

**MP3EI: LIFE PATTERN OF COASTAL COMMUNITY, MANGROVE DESTRUCTION LEVEL OF  
CONSTRUCTING MANGROVE DATABASE IN NORTH MALUKU**

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**ABSTRACT :** *The Province of North Maluku is one of the provinces in Indonesia that has the longest coastline; this province is geographically shaped by some islands. The condition of the mangrove forests on the coastal area of North Maluku currently has declined significantly both in quality and quantity from year to year. The decline of the quality and quantity of mangrove forests has resulted alarming impacts, such as increase of abrasion, reduced catches of coastal fisheries, sea water intrusion is getting further toward the land, and even surprisingly the increasing cases of malaria. There are some long term goals in relation to the implementation of Penprinas-MP3EI toward the availability of supports for universities and governments to expand access capacity toward the development of research and higher education programs in the future, especially in the forms of synergic collaboration among some parties involving universities, businesses, and governments in the development of biodiversity of mangrove forests through policy development strategy which is recommended based on the result and analysis of this study. In addition, this study will be base of direction for the development of science and technology-based life skills in order to improve the quality of life of coastal communities through appropriate technology and mangrove flour product as well as conservation toward mangrove forest biodiversity. Results of this study indicate that 1) database of mangrove destruction rate in North Maluku is stated that the lowest level of damage found in West Halmahera district while the highest level of damage found in South Halmahera district; 2) Database of life pattern and engagement of coastal communities toward the conservation of mangrove forest ecosystems shows that their perception is good, but the level of community participation and engagement in the management and conservation of mangroves in the area of mangrove ecosystems in North Maluku province varies as 37.14% relatively high level of participation (33), while the rest (10,86%) is relatively low.*

**KEYWORDS:** *life pattern, coastal communities, mangrove destruction level, mangrove database*

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## **I. INTRODUCTION**

The Province of North Maluku is one of the provinces in Indonesia that has the longest coastline; this province is geographically shaped by some islands. The coasts of North Maluku are such coastal region of islands chain strung with very high mangrove vegetation potential. Among the formations of the coastal vegetation that have high productivity and biodiversity, there are mangrove forests. In this case, the mangrove vegetation is indeed a part of the coastal and marine ecosystems that provide productive natural resources, covering as sources for daily foods, minerals as well as mining energy. In addition, the vegetation is as recreation areas or tourism vegetation to some extent. The distribution of the spread of the vegetation covers the coastal waters of South Halmahera, West Halmahera, and some islands around North Maluku. Based on the survey conducted by UNESCO (1993) the high potential of the coastal mangrove forests of South Halmahera region was 0.63% of the total mangrove vegetation of the 100/ha coastal of Maluku and North Maluku (Marimoi, 2004). To this day, the number of populations of coastal mangrove forests in North Maluku is not yet documented well. Based on the results of the current study, the condition of coastal mangrove forests in North Maluku has even declined both in the quality and quantity from time to time. The quality and quantity of mangrove forests have caused such alarming impacts, such as the increase of abrasion, reduced catches coastal fisheries, and sea water intrusion is getting further toward the land, and even surprisingly the increasing cases of malaria (Bengen, 2002). There are some long term goals in relation to the implementation of Penprinas-MP3EI toward the availability of supports for universities and governments to expand access capacity toward the development of research and higher education programs in the future, especially in the forms of synergic collaboration among some parties involving universities, businesses, and governments in the development of biodiversity of mangrove forests through policy development strategy which is recommended based on the result and analysis of this study.

In addition, this study will be base of direction for the development of science and technology-based life skills in order to improve the quality of life of coastal communities through appropriate technology and mangrove flour product as well as conservation toward mangrove forest biodiversity.

## II. METHOD

This study is supposed to be one package study, which this study is as the first phase study out of three phases: the first stage focused on the preparation of the database on the mangrove vegetation on the coasts of North Maluku, while the second phase focused on the distribution and mapping of mangroves potentials on the coasts of North Maluku, and the third phase aimed at empowering the life skills of the local community through the development of new food sources derived from the mangrove vegetation such as of fruit mangrove. At this stage, the data collection is conducted by using the Census Method Engineering documents and observational studies (*Concentration Count*) by Kartono (1994). The data collection is part of the study as identifying process of the life patterns of coastal communities as well as the level of destructions of the coastal mangrove vegetation which aims to collect primary data and secondary materials in the preparation of database of coastal mangrove vegetation in North Maluku. The formation of the database is based on the result of descriptive analysis and the presentation of data in relation to mangrove.

## III. RESEARCH FINDINGS

### Social Characteristics of Local Community around Mangrove Forests

Karakteristik sosial masyarakat (Responden) di sekitar hutan mangrove, yang dikaji meliputi umur, jumlah tanggungan keluarga, tingkat pendidikan dan agama, etnis dan kearifan lokal terkait dengan pengelolaan dan pemanfaatan ekosistem lahan mangrove. Komposisi responden menurut aktifitas ekonomi yang dilakukan pada masing-masing daerah kajian menunjukkan bahwa pada umumnya masyarakat di daerah pesisir bekerja sebagai nelayan tangkap dan petani, serta pada sektor non formal lainnya seperti pedagang atau pegawai. Tingkat pendapatan rata-rata/per tahun juga menunjukkan bervariasi perbedaan antara jenis pekerjaan/mata pencaharian untuk masing-masing daerah domisili. Data tentang komposisi responden berdasarkan jenis pekerjaan dan rata-rata pendapatan disajikan pada Tabel 1. Social characteristics of the local community (in this study as respondents) around the mangrove forests, whom were examined by age, number of family member dependents, level of education and religion, ethnic and local knowledge related to land management and utilization of mangrove ecosystems. The composition of the respondents according to economic activities performed at each study area showed that, in general, people in coastal areas work as fishermen or farmers, as well as in the non-formal sectors, such as vendors or employees. The average annual income (GDP) level also showed varying differences between the types of jobs / livelihood for each region of domicile. Data on the composition of respondents based on the type of works or occupations and the average annual income is presented in Table 1.

**Table 1. The composition of respondents based on type of occupation in the Province of North Maluku**

No.	District / City	Respondents (N)	Composition of respondents based on their occupations							
			Farmers		Farmers for fishpond		Fishermen		Others	
			n	%	n	%	n	%	n	%
1	Ternate	10	4	40	0	0	5	50	1	10
2	Tidore Islands	15	7	46.67	0	0	7	46.67	1	6.67
3	North Halmahera	15	5	33.33	0	0	4	26.67	6	40
4	Central Halmahera	15	7	46.67	0	0	6	40	2	13.33
5	East Halmahera	10	5	50.00	0	0	3	30	2	20
6	South Halmahera	15	6	40.00	0	0	4	26.67	5	33.33
7	West Halmahera	15	7	46.67	0	0	7	46.67	1	6.67
8	Kepulauan Sula	0	0	0	0	0	0	0	0	0
9	Morotai Island	0	0	0	0	0	0	0	0	0
The Province of North Maluku		95	41	43.33	0	0	36	38.10	8	18.57

Sources: Processed primary data

The database of the community's role and engagement in the preservation of mangrove forest ecosystems compiled from interviews that have been conducted on the selected respondents in 9 districts / cities in the region of mangrove ecosystems in the province of North Maluku indicated that the public perception is quite good toward the mangrove forests. The number of the perception obtained was 95 categories of perception respondents, 31.79% were included to moderate category, and highcategory was 22.38%, 25.24% for moderate-low category and the rests were 11.90% lower. The majority of respondents were classified as having knowledge that 62.32% for moderate and 14.76% higher and only a relatively lower knowledge of 24.24%. By seeing those numbers means that most of the people have adequate knowledge related to the function, role and utilization and sustainable management of mangrove forests; but the problem is on the level of community participation in the management and conservation of mangrove ecosystem in the region of North Maluku that are classified as 37.14% for high level participation of 33; the rest was 10,86%, remaining relatively low participations.

#### **IV. DATA FOR DESTRUCTION CONDITION OF MANGROVES IN NORTH MALUKU**

Based on research findings about the condition of mangrove destruction in 6 districts or cities in the province of North Maluku, it can be concluded and presented the survey and secondary data collected from some researchers that the level of mangrove destruction in North Maluku varies in which the lowest level of destruction was found in region of West Halmahera district while the highest level of destruction was found in the region of South Halmahera district. The following is the order of mangrove destruction per level in each district is from the lowest to the highest: West Halmahera (6.52%: minor category); Central Halmahera (7.55%: minor category); Tidore Islands (14.28%: moderate category); North Halmahera (20.07%: mild category); South Halmahera (25%: medium category).

The potential and distribution of mangrove area in the region of North Maluku based on satellite imagery / GIS reinterpretation, according to the results checking field in 9 districts / cities, it was showed that the area of potential mangrove areas identified through satellite imagery / GIS in which the reality on the ground was as follows:

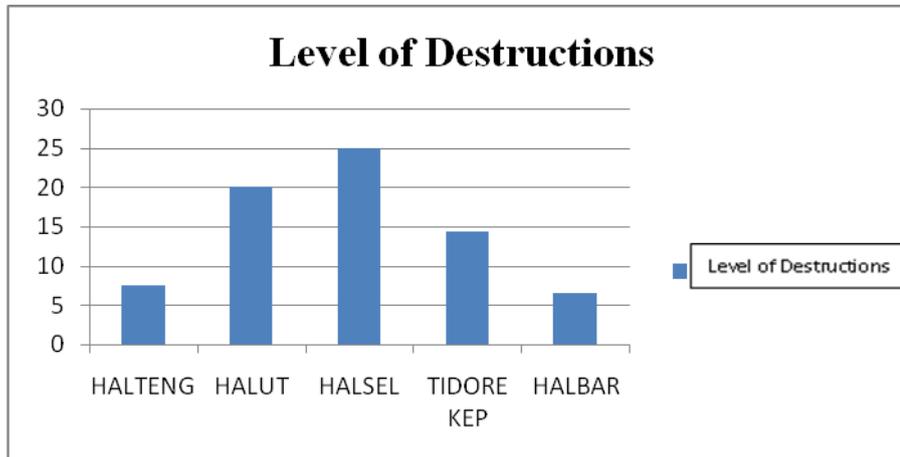
- a. Acreage identified with categories destructed, it was a shift in mangrove forest area (cover) as shrinking inland due to coastal erosion and lack of protection toward the mangrove areas so that the mangroves directly are hit by the large sea waves; the mangroves are not that strong to face the waves.
- b. Acreage identified with the category of severely destructed or damaged, there were not mangrove area or land that were heavily damaged or destructed due to the waves or other factors.
- c. Acreage identified with the category not destructed was also found in the field of the mangrove ecosystem (secondary data of Akelamo BP DAS).

Furthermore to the findings on the ground based on the carrying capacity and the natural ability to renew (assimilative capacity), as well as the suitability of its use, the coastal area and the mangrove forests subjected to over exploitation of natural resources as well as the environmental pollution due to the demands of development that still tends to be more rely on economy (profit-oriented exploitation). By seeing this paradigm, the more benefits / economic beneficare gained, the more severe the load of environmental or ecological destruction resulted. In other words, the less benefits / economic benefits, the less environmental damages as well would be.

#### **V. DISCUSSION**

Based on the data presented from this study, it can be seen that the people (members of coastal communities) who live around the degraded mangrove forests that are also declining in quantity and quality are those who have low economic welfare. The degradation of mangrove forests as well as other coastal environmental degradation might also cause a decline in fish catches productivity thus reduce the income of fishermen in coastal communities. The results of the population census of 2010 noted that in general the coastal communities (except in urban areas) are categorized into a poor village. Mangrove forests that have been converted to other uses along the coastal lines in the province of North Maluku are not been too much yet. However, it should be alarming as there were indications based on the field observation that small destruction or usage conversion would allow an increase in pressure on the mangrove areas in North Maluku. The indications include the increasing growth of the coastal communities in every year, the pace of urban development especially the needs for housing, the increase of fuel prices would also increase the intensity of the communities to utilize the mangrove forests as the firewood in daily basis, and the low concern of the government as well as the public including the members of coastal communities about the preservation of mangroves. Based on the identification and inventory toward the mangroves in the province of North Maluku, it can be concluded that mangroves in each district / city have suffered destruction in a relatively short time. Based on the calculation of mangrove areas in the nine districts /

cities with the width of 23 292 ha, of the total area categorized destroyed is 33.34% (7.765ha) while the rest is only 66.66% (15 527 ha) for the area that is not destroyed severely. The above circumstances become wake-up call for the government and public concern to learn; they had realized then how significant benefits of the environment, especially in this case the existence of mangrove ecosystem and need preservation. This was confirmed from interviews with local communities and relevant stakeholders in the nine districts / cities in the province of North Maluku, that perception and knowledge of the functions and benefits of mangrove forests is quite good, as well as the level of participation in mangrove forest conservation program. Description to the comparison of level of destruction of mangrove forests in some districts / cities as stated on the following chart:



**Figure 4.1 The comparison of level of destruction of mangroves in some districts in the province of North Maluku (Source: Tolangara and Sundari, 2012)**

Based on the description on the chart above, it can be seen that the average level of minor destruction to the average percentage of <25% (Kuswandi, 2003). The lowest level of destruction was found in West Halmahera district while the highest level of destruction was found in South Halmahera district. The order level of destruction of mangroves in each district from the lowest to highest is as follows: West Halmahera (6.52 %: moderate category); Central Halmahera (7.55%: moderate category); Tidore islands (14.28%: moderate category); North Halmahera (20.07 %: moderate category); South Halmahera (25%: medium category). According to Kuswandi (2003) who states that the environmental impacts due to the role of the local community could be identified by seeing the degradation of the coastal mangrove forests loss; from this degradation, the physical environmental destruction they might cause in the form of coastal erosion / abrasion, seawater intrusion, loss of riparian and coastal declining biodiversity and destructions of habitat of certain animals. In addressing some major issues encountered in the development and management of mangrove conservation and sustainable development as described above, there are two components of the main activities that considered relevant to be implemented in relation to rehabilitation programs and community development programs in the management and utilization of mangrove resources and other coastal resources.

## VI. CONCLUSION

Based on the discussion on the results and findings of this study, there are some conclusions as follows:

- [1] The formation of the database for mangroves is supported by the level of destruction of mangrove forest ecosystem as well as the life pattern of coastal communities toward the conservation of mangrove forest ecosystems.
- [2] By referring to the database containing the level of destruction of mangroves in the province of North Maluku, it could be seen that the lowest level of destruction was found in West Halmahera district while for the highest level of destruction was found in South Halmahera district.
- [3] The database containing life pattern of the coastal communities in relation to the conservation of mangrove forest ecosystems indicated that public perception around the mangrove forest was quite good, but on the other hand, the level of community participation and engagement in the management and conservation of mangroves in the area in the province of North Maluku Mangrove ecosystems were 37.14%; it was classified as high-level participation with 33. While the rest was 10,86%, categorized as low participation.

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