

## COASTAL AND MARINE ENVIRONMENT PROBLEMS IN EAST KALIMANTAN PROVINCE

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### ABSTRACT

*Coastal and marine problems were collected from the coastal community in areas of the Municipality of Balikpapan East Kalimantan Province, from fishermen, NGO's and government officials. The technique used was that of the Field Participatory Workshop's. The result of the study revealed some coastal and marine problems at the study sites. The problems are generated from three basic factors, i.e. coastal community awareness, coastal resources usage, and governmental policy. The local government's failure to solve those problems was mainly due to lack of social awareness for environmental coastal management and lack of enforcement.*

**Key Word :** Coastal and Marine Management's Problems

### I. INTRODUCTION

Indonesia is the largest archipelago in the world, comprising more than 17,500 Islands, and a coast line of about 81,000 km. It is a well-known fact that the coastal waters are the most productive marine ecosystems. For example, the primary productivity reaches up to more than 10,000 g C/m<sup>2</sup>/yr in coral reef ecosystem compared to only about 50-100 g C/m<sup>2</sup>/yr in the open seas. Therefore the Indonesian coastal line may provide an important contribution to potential economic development. However, many activities compete for the use of natural resources in the coastal areas. As

well, activities, such as fishing practice of using explosive and / or toxic materials, often destroy the potential value of the marine ecosystem.

The objective of this study is to inventory the coastal and marine environmental problems and issues in the East Kalimantan Province area. It is well known that marine and coastal productivity in east Kalimantan is very high, but industrial development in these area is suspected of endangering marine living organisms and coastal communities. Many industries, e.g. LNG plants and off-shore oil rigs are operated in these areas. Therefore some pollution problems may surface.

Very often oil tankers and tug boats passed through the coastal areas, even in the fishing ground of local fishermen. Thermal waste from LNG plants (Liquid Natural Gas), which is warmer than the natural water temperature, may affect marine living organisms in surrounding areas. Related to this, the study is focussed on the environmental problems, part of the coastal and marine management plan for these areas.

## II. METHODS

The study was carried at Kelurahan Sepinggan, Kelurahan Manggar, and Kelurahan Tritip, Kecamatan Balikpapan Timur, Kotamadya Balikpapan in East Kalimantan province for two months, from November-December 1998, while the data collection was carried out for two weeks, from 9-22 November 1998.

Two kinds of data were collected during the study, i.e. primary and secondary data. The primary data were collected using the problem census method through the Field Participatory Workshop. Participating in the workshop were Local agencies, including Bapedal (Regional Environmental Impact Management Agency) I & II, Bapedalda (Local Environmental Impact Management Agency), Environmental Bureau, Dinas Perikanan (Fisheries Department) I & II, Dinas Pariwisata (Tourism Department), PSL (Environmental Study Center, NGO's (Non Governmental Organi-

zations), other Local Government staffs (the staffs from Kecamatan and Kelurahan, districts and villages, respectively), and members of Local Coastal communities (Fishermen). The workshop was divided into two groups, (a) Group I, consisting of members of coastal communities, mainly fishermen, with about 20-30 persons at each location (kelurahan), and (b) Group 2, consisting of government official and NGO's, with 2-3 persons from each agency. For the Group 2 discussion, since the participants come from the local district and/or Kecamatan, this was only held at one location. The workshop was held on site (at the coastal area), where the participants should provide information about the local environmental problems, which they master since they also came from the surrounding areas. These problems were then discussed by the sub-group participants at each location during the workshop, and the results were then discussed again by the three sub-groups, to obtain the main existing coastal and marine environmental problems in the study sites, environmental problems in the East Kalimantan province in general and the government's constraints in their management. The latter data are expected to be obtained by the second group. With the method, Field Participatory Workshop, the data of coastal and marine problems could be recorded directly during the discussion. Secondary data were collected from the related department offices, e.g. BAPPEDA, PSL and Fisheries Department. The data included coastal and marine environment conditions in the study areas.

### III. RESULTS

#### 3.1. Coastal and Marine Problems in the East Kalimantan Province in General

Some potential coastal and marine ecosystem, e.g. mangrove, coral reefs, sea grass, are damaged in several parts of the province. The damage to the ecosystem was caused by several factors, but the most important of these factors is human activities in order to use the resources in the coastal areas, e.g. agriculture, fishery, deforestation, industrialization, marine tourism, oil drilling and mining. These activities affected the coastal and marine ecosystem. The deterioration of coastal and marine ecosystem is described in detail as follows :

##### 3.1.1. Mangrove

PSLH UNMUL (1996) reported that many mangrove forests have been damaged along the coast of East Kalimantan province, and only a small portion remain undamaged. The damage is due to the anthropogenic activities, mainly clearing mangrove by cutting. Many mangrove trees were cut for the purpose of using them to produce charcoal, cattle feed, and using the cleared areas for tambaks (brackish water pond). An example at Bontang, East Kalimantan Province showed that mangrove forests were cleared for harbour construction and fish pond development. These activities resulted in a sediment load of 457.14-461.43 mg/l, and the degradation of marine water quality in that area. The decrease in water quality due to sedimentation was also reported at the Sanggata Utara. Development in the area, i.e. for tambaks, mining and infra-

structure development of the harbour had resulted in high sediment loads. This affected many mangrove trees so much that those with a diameter of > 20 cm died. Only a small portion of the mangrove remained, mainly from the species *Rhizophora* sp and *Avicennia* sp. Mangrove community problems were also reported at the Muara Jawa areas. Many mangrove trees were cleared for the development of tambaks of more than 100 ha. This resulted in the decrease of the percentage of mangrove cover. Result of a satellite SPOT by PSL UNMUL (1989) showed a red colour of water at the mouth of the River Mahakam, due to high sedimentation. This condition also occurred at most coastal areas in the East Kalimantan province.

##### 3.1.2. Coral Reef

Similarly, at the same time that damage was done to the mangrove ecosystem, some coral ecosystems have also been damaged. For example along the coast of north Java Island, only a small percentage of living corals remain. The coral damage have been reported as the effect of bad land use management, which resulted in high sediment load in those areas. The same evident is also reported in the Bontang area, East Kalimantan. All reef corals died at the areas close to the out flow of the LNG (Liquid Natural Gas) plant at Bontang Bay, while they were growing luxuriantly outside Bontang Bay, with about 117 species, generated from 53 genera of corals (AMDAL LNG Bontang, 1988). The seawater temperature close to the out flow of LNG at Bontang is recorded about 8-10°C above the ambient level, i.e. 31.2-36.7°C. It has been proved that reef corals are unable to withstand too high

seawater temperature. Coles and Jokiel (1978), and Neudecker (1981), reported that an increase of seawater temperature to about 4-6°C or higher above ambient level will affect the growth or even kill reef corals and plankton (Supriharyono, 1997). Other environmental factors which are suspected of affecting reef coral distribution at the coast of Bontang, are reclamation, dredging for marine transportation, fishing with explosives and toxic materials, and sedimentation. The latter factor, i.e. sedimentation, may be the common factor affecting reef coral growth along the coast of East Kalimantan, i.e. Balikpapan, Samboja, Muara Jawa, Muara Badak, Bontang and Saggata areas, and this will finally affect fishing grounds (PSLH UNMUL, 1996).

### 3.1.3. Sea grass Beds

Sea grass is another productive marine ecosystem in coastal areas. From 12 genera of sea grass recorded in the world (Den Hartog, 1970) about seven of them have been recorded in Indonesian waters. These genera include *Enhalus*, *Thalassia*, *Halophila*, *Halodule*, *Cymodoceae*, and *Thalassodendron*. These genera grew at the sites (Sub District of Kecamatan Timur), mainly at the coast of Bontang and Balikpapan Timur (PSLH UNMUL, 1996). Similar to reef corals, the sea grasses were also affected by high sedimentation and other human activities in the coastal areas.

### 3.1.4. Fisheries

As mentioned before some parts of the coastal/ marine ecosystem, such as mangrove, coral reef, and sea grass beds, are important for products of the marine system.

It is in these waters that fish and other marine animals usually spawn, rear, feed and/or find sheltering grounds. Therefore the condition of these systems automatically affect these living organisms. As reported, the marine ecosystem, e.g. mangrove, coral reef and sea grass beds showed degradation of their condition, due to decreasing water quality. However, marine fish capture production was about 8,000 ton/year at Balikpapan (Local Fishery Department, East Kalimantan Province, 1995). Unfortunately, there was no information on where those fish were captured. I believe that the fishing ground was far from the coast line, since the water quality may be good enough for the growth of fish in that area.

## 3.2. Case Study of the Coast and Marine Environmental Problem and Issues in Kotamadya Balikpapan, East Kalimantan Province

The Municipality of Balikpapan may be one of the busy districts in the province of East Kalimantan. Many human activities, from agriculture, fishery, forestry, up to industrialization (including mining and oil drilling), are all developed in this district. These activities, in order to use the coastal and marine resources, some times overlapped, therefore some problems and issue, e.g. decreasing of coastal/marine water quality, may occurred in these areas. The coastal communities, mainly fishermen, may the most poor community. Since, it is often that fishing ground moved to further areas, due to decreasing of water quality in the coastal areas. The problem and issues, and the constraint of coastal management, moreover, are described as follows.

### 3.2.1. Problem and Issues

Results of the study showed that some problems and issues were reported at the study sites, i.e. Kelurahan Sepinggan, Kelurahan Manggar, and Kelurahan Tritip, Kecamatan Balikpapan Timur, Kotamadya Balikpapan, East Kalimantan Province. These problems are listed as follows :

1. Lack of aesthetic of the coastal areas, due to coastal community awareness on coastal management;
2. Industrial, agricultural and domestic sewage, as well oil spills either from the tug boats, fishing boats, or others, including tankers. These pollutants resulted that the fishing ground, especially for small fisheries, are becoming far and far from the coastal line. Moreover these pollutants were also reported by the fish farmers (petambak) that those affected the fish production;
3. Many tambaks (brackish water ponds) have been damaged and are no longer productive, mainly due to decreasing of water quality;
4. Boats collisions. These mainly occurred between fishing boats and the tankers. According to the local fishermen, that accident occurred due to many tug boats operated across the fishing grounds;
5. Mangrove ecosystems damaged due to functional changes. Many mangrove trees had been cut or be opened for the tambaks. This resulted that mangrove cover decreased at the study sites;
6. Corals reef ecosystem damaged due to the practice of fishing with the explosive and/or toxic materials (KCN). Although this may not mainly be conducted by the fishermen;

7. Low of community awareness about the need to manage coastal environment;
8. The functional changes of protected zones due to development in the coastal areas;
9. Abrasion. This resulted increasing sediment loads in the coastal areas.

Moreover these problem and issues may be categorized into three groups, according to the aspect of the problems, i.e.:

#### a). Coastal Community Aspects

Lack of people awareness the coastal environment; e.g.

1. The practice of fish capture using explosive and/or toxic materials (KCN); and
2. Coral collecting and mangrove cutting which resulted in damage to the coastal ecosystems.

#### b) Coastal and Marine Resources Usage

1. Industrial processes and other human activities in the coastal areas resulted pollution problems in marine and coastal areas;
2. Many mangrove ecosystems have been changed to tambak (brackish water pond);
3. The practice of fishing used explosive and/or toxic materials (KCN);
4. Deforestation resulted land erosion and high sedimentation in the coastal areas;
5. Many coral reef and mangrove ecosystems have been damaged.

### c) Governmental Aspects

1. There is no government planning for sustainable management of the coastal and marine environmental;
2. The environmental control from the government may not be socialized enough;
3. Coastal resources usage management are overlapped, e.g. between fisheries and industries (shipping). As many fishing boats were collided by the tug boats; and
4. The cost of technology for clean environment due to pollutant is very high.

### 3.2.2. Management Constraint

According to the government speakers, actually the coastal and marine environmental problems have been tried to be solved. Unfortunately, there are some constraints occurred, in relation to environmental management in the areas. These constraints are as follows :

1. Low community awareness. The response of coastal community is very low on the their environment;
2. Do not know appropriate techniques for coastal management;
3. Environmental control is not effective yet;
4. The infrastructure is not supported enough for environmental control activities;
5. There is no integrated coastal zone management as cross sectors approach;
6. There is no a special institution responsible for coastal zone management;
7. Coastal environmental monitoring is not continuous;

The main reason for the problem above is due to limited experts for the coastal and marine management. While the guide books for this matter is not available yet from the government.

## IV. CONCLUSION

According to result of the study it may be concluded that some problems and issues are faced to the local government. These may be grouped into three, i.e. the problems which related to (a) coastal community awareness, (b) coastal resources usage, and (c) government policy. Although the government have tried to solve these, but some constraints may occurred in relation to the coastal management.

## REFERENCE

- ADB, 1993. Environmental Assessment Requirements and Environmental Review Procedures of the Asian Development Bank. Office of the Environment.
- AMDAL LNG Bontang, 1983. Analisis Mengenai Dampak Lingkungan Proyek LNG Bontang, Kalimantan Timur. PT Widya Pertiwi Engineering dan Universitas Mulawarman.
- BAPEDA, 1998. Rencana Strategis Pengelolaan Pesisir dan Laut/Coastal and Marine Management Strategic Plan (10 volumes for each MREP Project).

- Coles, S.L. and P.L. Jokiel, 1978. Synergistic effects of temperature, salinity, and light on the hermatypic corals Montastrea verrucosa. *Mar. Biol.*, 49: 187-195.
- Den Hartog, C., 1970. The sea grasses of the world. North Holland Publishing Company. Amsterdam, 275p.
- Neudecker, S., 1981. Growth and survival of scleractinian corals exposed to thermal effluents at Guam. *Proc. 4th. Int. Coral Reef Symp.*, Manila, 1: 173-180.
- PSLH UNMUL, 1996. Studi Sosial Ekonomi dan Lingkungan di Kawasan Pesisir dan Laut (MCMA), Samarinda-Sangkulirang, Kalimantan Timur. Direktorat Jendral Pembangunan Daerah, Departemen Dalam Negeri, Jakarta.
- Supriharyono, 1997. Pengaruh kenaikan suhu air laut terhadap kelangsungan hidup plankton di perairan laut Jepara. Kerjasama antara Pusat Penelitian Energi dan Sumberdaya Alam, Lembaga Penelitian, Universitas Diponegoro dan Badan Tenaga Atom Nasional, Jakarta.