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### PERCEPTIONS OF MSALEMBU ISLAND COMMUNITES ON IMPORTANCE AND THREAT VALUES OF SMALL ISLAND RESOURCES

Ihsannudin<sup>(1\*)</sup>, Sukmo Pinuji<sup>(2)</sup>, Rif'ah Inayati<sup>(3)</sup>, Subejo<sup>(4)</sup> and Suadi<sup>(5)</sup>

<sup>1</sup> Agribusiness Department, Faculty of Agriculture, University of Trunojoyo Madura, Bangkalan, Indonesia.

<sup>2</sup> National Land College, Yogyakarta, Indonesia.

<sup>3</sup> English Department, Faculty of Social and Cultural Studies, University of Trunojoyo Madura, Bangkalan, Indonesia.

<sup>4</sup> Agricultural Socio-economics Department, Faculty of Agriculture, Gadjah Mada University, Yogyakarta, Indonesia.

<sup>5</sup> Fisheries Department, Faculty of Agriculture, Gadjah Mada University, Yogyakarta, Indonesia.

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#### CORRESPONDENCE

\*E-mail: [ihsannudin@trunojoyo.ac.id](mailto:ihsannudin@trunojoyo.ac.id)

#### A B S T R A C T

*Small islands have the nature of remoteness and vulnerability and commonly occupied by multi-ethnic communities that cause differences in the way they perceive natural resources. This study aimed to find out the communities perceptions on the importance and threat values of resources. This study was conducted through a survey method in Masalembu island, Sumenep Regency, East Java, Indonesia. The data were analyzed using descriptive frequency analysis method. The study shows the resources perceived very important are the sea, mosques and 4 resources with the same score (schools, madrasah, public health centers, and markets). Meanwhile, the top 3 resources that highly threatened are the sea, breakwater, and sand mining. There exists a paradox for marine resources because they are perceived very important and contrastively very threatened at the same time. Comprehensive regulations, programs, and policies are needed in the development related to the sea. In this case, social development, education, health, and economic cannot be ignored. Rehabilitation of mangrove vegetation should be encouraged in ex-mining and abrasion areas, taking roles as breakwaters as well as a means to increase the wealth of marine and coastal resources.*

#### A. INTRODUCTION

Indonesia is an archipelago which consists of large and small islands. There are 7870 islands that have names on it and more than 9 thousand islands do not (Badan Riset Kelautan dan Perikanan, 2003). Small islands can be defined based on the area and number of the population that inhabit them. It is stated that a small island is an island with an area of less than 5000 km<sup>2</sup> with a total population of less than 1.5 million (Patil et al., 2016; McElroy, 2006). Meanwhile, the definition of a small island, referring to regulations in Indonesia, is an island with an area smaller than or equal to 2,000 km<sup>2</sup> with a population of less than 200,000 people with a unitary ecosystem (Decree of Minister of Marine and Fisheries No. 67/2002<sup>1</sup>; Act No. 1/2014<sup>2</sup>).

Small islands separated from main islands have the feature of remoteness and limitations concerning the natural resources, infrastructures, and human resources which cause the vulnerability (i.e. as susceptibility to harm from shocks) to environment, disasters, and socio-economic conditions (Briguglio, 1995; UN-OHRLS, 2011; Suntoo & Chitoo, 2012; Niles & Lloyd, 2013). The environmental vulnerability and disasters result from population growth leading to overexploitation (Kaly et al., 2002). The susceptibility to disasters on small islands is generally associated with natural hazards, such as cyclones, earthquakes, and tsunamis (Méheux et al., 2006). Meanwhile, economic vulnerability is due to limited resources and dependence on external supplies, limited markets, limitations affecting domestic prices, limitations on exploiting the advantages of economies of scale,

<sup>1</sup> Amendment to the Decree of the Minister of Marine Affairs and Fisheries Year 200 concerning General Guidelines for Community Based Sustainable Small Islands Management.

<sup>2</sup> concerning Management of Coastal and Small Islands

limited domestic competition, and administrative limitations (Briguglio, 1995). Inevitably, such conditions create social vulnerability in the form of social welfare (Campling & Rosalie, 2006). Additionally, such kind of conditions become more vulnerable when the small island has communities with multi-ethnic types. Furthermore, in the context of multi-ethnic communities, there are some implications due to differences in social, cultural and economic backgrounds (Subejo, 2009).

One of the small islands with a multi-ethnic communities is Masalembu island, which is administratively located in the Masalembu District, Sumenep Regency, East Java Province, Indonesia. This exotic small island which has not been revealed is located in the Masalembu Triangle, which is known as meeting water flowing from the Java Sea, Pacific Ocean and Indian Ocean. The island with an area of 23.86 km<sup>2</sup> has a population of 17,066 people consisting of Madurese (74%), Bugis (18%), Mandar (7%) and Javanese (1%). Similar to other small islands, Masalembu island also faces various challenges (Ihsannudin et al., 2017). Furthermore, Ihsannudin, et al., (2017) reported that there are limitations in accessing a source of income and fluctuations in fishery production as a natural marine resource. Likewise, Masalembu island is vulnerable to conflicts over land resources (Pinuji & Ihsannudin, 2016).

Various global programs have been carried out to develop and to solve small island problems, one of which is Masakambing island. The agenda 21, Small Island Developing States (SIDS), realizes the need for sustainable economic development by utilizing marine and coastal resources, meeting human needs, preserving biodiversity, improving the quality of community life, mitigating and reducing the threat of coastal and marine resources (Dahl, 2014). The Barbados Program of Actions (BPOA) also implements it by carrying out human resource development, institutional development (for the integration of environmental policies in national planning and financial resources), public education and participation, and additional financial resources.

Moreover, in the national scope, efforts to manage and develop small islands have also been carried out. Refers to Act No.27 / 2007 concerning Management of Coastal and Small Islands, mandating that the development of Strategic Plans for Coastal and Small Islands (Rencana Strategik Wilayah Pesisir dan Pulau-Pulau Kecil or RSWP3K), Coastal Zoning Plans and Small Islands (Rencana Zonasi Wilayah Pesisir dan Pulau-Pulau Kecil or RZWP3K), Coastal and Small Islands Area Management Plans (Rencana Pengelolaan Wilayah Pesisir dan Pulau-Pulau Kecil or RPWP3K), and Action Plans for the Management of Coastal and Small Islands (Rencana Aksi Pengelolaan Wilayah Pesisir dan Pulau-Pulau Kecil or RAWP3K). Furthermore, in Act No. 1/2014 concerning Amendments to Act No. 27/2007, that the District Government and Provincial Government have an

obligation to prepare the RZWP-3-K, which is valid for 20 years and is reviewed every 5 years. In the recent act on Omnibus Law on Job Creation, Act No. 11/2020, we also find the government's attention to regulate coastal areas and small islands as part of efforts to create jobs and investment. Thus, assessment efforts are required to evaluate, plan, and formulate the appropriate policies.

Seeing those exposures, the vulnerability of small islands, including Masalembu island, should not be the reason for the stagnation of development. There has been some criticism that, in fact, small islands are very capable of coping with these conditions (Barnett & Waters, 2016). On the environmental aspect, small island has a typical and high-value endemic and biodiversity (Briguglio, 1995); (Briguglio & Nurse, 2001). Besides, to face a disaster, the the small island communities do not remain weak. Through their capacity, social cohesion and local knowledge, small island communities are able to survive in carrying out the sustainable livelihoods (Rampengan et al., 2014); (Walshe & Stancioff, 2018). Additionally, through the MIRAB process (migration, remittance, aids and beureaucracy), small islands are also able to mediate conditions of socio-economic vulnerability (Bertram & Watters, 1985). Furthermore, small islands are also rich and full of cultural diversity, local knowledge, and typical adaptation types that can be used to manage small island resources (Fisher, 2004; Voght, 2014).

It is notifiable that small island management, specifically those with multi-ethnic characteristics like Masalebu, is complicated and need multi-disciplinary approaches. Therefore, a comprehensive and appropriate management of natural and social resources is necessary. To support this demand, this study aims to understand the perception of the community in the island on the importance and threat value of the resources.

## B. METHOD

This study employs a post-positivist paradigm through empirical observations and measurements. As stated by Creswell, (2014), this paradigm implies that researchers need to collect information using certain measurement instruments filled in by participants and strengthened by observations of the research location. Meanwhile, the research design used a quantitative approach with a survey method.



Figure 1. The Location of Masalembu Island, Sumenep Regency, East Java, Indonesia

The location was chosen purposively in Masalembu Island, Masalembu District, Sumenep Regency, East Java Province, Indonesia. The location was chosen with consideration of Masalembu as a small island (has large 23.86 Km<sup>2</sup>) with multi-ethnic communities (number of population are 17,066 people consisting of Madurese 74%, Bugises 18%, Mandarese 7% and Javanese 1%) (Ihsannudin et al. 2017b). Masalembu island is divided into two villages: Sukajeruk Village and Masalima Village. Primary data collection was carried out through observation on Masalembu island and interviews using questionnaires. Questionnaires were given to 53 respondents determined in proportionate random sampling representing ethnicity in Masalembu Island. Focus Group Discussion (FGD) was also carried out by involving community leaders, representatives of ethnic groups, and government elements. Then, the Rapid Rural Appraisal (RRA) was conducted for further exploration of the conditions of the research object. Secondary data from Masalembu District Office, village office and the other sources were used as supporting data.

Assessment of community perceptions of the importance and threat values of small island resources was carried out using variables by adapting the ideas of Raymond et al., (2009). Assessment points (importance and threat values) are carried out on 45 types of resources consisting of Marine, Agriculture Area, Cattle Farm, Field, Grasslands, Pond, Lake / swamp, Dryland forest, Wetland forest, Mangrove, Shrub, Runway (Prospective Airport), Plantation, Seaport, Settlement, Rainfed Rice Fields, Fishpond, Water Reservoir, Wells / springs, Public health center, breakwater Village Polyclinic, Police Office, Army Office, Sub-District Office, Village Office, Harbormaster office, Telecommunication Station, Post Office, Bank, School, Islamic School (*Madrasah*), Sport Building, Sand Mining, Stone Mining, Diesel Power Plant Building, Gas Station, Islamic Boarding School, Mosque, Tomb, The Square, Tourism Destination, Market, Entertainment Place and Foot Ball Field.

Table 1. Assessment Variables of Importance and Threat Values

No.	Type of Resources	Perception									
		Very Unimportant Not Very Threatened					Very Important Very Threatened				
		1	2	3	4	5	6	7	8	9	10
1	Marine										
2	Agriculture Area										
3	Cattle Farm										
4	Field										
5	Grasslands										
6	Pond										
7	Lake / swamp										
8	Dryland forest										
9	Wetland forest										
10	Mangroves										
11	Shrub										
12	Runway (Prospective Airport)										
13	Plantation										
14	Seaport										
15	Settlement										
16	Rainfed Rice Fields										
17	Fishpond										
18	Water Reservoir										
19	Wells / springs										
20	Public health center										
21	breakwater										
22	Village Polyclinic										
23	Police Office										
24	Army Office										
25	Sub-District Office										
26	Village Office										
27	Harbormaster										
28	Telecommunication Station										
29	Post Office										
30	Bank										
31	School										
32	Islamic School										
33	Sport Building										
34	Sand Mining										
35	Stone Mining										
36	Diesel Power Plant										
37	Gas Station										
38	Islamic Boarding School										
39	Mosque										
40	Tomb										
41	The Square										
42	Tourism Destination										
43	Market										
44	Entertainment Place										
45	Foot Ball Yard										

Source: Adopted from (Raymond et al., 2009)

The data obtained using questionnaire were analyzed by descriptive analysis method. The score value of each type of resource (attached) by all respondents were classified in accordance to the score determination. Determining the level of importance was carried out by giving a score of 1-10. The score used in the preparation of this importance is a score of 1-2 (very unimportant); score 3-4 (unimportant); score 5-6 (Moderate), 7-8 (Important) and 9-10 (Very Important). Then, the determination of the threat level is carried out by giving a score from 1-10 with details: score 1-2 (not very threatened); 3-4 (not threatened); 5-6 (Moderate), 7-8 (threatened) and 9-10 (very threatened). Furthermore, by using frequency analysis will be found out what resources are perceived to be very insignificant to which resources are perceived to be very important.

**C. RESULTS AND DISCUSSION**

As a small island, Masalembu is surrounded by vulnerabilities and insularity. On the other hand, the small island has great potentials and valued to be empowered optimally. This condition can be analyzed and mapped in the form of importance and threat values based on the perception of the local communities on its geographical environment. An analysis and mapping of importance and threat values are performed on resources that have very important values and on very threatened areas that deserve more attention.



The second resource that was perceived to be important is the mosque. There are 20 mosques recorded throughout Masalembu island, consisting of 9 mosques in Sukajeruk village and 11 mosques in Masalima village. This fact is inseparable from the status quo that all Masalembu island communities are adhering to Islam. Mosques are perceived to have both religious and cultural values. All ethnic groups in Masalembu island, including Madurese, Bugises, Mandarese, and other ethnic groups, have religious background of Islam. The mosque is one of the unifying icons for all existing ethnic groups. It proves that Masalembu island community might use mosques as a medium to adapt to the new environment, people and culture (García-Acosta, 2016). In more details, Yahya et al., (2019) explained that religion, within the religious frame of social integration, can be built by establishing and synergizing the values of harmony, unity, justice, kinship, and solidarity with the government support. The mosque can continue to be empowered as an institutional medium in community development with the urgency of identity symbol and unifying symbol of the people in Masalembu island. Government authorities need to pay attention to the existence of this religious symbol (i.e. mosque) as a unifier and trigger for life harmonization.

The third resources having the same score are educational institutions (public schools and Islamic schools/*madrasah*), markets, and health centers. Throughout Masalembu island, there are 8 elementary schools, 1 junior high school and 1 high school. Meanwhile, for the Islamic schools (*Madrasah*), there are 13 *Madrasah Ibtidaiyah* (Islamic Elementary Schools), 7 *Madrasah Tsanawiyah* (Islamic Junior High Schools) and 4 *Madrasah Aliyah* (Islamic Senior High School) throughout Masalembu Island. Based on the education profile, most of Masalembu island communities have graduated from elementary school (41%) and have not graduated from elementary school (39%) (BPS-Sumenep, 2015). In this case, the society expects to have a generation with higher education. Viewed from the ethnicity, it can be seen that Bugis ethnic generation has higher education than other ethnic. Education is believed to be capable of being a capital in human development, as a means of human development efforts, in facing external shocks, challenges—economic, environmental, cultural, and political—in a small island (Crossley & Sprague, 2014). Thus, the education sector in Masalembu island needs to receive greater attention, especially in relation to infrastructure and teaching staff.

The resource with the next score is public health center. There is 1 public health center in Masakambing island, serving the community. The public health center is equipped with the services of 2 doctors, 4 midwives and 15 nurses, and 2 non-nurse paramedics. In addition, some of the facilities available include 2 units of Village Health Post (*Poskesdes*) and 14 units of Integrated Healthcare

Center (*Posyandu*). It is admitted that health infrastructure and technology on small islands are generally still inadequate, so an effective and efficient transportation means is required for the health workers (Suzana et al., 2018). Comprehensiveness of infrastructure is a support, and the readiness of medical personnel (i.e. doctors, midwives and nurses) is a must. This is due to the remoteness of the island, with a travel time of, at least, 10 hours to the hospital.

The market is a resource that is perceived, in the third place, to be very important. There exist 1 market, on Masalembu island, as a place for transactions of marine, agricultural and handicraft products and other products produced by the community. From ethnic aspect, Madurese dominant in commerce. In addition, the market is also a place to fulfill people's needs imported from the outside of the island. Staple goods are generally supplied from Sumenep, Surabaya, and Kalimantan. Apart from being transported by large ships, there also exist wooden ships that regularly carry goods needed by the community. However, the market facilities on Masalembu island are still inadequate. This will certainly affect the service and comfort. The market character on small islands is generally smallscale; large transaction costs and prone to natural hazards (Tisdell, 2006). Therefore, it is necessary to pay attention to structuring and completing the market facilities/infrastructure in Masalembu. It can be expected that the market becomes increasingly involved in the economic activities of the community, as a place for transactions. In addition, the market also needs to be encouraged to become a location for transactions increasing the domestic competition, which is often considered constraints on Small islands (Briguglio, 2000). Self-sufficiency efforts need to be primarily made in relation to food productions. Figure 2 shows the distributional map of community's perception on the importance of public facilities and natural resources.

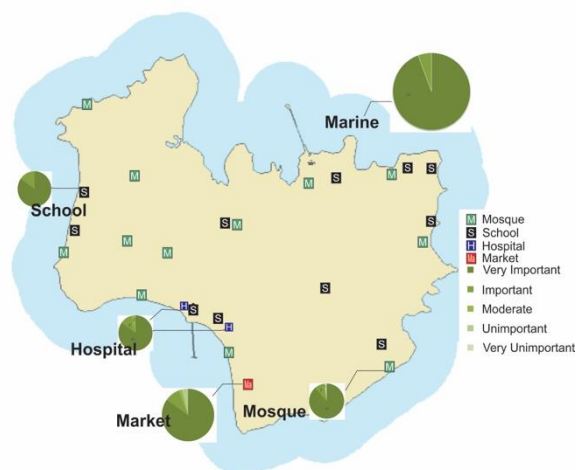
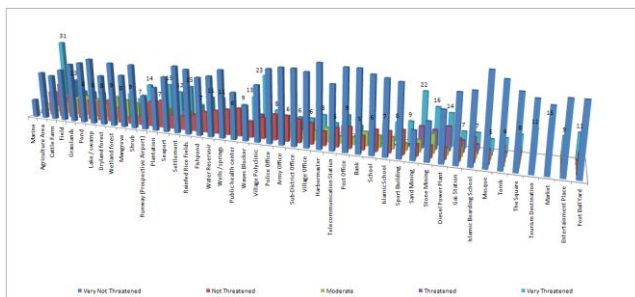


Figure 3. Perception Map of the Importance of Natural Resources and Public Facilities in Masalembu Island. (Source: primary data collection, 2016).

The top three resources that the people of Masalembu island perceive as having very important values consist of the sea, mosques, schools, markets and public health centers. It indicates that the sea is an inseparable resource in life and affects all aspects. Apart from being a source of income, the transportation route also has socio-cultural values for the whole society. The mosque is the second resource that is perceived to have very important values. This implies that socio-religious values have an important position in people's lives; beside being able to unite ethnic differences between them. Meanwhile, the four resources that have the same value (schools, *madrasah*, health centers, and markets), give an indication that the education sector, health and wellness are perceived important by the people of Masalembu island. This condition provides guidance that development policies and programs should place these resources on a priority scale for all ethnics in Masalembu.

## 2. Community Perception on Threats values

The people of Masalembu island have a perception on resources with a very high level of threat and on resources with a very low level of threat. The resources perceived as being highly threatened need more attention. This is important to do to maintain the functionalization of resources affecting the sustainability of Masalembu island.



prohibition of the use of trawls in Masalembu fishing area. This is necessary to avoid conflicts between fishermen from Masalembu island and fishermen from outside Masalembu island. It is believed that more than having impact on destroying FADs, the fishermen from Masalembu island feel disadvantaged by the reduced fish resources. As a result, fishermen have to quest fish far out to sea. This has happened. The fishermen currently have to fish for more than 20 miles. This indeed will require a longer time and higher costs.

The second resource that is perceived as being seriously threatened is breakwater. This is due to conditions of breakwater on Masalembu Island that has relatively been damaged. Several fractures are visible and eroded by the waves. Urgently, budgeting for construction of breakwaters in the areas prone to abrasion needs to be done immediately. Buginese and Mandar are those who experienced most, because it located near their settlement area. However, an introduction to mangrove is also necessary, considering the findings of Choirunnisa & Giyarsih, (2018) that beaches with mangrove habitat (as natural wave barriers) are considered capable of minimizing land area exposed to sea waves and coastal erosion. Factually, the areas experiencing abrasion are areas that used to be mangrove vegetation, but are no longer there. Thus, the communities need to be given awareness and motivation to replant the area with mangroves. Mangroves are believed to have an ecological service function, as well as to provide food and economy (Veitayaki et al., 2017). Unfortunately, in several areas on Masalembu island, mangroves have been damaged due to their use as firewood and land conversion. Improvement and conservation efforts should be able to use a tourism perspective with the involvement of local communities (Hakim et al., 2017). This will further enrich the efforts to develop the existing tourist destinations on Masalembu Island. Of course, efforts to raise awareness among communities are crucial because based on the findings of Setiawan et al., (2017), people still have low education in mangrove conservation. This effort is considered able to reduce erosion.

The third resource that the people of Masalembu island perceive as highly threatened is the area of sand mining. Buginese and Madurese are dominantly perceived this because their settlement area are nearby, and shared the area that are closed by. There are 7 locations of sand and stone mining in Masalembu island. The threat of this massive exploitation is the potential existence of seawater abrasion. The sand and stone mining is entirely used to meet the needs of the house construction and other facilities in Masalembu island. The activities of sand and stone mining are carried out in the coast, with the state and private land ownership. As Law 27/2007 concerning Management of Coastal Areas and Small Islands, land along the edge whose width is proportional to the physical shape and condition of the beach, at least 100 (one hundred) meters from

the highest tide point to the land, is categorized as coastal boundaries. Sand and stone mining is a big problem for the small island. The community does not have another choice because if they bring materials from outside the island, of course, it will cost a lot. The effects of uncontrolled sand mining activities are closely related to the balance of the ecosystems and disasters. As stated by Méheux et al., (2006), disasters, such as tsunamis and hurricanes, are the main sources of vulnerability on small islands. So, there needs to be a recitation step and arrangement of spots where mining can be carried out. This step needs to be followed by recovery efforts, because if not, it will give a very big threat to the survival of the people of Masalembu Island. Figure 4 show distributional map of resources perceived as threatened by the community

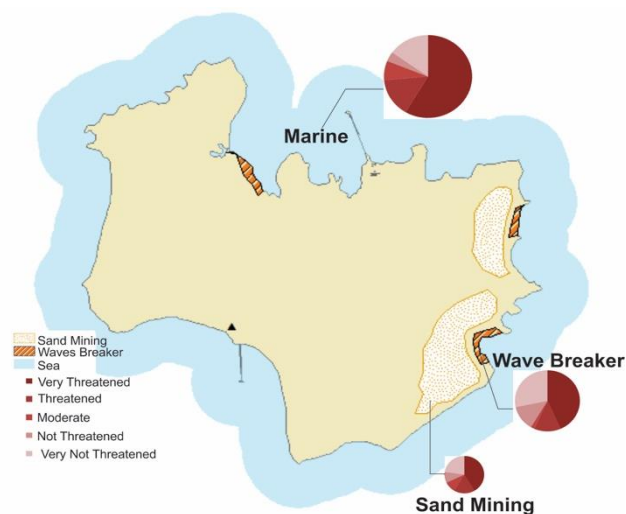


Figure 5. Map of Resources Perceived as Being Highly Threatened (Source: PrimaryDataCollection, 2016)

In addition to being perceived as very important, marine resources are also perceived as being very threatened. It suggests a paradox for this resource. Accordingly, Dahl, (2014), in Agenda 21 for development in small island areas, emphasizes on the sustainable use of marine and coastal resources for human needs, mitigates and reduces threats to coastal and marine resources. Consequently, all stakeholders, especially the Masalembu communities, should pay more attention to it. Likewise, other stakeholders, such as the government from the village level to the central level, need to focus on programs, policies and regulations in this regard. It cannot be denied that these two resources greatly affect the sustainability of the life of the small island communities.

#### D. CONCLUSIONS

The resources of Masalembu island that are perceived respectively as very important by the communities are the sea, mosques, and 4 resources with the same scores (schools, *madrasah*, public health center, and markets). The sea, which is

considered very important as a source of livelihood, has an important relationship with various other aspects of life specifically for Buginese. On the other hand, the mosque represents a socio-religious aspect and is a symbol of unifying between various ethnicities. Additionally, the aspects of education, health and trade have an important meaning in people's lives of all ethnics. Furthermore, the top 3 resources on Masalembu island perceived as being highly threatened are the sea, breakwater, and sand mining which were dominantly perceived by Buginese, Mandar and Madurese. The sea threats come from fishing activities using trawls carried out by fishermen from outside the island. While breakwater and sand mining are considered as threats for the island's existence through abrasion. These findings indicate a paradox for marine resources because in addition to being perceived to have very important values, the marine resources are also perceived as being very threatened. For this reason, comprehensive regulations, programs and policies in the development related to the sea of Masalembu island are needed. Accordingly, social development, education, health and trade (economy) need to be the

focus of attention. Religious value can be used as means for unification, since this value is considered as common value of all ethnics. A strict regulation of sand mining activities must be implemented immediately to avoid ecological damage and danger of abrasion. Likewise, rehabilitation and addition of mangroves must be encouraged in ex-mining and abrasion areas. In this case, besides being able to breakwater, mangroves also have ecological values that can increase the wealth of marine and coastal resources.

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