriptive analysis technique. In this case the data obtained from the field by means of observation, documentation and interviews using a questionnaire, then processed and compiled into a frequency table. Furthermore, it was used to explain a symptom and draw logical conclusions.

To answer the extent to which community interests were attached to the mangrove forest rehabilitation program to be implemented, it was measured by the level of community knowledge about mangrove forests and also through community attitudes. This was intended to see the extent of the community's willingness to be involved in the mangrove forest resource management program that will be implemented. To find out the community model for the management of mangrove forest resources, this was done through in-depth interviews.

Meanwhile, to determine the planning of the community's mangrove forest resource management program, the PRA (Participatory Rural Appraisal) approach was used. The PRA method is a method and approach regarding rural

condition<sup>16</sup> and life from, with, and by rural communities themselves. Activities include<sup>1</sup> analyzing, planning and acting on the management of mangrove forest resources, as well as an approach method<sup>1</sup> in the process of increasing community participation, which emphasizes community involvement in overall management activities.

## RESULTS AND DISCUSSION

### Research Location

The location of the research was located at Purworejo, Pasir Sakti, East Lampung. Geographically this land located at coordinate<sup>14</sup> 5°31'S - 105°49'E.

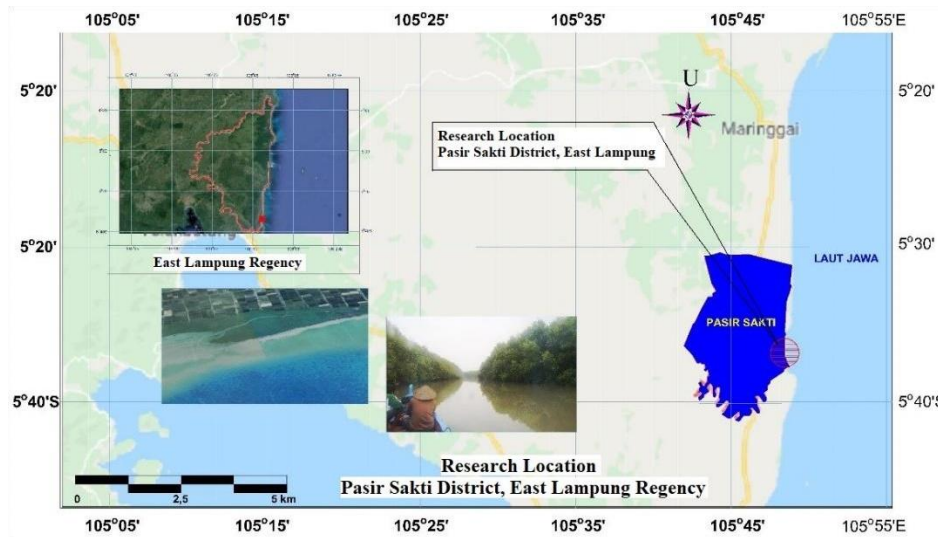


Figure 1. Research Locations Around the Lampung Mangrove Center (LMC) area, East Lampung Regency

### Objective Condition of the Pasir Sakti Community

Mangroves at Pasir Sakti coast spread from purworejo to border area Labuhan Ratu, South Lampung. Mangroves are also commonly found around ponds. The average thickness of mangroves along Pasir Sakti coast is between 50 m to 100 m. The most commonly found mangrove species is *Avicennia marina*. According to Samsudin (Chairman of the Mangrove Conservation Farmer Group), from 2013 since the existence of the mangrove arboretum, several mangrove species have been collected, such as *Rhizophora apiculata*, *Rhizophora mucronata*, *Sonneratia alba*, *Sonneratia caseolaris*, *Ceriops decandra*, *Ceriops tagal*, *Avicennia alba*, *Bruguiera gymnoerariza*, *parviflora*, *Xylocarpus granatum*, *Lumnitzera racemosa* and *Nypa fruticans*.

Sources of life for residents in the coastal area of East Lampung based on the sector of work can be categorized as farmers, fishermen, fish farmers, traders, employees and so on. The population of Pasir Sakti based on the population projection in 2019 is 38,199 people consisting of 19,561 male residents and 18,638 female residents [13]. Based on statistical data from Pasir Sakti, East Lampung, it was found that most of the population who inhabit the coastal area sourced their livelihood as fishermen and farmers.

### The Level of Knowledge

Community knowledge is a supportive factor<sup>21</sup> in the management of mangrove resources. In general, people in the research location know that around the coast there are some species of mangroves, namely mangroves (*Rhizophora* sp) and api-api (*Avicennia* sp). Based on the observation, the most growing mangroves are api-api mangroves (*Avicennia* sp) and mangrove (*Rhizophora* sp). Both species are found around pond drains and on the coast with group growth but do not form a dense forest area.

## Perception of Mangroves Forest Management

Most of the respondents stated that the management of mangrove forest resources so far has involved a lot of coastal communities especially in the nursery and replanting (rehabilitation) stages.

In implementing the management of mangrove forest resources, respondents want them to be involved in all aspects. The parties who need to participate in the management of mangrove forest resources are all interested parties, including coastal communities, non-coastal communities, government officials, entrepreneurs, and non-governmental organizations (NGOs).

The frequency of extension on the management of mangrove forest resources has also been carried out by the Government, especially by the Protected Forest Management Unit (KPHL) and the Lampung Provincial Forestry Service. The community considers that extension is very important because sometimes people use mangrove forests as a source of income to damage the mangrove forest ecosystem.

Mentoring in the management of mangrove forest resources according to respondents is also very important because the community can at any time ask questions about what they will do whether it will not disturb or damage the mangrove forest resources, as well as the mentors provide directions in the management of mangrove forest resources so that they remain sustainable. The community also wants the determination of management zones as conservation, rehabilitation, cultivation areas so that the mangrove forest area and its resources can be maintained and sustainable.

Respondents' concern for the preservation of mangrove forest resources is quite high. Since 2015 the community has understood a lot about the benefits of mangroves since the occurrence of the big tidal wave, before there was mangroves some areas were submerged while there were mangroves that did not sink. This fact can be seen based on the attitude of the majority of respondents who will reprimand and advise if they see someone destroying mangroves and their resources. They do this because they are aware that destroying mangrove forests will result in reduced fish, shrimp, crabs, baby fish and baby shrimp, so that their additional source of income will decrease. However, there were also respondents who are silent, do not reprimand and give advice when they see actions that damage mangroves.

In addition, most of the respondents if they see someone catching fish, shrimp and crabs using drugs, they will reprimand and give advice. They argued that using anesthetics or poison will kill fish and shrimp seedlings (baby fish/baby shrimp) and damage the mangrove ecosystem. But there are also those who are silent when they see someone making an arrest using drugs or poison.

Damage to mangrove forests along the coast of Pasir Sakti is generally caused by the conversion of mangrove forests into ponds and being hit by big waves. This has led to changes in the function of mangrove forests and changes in substrates in coastal areas. Some people also use it as firewood and building wood, and it is cut down for boats to lean on.

Damage to mangrove forests has caused the loss of economic resources around mangrove forests. This has led to a decrease in catches in the mangrove forest area.

Communities around the mangrove forest area consider that mangrove forests have economic value. Generally they catch fish, shrimp, crabs, baby fish and baby shrimp. Some of the catch is sold to fill daily needs. Some people also use mangroves to make syrup, sweets, and other food preparations.

The existence of mangrove forests is also very beneficial when viewed from the ecological aspect. Generally, respondents answered that the mangrove forest also functions as a place for fish spawning, breeding fish and shrimp seeds and maintaining the existence of coastal biota. Another function of mangrove forests according to respondents is to prevent coastal erosion, protect against typhoons, and accelerate land formation. Communities on the coast also argued that the presence of mangrove forests will add to the beauty of the scenery, and can be used as ecotourism destinations.

## Participation in Mangrove Forest Management

The community participation model in question is the desire of the community along the coast of Pasir Sakti who actively participates in the management of mangrove forest areas starting from the planning, controlling, maintenance, to the stage of preserving mangrove forest resources.



### *Planning*

At the planning stage they will participate in terms of ideas, ideas and concepts that should be done. They are the ones who know for sure about the condition and status of the mangrove forest area around them. Therefore, the community around the coast who are members of the Mangrove Conservation Farmer Group (Mutiara Hijau) is about 10%. The community and farmer groups play an active role in planting, caring for, and preserving the mangrove forest in Purworejo. Members of the group are those who live around the mangrove forest area and who utilize mangrove forest resources. The sections in the group are also divided into sections that focus on tourism aspects and there are also sections that focus on aspects of mangrove conservation.

### *Implementation*

At this stage, respondents were willing to participate in providing seeds when planting is carried out. In this case they want the government to be willing to buy the seeds they sow and be paid for planting them. At the time of planting, the government only acts as a facilitator, namely by providing facilities, needs or funds when planting is carried out. The community wants the planting process to be managed by groups of 10–20 people. The community really hopes to be involved in determining the area to be planted.

### *Maintenance*

Based on the results of interviews conducted, respondents generally stated that they are ready to participate in the maintenance and preservation of mangrove forests. The form of their participation is that if mangroves are planted in their area, they will be willing to re-embroider if there are mangroves that die or are carried away by the current and eradicate pests attached to mangrove seedlings. As in the implementation phase, some respondents also expected that there would be incentives from the government for maintenance costs.

### *Monitoring/Preservation*

At this stage they want sanctions to be given in the form of fines for those who destroy and uproot the planted mangroves. A community-based empowerment is needed through outreach activities, skills training and assistance to the community in the use of mangrove plants as abrasion prevention that can improve family welfare and empowerment to maintain and preserve mangrove plants. The government also in this case the relevant agencies must be involved in supervision. If there are officers or officials who commit violations, for example by converting mangrove land into ponds and not in accordance with applicable laws, they must receive sanctions.

## **CONCLUSIONS**

Based on the research above, it could be conclude that the community perception of mangrove plants in the Pasir Sakti area, the community think that mangrove forests have many benefits for the environment and society, including being able to play a role in preventing beach abrasion, breeding grounds for fish, nursery ground, wood, fuel, building materials and Avicennia plants can be consumed as food. The community desire in the management of mangrove forest, all component of community are directly participate in the use of mangroves resource. The existence of the mangrove forest in the Pasir Sakti area is used by the community not only to prevent abrasion, but also to be cultivated and used as a ecotourism. The community participation model in question is the desire of the community along the coast of Pasir Sakti who actively participates in the management of mangrove forest areas starting from the planning, controlling, maintenance, to the stage of preserving mangrove forest resources.

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