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# The Condition of Coral Reef And Local Wisdom in Kei Besar North East District (Coastal Resources Management Model Based on Local Wisdom in the Kei Besar District of North East, Southeast Maluku Regency)

Agmi S. P. Beruat

Polytechnic State fisheries. Tual, Ambon, Indonesia

Aziz Nur Bambang

Fishery and Marine Science, Diponegoro University, Semarang, Indonesia

Ambariyanto

Central Laboratory of Research and Services Diponegoro, University Semarang,  
Indonesia

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## **Abstract**

Southeast Maluku, particularly the North East District of Kei Besar has a concept of management of natural resources including coral reefs based on local wisdom. This study aims to analyze: 1) the existing condition of coral reef resources, 2) social, economic, and cultural aspect, 3) the legal and institutional aspects. Primary data collection techniques of coral reef data are the using line transect method (line intercept transect). Mean while the secondary data collection is conducted through in-depth interviews using a structured instrument and direct semi participatory observation. The results of the study showed that there are 94 species of coral, there are Acroporidae (29 species), Faviidae (20 species) and Poritidae (10 species). Approximately 46.08 % of the coral species inhabit the coral reefs of

the North East District of the Kei Besar. Coral species, commonly found are palifera Acropora, A. tenuis, A. cytherea, A. clathrata, A. humilis, A. Millepora, A. dendrum, Favia pallida, Favites abdita, Giniastrea pectinata, Platygyra pini, Porites lutea, Porites stephensoni, Solida Porites, Millepora intricata and Heliopora caerulea. Resource conditions in the North East District of the Kei Besar has experienced a decline whether the coral reef ecosystem, which is caused by an increasing population, increasing the need of the people have an impact on increasing the utilization both legally and illegally.

**Keywords:** Modeling, Coastal resource management, Local knowledge, Strategy

## 1. Introduction

Indonesia's coral reefs have a very large potential resources viewed by its productivity, bio-diversity and aesthetic. This resource can be used for the greater prosperity for the people with regard to sustainability and conservation. Several cases of environmental degradation of coastal waters has become a national issue, including damage of coral reef ecosystems, due to the use of pressure, which affects the food chain in coral reef ecosystems, which in turn affect the availability of nutrients and resources (fish stocks and non fish).

Southeast Maluku district have the concept of natural resource management based on local wisdom, which is known as the “Bat Batang Vid Roa Vid Nangan” means keeping the door sea and land. The concept of management is to assign each unit area (zone) with a designation based on the potential and carrying capacity of the intended area (Rahail, 1995).

Existing zoning can actually be said that the people in this region have had spatial management with its details, however today the various development of policies and concepts of modern science has inadvertently eliminate this culture. Though the concept has been established by community hereditarily and implemented to maintain ownership rights.

Therefore, this study aimed to analyze the application of local knowledge as a basis for the management of coral reef resources especially the island of Kei Besar in particular the North East District of the Kei Besar. Therefore both the coral reef ecosystem, irrigation quality, economic, social and cultural conditions, need to be evaluated, so the effectiveness of traditional rule can be analyzed comprehensively.

## 2. Research Methods

### 2.1 Place and Time of Research.

This study was conducted from May to July 2012, in the waters of Southeast Maluku District of Eastern North Kei Besar(Figure 1). Location of sampling the waters of the geographical boundaries of the study site is located at position 133 °07'43, 39 "E -133 °10'21, 31 " E, and between 5 °29'38, 82 "S -5 °27 '52.65 "LS.



Figure 1. Location research.

## 2.2 Data Collection Techniques.

Primary data were collected by direct observation and measurement of the existing condition of coral reefs, secondary data were collected through in-depth interviews and literature study were collected in the form of tabulation, but for certain data that has been mapped are collected in the form of a map -thematic maps that have been published.

## 2.3 Identifying Social, Economic and Cultural Condition

To obtain information on the socio-economic situation of local culture, field observation data were analyzed using a bar chart or pie chart based on the presentation of issues studied.

## 2.4 Analyzing the Application of Law SASI

Analyzing the various application of the law by law "Larvul Ngabal " and sanctions for violators who are given the customary and institutional arrangements based on the functions and duties in the management of coastal resources based on local wisdom in the North East District of the Kei Besar.

## 3. Results and Discussion

### 3.1 Coral Reef

The results of the analysis of satellite data and field checks, it is obtained extensive coral reefs reach  $\pm 10.33$  km<sup>2</sup>. Growing coral and reefs spread over as many as 94 species, including 44 genera and 15 tribes. Tribal coral stone with high species richness is Acroporidae (29 species), Faviidae (20 species) and Poritidae (10 species). Acropora coral species are palifera, A. tenuis, A. ctyherea, A. clathrata, A. humilis, A. Millepora, A. dendrum, Favia pallida, Favites abdita, Giniastrea pectinata, Platygyra pini, Porites lutea, Porites stephensoni, Solida Porites, Millepora intricata and Heliopora caerulea. There are at least four species of coral stone with limited categories namely Physogyra lichensteini, Echinopora gemmacea, Archelia horrescens and Cycloseris cyclolites. Coral species richness in Hollat coastal waters is higher than Ohoifau coastal waters (Table 1).

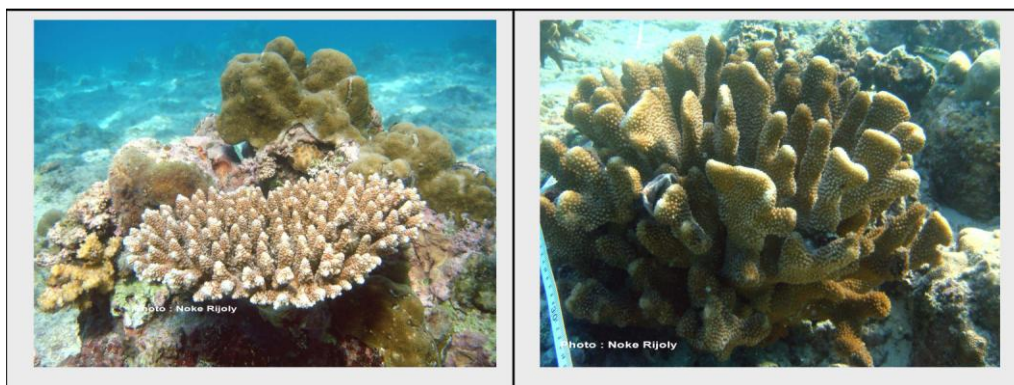


Figure 2. Species of hard coral *Porites lutea* and *Acroporatenuis* (left), and *Acropora* Coral Ohoifau palifera in area (right)

Table 1. Wealth Species, Percent Cover Coral Stone and Components Constituent of coral reefs in the coastal waters of the Kei Besar districts of North East

( Coral location	Total.	coverage of the constituent components of the reef %					
		Coral rock	<i>Acropora</i>	Non <i>Acropora</i>	Fauna	Alga	Komp. Abiotik
Ohoifau	56	35,96	5,70	30,46	0,78	1,16	62,10
Hollat	73	60,96	43,26	17,70	14,92	3,34	20,78
Kei Besar Utara Timur	78	48,46	24,48	23,98	7,85	2,25	41,44

Percent coverage abiotic components that stand on the coral reef area of the North East District of the Kei Besar dominated by rock in the form of Pavement Reef coral reefs in Ohoifau coral reef are categorized as damaged. This is not due to the influence of pressure reef fisheries resource use, but due to the influence of natural conditions. Natural environmental pressures meant is the wave, so that the growth and development of colonies of coral rock types be inhibited, which in turn affects the value of percent cover of coral rock (live rock) at the base of the reef.

### 3.2 The Condition of Social, Economic, Cultural Society

#### 3.2.1 Social conditions of Society

The level of public education is one of the parameters is quite influential to the changing of environmental conditions. Communities with a high enough level of education is expected to give positive energy to other community members, for example, in terms of perception of the sustainability of natural resources and environmental sustainability for future generations. The results obtained by the research community in the education level of the North East District of the Kei Besar is the highest level of high school (SMA) and Vocational School (SMK) that is equal to 42 %, while approximately 49 % have education level only at the elementary school level and Junior High School. The level of education that most of the high school or vocational school is the traditional lifestyle still can be optimally used to help implement government programs, especially on natural resources and protection of the marine environment.

Villagers in the North East District of the Kei Besar turned out to be evidenced by their ability to understand the true impact of habitat destruction on the preservation of natural resources. Society knows that if coral reef habitats are damaged, natural resources is reduced (44 %), natural resources can be dead or extinct (25 %), the resource cannot breed (15 %), while 16 % stated that the impact of habitat damage can also affect the communities that can be harmful to society itself (Figure 3).

It can also be strengthened by the statement that 98 % of people expressed concern about the existence of natural resources. Such condition can be used by government to optimize the efforts of community-based resource management, so as to meet their needs appropriately.

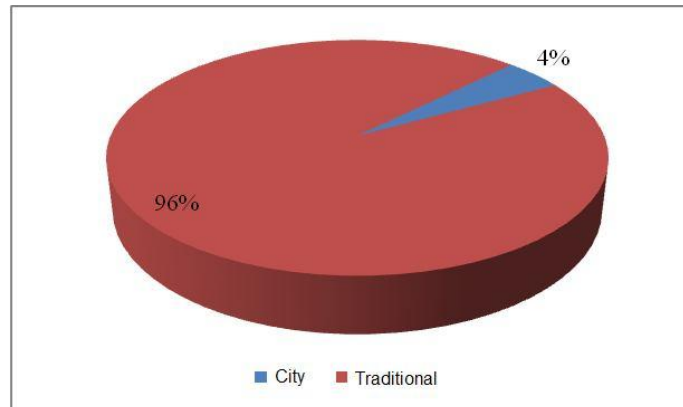


Figure 3. Public Perceptions to Damage of Resource Habitat

People in the North East District of the Kei Besar has enough understanding of the impact of fishing gears that are not friendly environment and not friendly to the sustainability of marine natural resources indicated by 61% of the people who answer that there will be damage to coral reefs as a habitat for organisms life depends on these ecosystems. While it is as much as 25 % states that the use of this type of fishing gear can destroy the existing resources in it. In addition 11% of people even argued about the danger to themselves if not using environmentally friendly fishing gear such as the use of explosives (Figure 4).

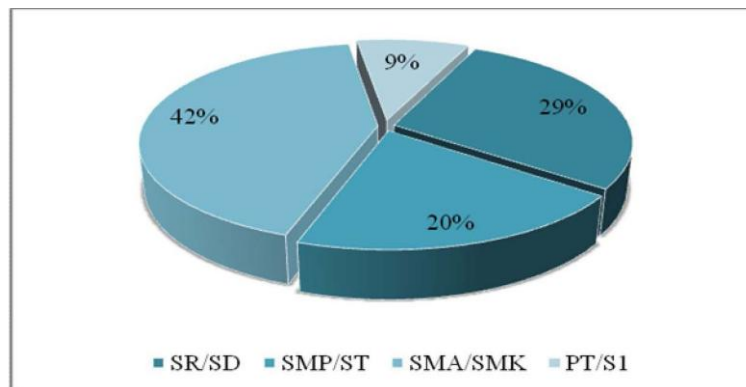


Figure 4. Care Forms of Natural Resources

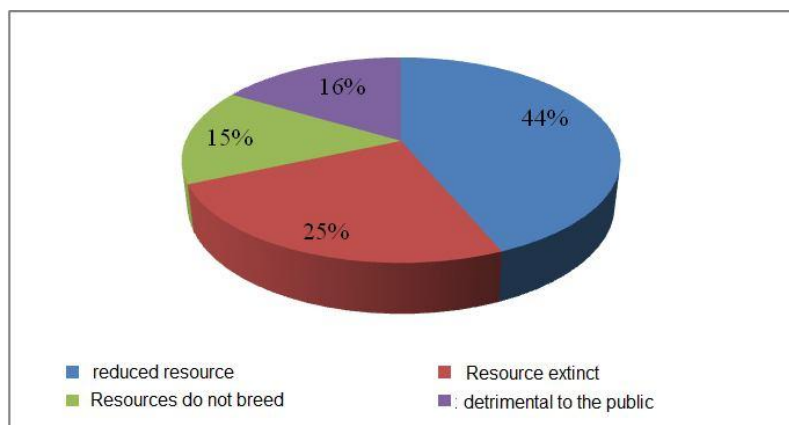


Figure 5. Perceptions About Impact Using Inhospitable Environmental Capture Device

### 3.2.2 The Condition of Economic Community

The type of people occupation are identified in the study area as farmers (34 %), Saniri state (21 %), as civil servants, teachers and temporary employees (15 %), fishing (12 %), self-employed (8 %), Marinyo (4 %), works as a carpenter / mason (2 %), and others (Figure 12). Besides that, the observation result rural communities in the North East District of the Kei Besar also has a special skill that can make copra (38 %), fishing (31 %), making traditional foods (15 %), farming (12 %), the driver of the speed boat (4 %), and so on (Figure 6).

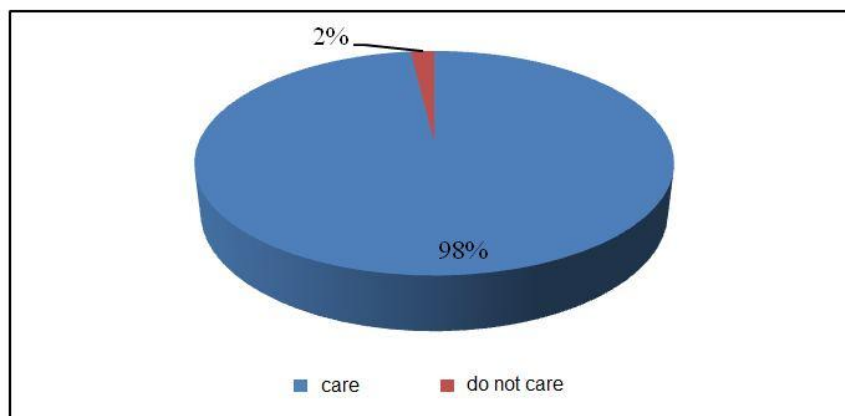


Figure 6. Type of Village Community Job

One measure of the economic level of the community is the level of income. Based on the standard minimum wage (UMR) set by the local government Maluku Rp. 900,000, -/bulan. If related to the results of this study turned out the income of communities in the North East District of the Kei Besar largely classified as below minimum wage income and less than 11 % have incomes above the minimum wage (Figure 6). But the fact that the income referred to above are also subject to change -change every time, because there are people who work as fishermen also have special skills as a maker of copra or otherwise farmers may also conduct " bameti ". Thus it appears that people income in the District is not stable (Figure 7 and 8).

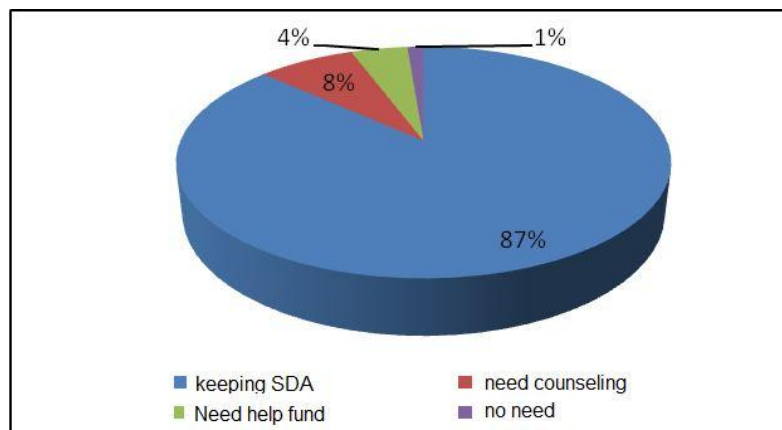


Figure 7. Care Forms of Natural Resources



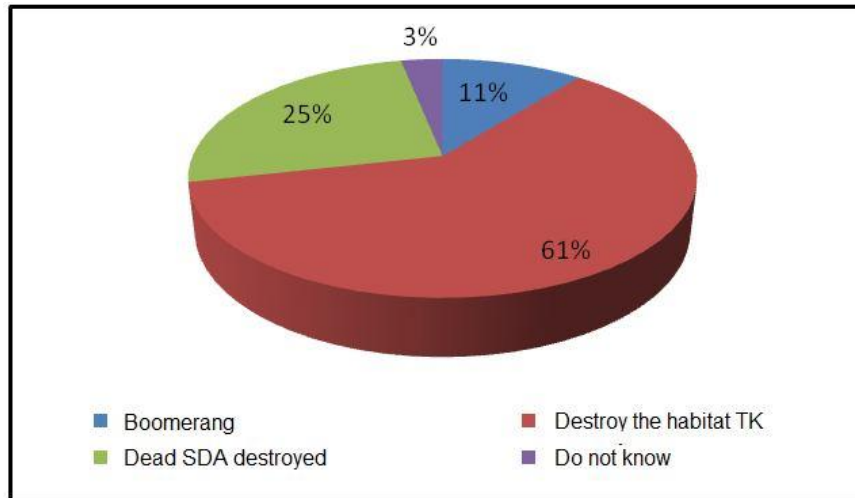


Figure 8. Perceptions About Impact Using Capture Device Not Sustainable

Local knowledge of an area can actually be a mean to regulate the management of natural resources and the environment, in Maluku local knowledge is the "SASI " imposed for both land and marine natural resources. This is also applicable in the villages in the North East District of the Kei Besar(Figure 9).

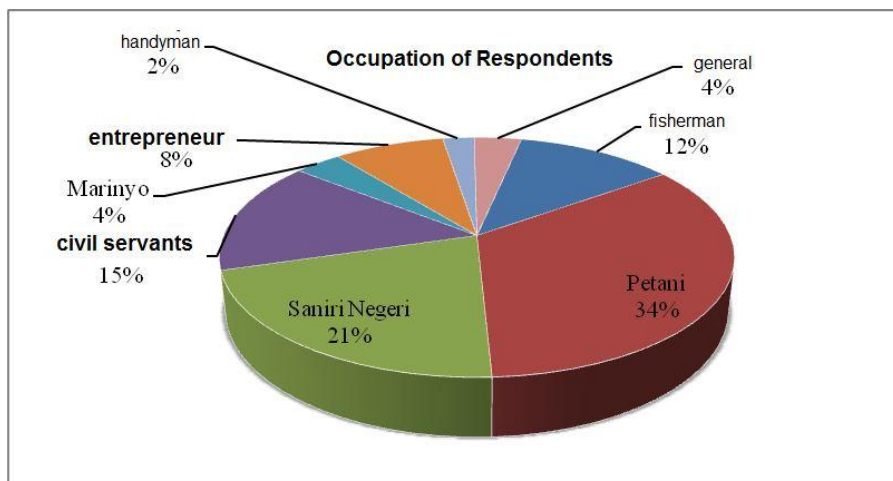


Figure 9. Local Wisdom That applies in the District of Kei Besar North East

Results of the study found that 99% of people said the imposition of "SASI " quite successful in this area to protect natural resources from extinction. The types of natural resources on the land "SASI" is coconut while the natural resources of the sea in "SASI" is lola (Trochusniloticus), sea cucumber and fish. Enforcement "SASI " lola (Trochusniloticus) usually from closing time "SASI " until opening "SASI " usual ranges between 3-4 years and even more, it also depends on the needs of the community. "Sasi " applied to the type of marine resources such as sea cucumber and fish "SASI" done 1 (one) week prior opening " SASI " lola.



The success rate of imposition "SASI" the preservation of natural resources such as marine (Trochus niloticus) lola turns to increase its annual production of 1 ton / yr to 7 tons / yr depending on the length of "SASI ". The success of the imposition of "SASI" is also highly dependent on the supervisory institutions in the villages who carry it out.

### 3.2.2 Local Wisdom Conditions

SASI law in Kei, basically, is a rule of law based on the principles of conservation and balance the human relationship with nature (the ecosystem). This principle is rooted in the first verse of the philosophy underlying speech Larwul Ngabal customary law, namely itdok fo fo ohoi itmian Nuhu (we inhabit or occupy the town / village where we live and eat from nature or soil). The philosophical basis emphasizes the integral relationship between life with nature. Nature is an integral part of man, which we as indigenous peoples. Destruction of nature means the destruction of indigenous life. Therefore, the management of nature for human survival and the balance of nature itself is very basic stuff to cope with malicious intentions, greed and selfishness. The principle of sustainable is one of the main basis of life of indigenous peoples Kei (Evav) (Rahail, 1993).

Based on the above description and the results of interviews and observations obtained in the field in general, people are still very loyal to the application of customary law in protecting and preserving the marine resource known as SASI, by law or legality though people only use customary law / regulation / customary norms applicable for the people in the district of North East Kei Besar categorized theoretically low but people still remain in compliance at the time of enactment of the SASI.

In ancient times few people / society still less obedient to the provisions of the SASI. The violations are usually done by people / society namely 1) harvesting during closed SASI, 2) the use of tuba root for fishing and, 3) the use of fishing gear that is not environmentally friendly like a bomb. The sanctions to the violation are usually subject to fines / witness in the form of: 1) Jaunty (remnants of the Portuguese era trade or shaped cannons and gongs), 2) a fine in the form of money and, 3) in the drop sanctions beaten and told to walk around village with tabaos (shouting) to the public that he committed theft to seafood being in SASI and promised not to repeat the mistakes

Rahail (1993), argued for the Kei "custom" contain some sense as well, namely: 1) Traditional in the sense of " courtesy ". In other words, custom can mean "knowing respect " and " good manners ". It is not good manners that will act carelessly called "unrespectable" or " barbaric ". 2) Custom also means " rules ", " regulations ", " condition " or " way " that all are aimed at regulating human life to peace and happiness together. In this term, custom view often combined with the word "custom" means various rules that govern human life. 3) Custom can also be used in the sense of "innate," which is contained in a person. In a sense this is often equated with the customary "habit". Example: a person who commits a fault usually called people who "do not know the customs".

Brief description above describes the notion of customary law as a habit in all regions of the Kei Islands (Evav) clearly and unambiguously referred to as customary law Larwul Ngabal.

Although it is not or has not been written yet, this Ngabal Larwul law is a positive law in the whole region Kei, because there are traditional institutions that implement them and to those who turned out or found guilty of violating it will be penalized or specific penalties anyway. The division of functions and duties of each customs officials and village government officials at closing time and opening SASI:

#### 1) Functions and Duties of the King or Rat

Customary power includes the villages, according to what is stipulated since the grandfather and ancestors, while the rights belong to the village in the territory of the king of the king should ask the leaders and the leaders / traditional leaders from each village litigants especially (Tuan Tan / Turan Duan Nuhu) who came from the villages. So in addition to land owned by the King of the land of the people, the king must get input from leaders / village traditional leaders.

#### 2) Functions and Duties Vis Ka (Kapitan)

The word is derived from the Portuguese “kapitan” /captain whose job helping Portuguese king to discuss / formulate various events which violate customary law mainly assist the king in war strategizing with others who enter and disrupt the territory of the king established after the entry of the Portuguese and Dutch colonial territory was called Ratschap.

#### 3) Functions and Duties of the Vice Kapitan (Major)

Major is derived from the Portuguese language is mayores serves as assistant principal lieutenant.

#### 4) Functions and Duties of the Village Head or Persons Kai

The functions and duties of the head of the village / kai at the time of execution of the lid and open the SASI (Hawear) namely: its coordination with the head soa / clan head / head fam (in charge of several genera / fam in the village / ohoi). The purpose of the closure of SASI is due to two (2) main points, namely: 1) improve the welfare of rural communities, 2) there is a development in the village, for example to establish church or mosque. Before the closing of SASI usually head village / rich people collect saniri member ohoi (BSO) and village officials government have meeting, discuss matters concerning the implementation of SASI closure, as well as talks about one of the essential requirements for the people who violated at the time of closing SASI and witness / fines given to violators. After deliberation and consensus is reached / agreed then it is conducted planting SASI (hawaer).

#### 5) Functions and Duties of the Head of Soa

Assist in general duties within the village head of government in the soa in coordination with the village head. Soa chief function is the core function of coordination

with village leaders in the implementation of SASI. Closing and opening SASI is conducted based on the needs of each hamlet separate from the parent village. The result obtained is managed by head soa with the people for the prosperity of the people.

#### 6) State Saniri Agency (BSO)

State Saniri Agency (BSO) is a collection of the clan heads (Soa) in the village. Duties and functions of Saniri ohoi is generally oversees the closing SASI and make sure there is no violation. In particular, supervise or remind each clan must not violate the provisions of the SASI.

#### 7) Barin -Wab Wab (Marinho)

From the Portuguese language, which means door keeper, in charge of securing the village chief command / kai convey to the public and act as well as the village policeman. And head soa (the hamlet separate from the parent village). To natural resource management Marinho duty is to convey the message to the entire community, regarding closing and opening SASI.

#### 8) Tuan Tan

May be called Nuhu Met Duan, the duties is keeping the boundaries of the village and hamlet boundaries of society. Tuan tan more familiar with the property and the village in a rural community heritage, hosts tan is not the owner of the village 's total land (land lord has a tan, but not wholly owned by the tuan tan). Functions and duties of Tuan Tan when there is conflict the boundaries of coastal waters, in the management of marine resources, to give an opinion at the time of the customary trial led by the king.

#### 9) Apparatus Village Government

Running administrative system, notify the chief of police chief district and sector (police chief), to obtain a permitting letter of harvesting sea in SASI.

### **4. Conclusions and Suggestions**

#### *4.1 Conclusion*

1) The condition of the resource in the North East District of the Kei Besar has experienced a decline in both the coral reef ecosystem, which is caused by an increasing population, increasing the need of population have an impact on increasing the utilization both legally and illegally. 2) fisheries Community is experiencing considerable pressure to address the needs of family life, as a result of the limitation of access to education, health, information, market, transport and the availability of venture capital, prompting the public to increase revenue in order to fund the needs by exploiting excessively resource areas on coral reef ecosystems.

#### *4.2 Suggestions*

1) It is necessary to raise public awareness efforts rough strengthening and building capacity, provision of access and community empowerment, so that people are not constantly take advantage of the area resources in ways that are not sustainable.

2) For academics, researchers and non-governmental organizations engaged in resource and ecosystem protection activities, it is expected to provide support regional development through research activities periodically and continuously in the region, so that it is able to

provide information to the management agency area and to the government about change of environment so that they can formulate better management plans.

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