POLICY ANALYSIS OF MANGROVE FOREST MANAGEMENT IN NORTH SUMATERA PROVINCE

ITTO PPD 95/04 (F):
“MODEL OF REHABILITATION AND SUSTAINABLE UTILIZATION OF MANGROVE FOREST AT LANGKAT, NORTH SUMATERA”

COLLABORATION BETWEEN:

INTERNATIONAL TROPICAL TIMBER ORGANIZATION [ITTO]
AND
DIRECTORATE GENERAL OF LAND REHABILITATION AND SOCIAL FORESTRY,
MINISTRY OF FORESTRY - THE GOVERNMENT OF INDONESIA

Jakarta, October 2005
# CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contents</td>
<td>i</td>
</tr>
<tr>
<td>Tables</td>
<td>ii</td>
</tr>
<tr>
<td><strong>I.  INTRODUCTION</strong></td>
<td>1</td>
</tr>
<tr>
<td><strong>II. MANGROVE FOREST MANAGEMENT POLICY</strong></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1. National and International Policy Connected with Mangrove Forest</td>
<td>2</td>
</tr>
<tr>
<td>Management</td>
<td></td>
</tr>
<tr>
<td>2.2. Sectoral Policy</td>
<td>8</td>
</tr>
<tr>
<td>2.2.1. Forestry sector</td>
<td>8</td>
</tr>
<tr>
<td>2.2.2. Environment Sector</td>
<td>13</td>
</tr>
<tr>
<td>2.2.3. Agriculture/Fisheries Sectors</td>
<td>13</td>
</tr>
<tr>
<td>2.2.4. Regional Government (Instruction of Internal Affair Minister No.</td>
<td>14</td>
</tr>
<tr>
<td>26, year 1997 about Establishment of Mangrove Green Belt)</td>
<td></td>
</tr>
<tr>
<td><strong>III. MANGROVE FOREST MANAGEMENT INSTITUTIONS</strong></td>
<td>15</td>
</tr>
<tr>
<td>3.1. Associated institutions in Mangrove Forest Management</td>
<td>15</td>
</tr>
<tr>
<td>3.2. Analysis of Activities of Each Stakeholder</td>
<td>16</td>
</tr>
<tr>
<td><strong>IV. CONCLUSION</strong></td>
<td>27</td>
</tr>
<tr>
<td>REFERENCES</td>
<td></td>
</tr>
</tbody>
</table>
TABLES

Table 1. Regulation of Mangrove Forest Ecosystem Management ....................... 17
Table 2. Institutions related in mangrove forest ecosystem management in Indonesia .......................................................... 18
Table 3. Forest Management Institutions according to Law No. 41, year 1999...... 21
Table 4. Time Range for Forest Usage License Published ............................. 22
I. INTRODUCTION

Republic of Indonesia has mangrove forest area around 3.7 million hectare which spreads from Sumatera, Kalimantan, Sulawesi islands to Irian Jaya. North Sumatera province has around 85,393 hectare area of mangrove forest with the vastest area found at Langkat district (± 35,908, 34 Hectare or 42.05%).

The policy of mangrove forest management in Indonesia has been started from East Indische government which established mangrove forest area as production forest (produce wood) and conservation forest (to protect and conserve). Republic of Indonesia with law number 5, year 1967 grouped the forest according to its function as: conservation forest, production forest, nature conservation forest, tourism forest (conservation). Law number 5, year 1990 and law number 41, year 1999 (forestry) regulate the management of forests in Indonesia which include the management of mangrove forest.

Technically mangrove forest management activities have been arranged in law products of government’s regulation, President Decree, Ministry Decree and regional regulations. But the implementation for those rules are still weak, therefore the exploitation rate of mangrove forest still uncontrollable.

Two main causes of mangrove forest damage in Indonesia are: wood exploitation (for daily using, charcoal material, and chips) and mangrove forest conversion (most for fisheries). Some causes of mangrove forests ecosystem damage in North Sumatera are: conversion, illegal logging, overlapping in space arrangement and landuse, and functions of mangrove management authority that still work sup optimally. These cause the suboptimal functions of mangrove ecosystem.
REFERENCES


ODA and Directorate General of Fisheries Indonesia. 1993. Comparative Economics of Land Use Options in Mangrove Forest Areas on The Malacca Straits Coast of North Sumatra Province.


II. MANGROVE FOREST MANAGEMENT POLICY

2.1 National and International Policy Connected with Mangrove Forest Management

Some policies connected with mangrove forest management in Indonesia is mentioned in several law and regulation mentioned below:

- National constitution 1945 chapter 33 verse 3
- Law No. 5 year 1960 about Main Agrarian Affairs
- Law No. 9 year 1985 about Fishery
- Law No. 5 year 1990 about Natural Resources and Ecosystem Conservation
- Law No. 9 year 1990 about Tourism
- Law No. 24 year 1992 about Space Arrangement
- Law No. 5 year 1994 about Biodiversity Convention
- Law No. 6 year 1994 about Climate Changing Convention
- Law No. 23 year 1997 about Environment Management
- Law No. 22 year 1999 about District Government
- Law No. 41 year 1999 about Forestry
- Law No. 25 year 2000 about Propenas
- Law No. 7 year 2004 about Water Resources Management
- Government Act No. 28 year 1985 about Forest Protection
- Government act No. 15 year 1990 about Fishery
- Government act No. 20 year 1990 about Water Pollution Monitoring
- Government act No. 27 year 1991 about Swamps
- Government act No. 35 year 1991 about Rivers
- Government act No. 18 year 1994 about Ecotourism Effort
- Government act No. 47 year 1997 about National Space Arrangement Plan
- Government act No. 68 year 1998 about Natural Conservation and Preservation Area
- Government act No. 27 year 1999 about Environment Impact Analysis
- Government act No. 25 year 2000 about Government and Province Authority as Autonomy Region
Government act No. 34 year 2002 about Forest Arrangement and Forest Management Plan Arrangement, Forest Usage and Use of Forest Area

As a country with high biodiversity and to build perception as an independent nation who concern for biodiversity conservation, Indonesian Government has ratified some result of International convention, such as:

- CITES Ratification through President Decree No. 43 year 1978
- Ramsar convention ratification through President Decree No. 48 year 1991
- Biodiversity convention ratification through Law No. 5 year 1994
- Climate Changing convention ratification through Law No. 6 year 1994
- UNCCD ratification
- Cartagena protocol (Biodiversity safety from biodiversity convention) ratification
- Kyoto protocol ratification

Those National and International policies are connected with mangrove forest management in Indonesia, but specifically policies that dominantly regulate mangrove forest ecosystem management in Indonesia are mentioned below:

National policy in mangrove ecosystem management in Indonesia can be seen in Law No. 24 year 1992 about Space arrangement and President decree No. 32 year 1990 about Protected Area Management. In National space arrangement plan and clarified in province’s and district’s space arrangement, mentioned that mangrove forest area that has categorized as protected area. Space arrangement based on area’s main function including protected area and cultivation area. Some main ideas that establish coastal Protected Area are:

(1) Law No. 24 year 1992
   a. Chapter 1:
      (1) Protected area is an area which main function is to protect environment including natural resources and artificial resources.
      (2) Cultivation area is an area which main function is to cultivate based on its natural, human and artificial resource’s condition or potential.
b. **Chapter 3 (explanation):**

Protected area utilizing arrangement is forms of space arrangement in protected area such as rehabilitation, conservation, research, ecotourism, etc.

Aims of protected area space arrangement are: (a) Optimal achievement space arrangement of protected area; (b) Increase protected area function.

Cultivation area utilizing arrangement is forms of space arrangement in cultivation area such as mining activities, silvi-culture and agriculture cultivation, and housing, industry, tourism and other aspects development activities.

Aims of cultivation area space arrangement are: (a) Optimal space arrangement of cultivation area is achieved; (b) Increase cultivation area function.

c. **Chapter 7 (explanation):**

Included in protected area are protected forest area, peat swamp, water absorption area, coastal green-belt, river banks, area around lake/dam, area around water sources, natural conservation area, mangrove forest, national park, natural tourism park, and high risk natural disaster area.

Included in cultivation area are production forest area, agriculture area, urban area, industry area, tourism area, education area, Security and Defences area.

**2) President Decree No. 32 year 1990**

a. **Chapter 1:**

(1) Protected area management is an effort to establish, conserve and controlled protected area utilization.

(2) Protected Forest area is forest areas that hold specific character which can provide protection to surrounding and underneath area as water regulator, flood and erosion buffer and to maintain soil fertility.

(3) *Coastal green-belt* is area in the left and right handed side of the coastline that hold important function to protect beach function infinity.
(4) *River bank* is area in the left and right handed side of the river, including artificial river/canal/ primary irrigation waterway that hold important function to protect river function infinity.

(5) Natural conservation area is areas with specific character, in land or in water which main function is to flora and fauna diversity and ecosystem preservation area.

(6) Beach area with mangrove forest is mangrove natural habitat coast area that gives protection to the existence of live in beach and sea.

(7) Natural tourism park is natural conservation are both in land and sea that been use mostly for ecotourism and natural recreation.

b. **Chapter 2:**

(1) The objective of protected area management is to prevent destruction of environment function.

(2) Target of protected area management are: (1) to increase protective function towards soil, water, climate, flora and fauna also historical and cultural values of a country; (2) To preserve plantation and animal species, ecosystem type and natural rarity diversity.

c. **Chapter 8: Protected forest area criteria:**

(1) Forest area with diagonal grassland, soil type and rain flow factors above 175 point and or;

(2) Forest area that posses 40% diagonal grassland or more and or;

(3) Forest area with height 2000 meters above sea level or more.

d. **Chapter 16: Coastal green-belt criteria;**

(1) At least 100 meters left and right handed side of big river and 50 meters left and right handed side of river stream outside housing area.

(2) for rivers in housing area *Sempadan* is estimated to 10 – 15 meter long, enough to build inspection road.
e. Chapter 18
Lake/dam surrounding area criteria is ground along lake/dam side with proportional wide with physical condition and shape of the lake/dam between 50 – 100 meters from highest tide level to the ground.

f. Chapter 23:
(1) Natural reserve criteria:
   a. Identified area has flora and fauna species diversity and its ecosystem type.
   b. Represent specific biota formation and/or construction units.
   c. Has natural condition both physical and biota, is still virgin, never or not yet intruded by human activities.
   d. Has certain wide and shape in order to support effective management with a spacious buffer area.
   e. Hold specific unique character the one and only examples in a region that their existence is crucial for conservation effort.

(2) Wildlife reserve criteria:
   a. Identified area is a living and breeding habitat for certain animal that need to be conserved.
   b. Has high fauna population and diversity.
   c. Is a living and migrating place for particular migrant species.
   d. Spacious enough to become a habitat of the particular species.

(3) Forest recreation area criteria:
   a. Identified area has interesting and beautiful condition whether it’s natural or artificial.
   b. Able to provide human demand of recreation and sport and located near the urban area.
   c. Has hunt animal that easily breed so regular hunting season is possible, but recreation, sport and animal welfare side is still priority.
   d. Has enough space and not dangerous land.

(4) Plasma nutfah (genetics source) area criteria:
   a. Identified area has particular species of genetic source that hasn’t been found in other conservation area.
b. Animal transferring area which will be the new habitat for that animal.
c. Has enough space and not dangerous grassland.

(5) Fauna evacuation area criteria:
   a. Identified area is the original habitat of certain species.
   b. Spacious enough to become a habitat of the particular species, and enough for its live-cycle.

g. Chapter 26:
   Protection on beach with mangrove forest area is done to conserve mangrove forest as ecosystem maker and also as breeding place for other biota beside to protect beach and sea water erosion and cultivation effort behind it.

h. Chapter 27:
   Beach with mangrove forest area criteria is minimal 130 times average score difference between highest and lowest annual tide measured from the lowest ebb tide to the ground.

i. Chapter 37 (Controlling protected area):
   (1) Inside protected area cultivation is prohibited; except it’s not harm the forest function.
   (2) Inside natural preserve area any cultivation is prohibited, except it’s connected with its function and not changing natural condition, area utilizing and existed natural ecosystem.
   (3) Existed cultivation act in this area that provide important environment effects is affected by several regulations as mentioned in Government act No.51 year 1993 about Environment Impact Analysis.
   (4) If the analysis suggest that this activity harms forest functions the development should be banned and protected area function should be restored gradually.

j. Chapter 38:
   Cultivation activity management mentioned in verse 2 is done by maintain protected area’s function.
**k. Chapter 39:**

(1) Government in district level must control landuse utilization in protected area.

(2) Decision in verse (1) is including observation, supervision and controlling.

**2.2. Sectoral Policy**

**2.2.1 Forestry sector**

**(1) Law No. 41 year 1999 about forestry**

*Chapter 3:* Forestry organizer goal is for community prosperity that’s fair and sustainable with:

a. Assure that forest existence with enough space and proportional distribution.

b. Optimal forest function, including conservation, protection, production to achieve balance and sustain environment, social, cultural and economy benefit.

c. Increase Watershed (DAS) support.

d. Increase ability to develop community capacity and empowerment that participative, fair and environment literate also able to create social and economy defence through external changes.

e. Assure fair and sustainable benefit distribution.

*Chapter 6:* Verse (1): Forest has three functions: conservation, protection and production.

Verse (2): Government define forest based on their main function as: Conservation forest, protected forest and production forest.

*Chapter 7:* Conservation forest consists of: natural reserve area, preserve forest area, and Games reserve.

*Chapter 12:* Forest planning activity

(1) forest planning and arrangement activity is part of forest planning which include forest inventories, establishment area, arrangement area, forming of forest management area and forestry planning activities.

(2) Forest Inventories activities consist of: nation, region, DAS and management forest inventory.

*Chapter 15:* Forest area establishment include: forest area appointment, forest area border arrangement, mapping, forest area establishment. Establishment forest area appropriate with regional space arrangement plan (province and district).
Chapter 16: Utilizing forest area consist of functioning and utilizing forest area activities.

Chapter 17: Forming of forest management area include: province, district/city, management unit level management, considered: land characterization, forest type, forest function, DAS condition, social, economy and cultural of local community, and their institution.

Chapter 18: Verse (1) Government define and maintain enough space or forest area and forest covered for every DAS and or island, in order to optimize environmental, social and local community economic benefit value.

Verse (2) Total Forest area that must be maintained as mention in verse (1) is minimal 30% of DAS space and or island with proportional distribution.

Chapter 20: forest management planning was made by time range, long range (>20 years), mid range (5 years), and short range (1 year).

Chapter 24: Forest utilizing can be done to all forest area, except conservation and core zone and jungle zone of national park.

Chapter 27: (Protected Forest Utilization)
Verse (1): utilizing area licensed can be given to person or koperasi.
Verse (2): environment services utilizing licensed can be given to personal, koperasi, Indonesia private company, and national or state company.
Verse (3): non wood forest product collection licensed can be given to personal and koperasi.

Chapter 29: (Production Forest Utilizing)
Verse (1): Forest concession licensed can be given to personal and koperasi.
Verse (2): environment services utilizing licensed can be given to personal, koperasi, Indonesia private company, and national or state company.
Verse (3): non wood forest product collection licensed can be given to personal and koperasi.
Verse (4): Wood forest product utilizing business licensed can be given to: personal, koperasi, Indonesia private company, and national or state company.
(2) Law No. 5 year 1990 about Natural resources conservation and its ecosystem.
Main ideas that mentioned in the law above and connected to mangrove forest conservation are:

a. Life supporting system is natural process from several live and non live element that assure the live of a species.
b. Protection of this life supporting system is done in order to maintain ecological process that supports life sustainability to increase human prosperity and life quality.
c. Each land utilizing licensed and water business licensed in life supporting system area must maintain the sustainability of protection function of the area.
d. In order to protect life support system, government regulate and done some controlling action to soil utilization and management inside the life supporting system area.
e. Life supporting system area that going through destruction naturally and or due to the utilizing and other factors should be followed by rehabilitation effort that well planed and continues.
f. Preservation of flora and fauna diversity and their ecosystem, is done to maintain the completion of conservation site in order to maintain it’s originate.
g. Sustainable utilizing of natural resources and ecosystem is done through some activities: (1) environment condition and utilizing of conservation area (National park, Grand forest park and recreation forest); (2) Flora and fauna species utilizing.
h. Environment condition utilizing of conservation area should be keep as it’s function.
i. Flora and fauna utilizing could be done by: (1) acknowledgement, research and development; (2) Nurturing; (3) Hunting; (4) Trading; (5) show and exchange; (6) medicine plantation cultivation and (7) caring for excitement.

(3) Government act No. 18 year 1994 about natural tourism in utilizing zone of National park, grand forest park and recreation forest

Some regulation connected with possibility of mangrove forest utility for recreation forest importance, such as:

a. Ecotourism is everything that connected with natural tourism, including make an effort of the object and affection and other business that connected to the field.
b. Natural tourism is touring activity or part of that activity that done voluntarily and temporary to enjoy unique phenomenon and nature beauty.

c. Nature Tourism Company is done according to natural resources and ecosystem conservation principle.

d. Nature Tourism Company is targeted to increase utilizing of unique phenomenon and beautiful scenery in Utilizing Zone in natural tourism park.

e. Natural tourism companion company consist of: accommodation (motel, camp, caravan, teenage guesthouse), food and beverages, water tourism device, tourism transportation, souvenir, cultural tourism instrument.

f. Natural tourism company instrument is held with some condition:
   (1) Space use to build structure and infrastructure of natural tourism maximum 10% of utilizing block space of natural tourism park.
   (2) Building is built with local cultural architecture.
   (3) Not changing natural landscape.

(4) **Government act No. 68 year 1998 About Conservation And Preservation Area**

This government act regulates conservation management, including:

   (a) Natural preserve establishment
   
   An area been called as wildlife reserve if these criteria are fulfilled:
   
   a. This area is habitat and breeding ground of fauna species that need to be conserved
   
   b. Has high fauna diversity and population
   
   c. Is a habitat for endangered species
   
   d. Is a living and migrating place for particular migrant fauna
   
   e. Spacious enough to become a habitat of the particular fauna

   (b) Management and Preservation
   
   Each wildlife reserve managed based on one management planning, arranged by ecology, technique, economic and social culture aspect analysis. Wildlife reserve planning at least contains management objective, activity guideline that provides protection effort, preservation and limited utilization. Meanwhile preservation effort of wildlife reserve is done by some activities: area protection and security, area potential inventories, supporting research and development.
Beside those activities in wildlife reserve also done habitat establishment and animal population activities, including education about animal feeding, providing wallow/ drinking pot, habitat rehabilitation (reforestation, preservation), and population rarity, plantation and animal intensify, destroying of destructive animal and plantation.

(c). Utilizing

Wildlife reserve can be utilize for:
- Research and development
- Science
- Education
- Limited ecotourism
- Supporting cultivation activity

(d). Supporting Areas

The function of supporting area is to maintain wildlife reserve from all pressure and disturbance from outside and or inside the area that might cause changes in unity and or area function.

Supporting area decided by these criteria:
- Geographically side by side with wildlife reserve
- Ecologically has good effect to wildlife reserve from inside or outside.


Main policies are:
- Tree that allowed to be cut has to have >10 cm diameter and each acre should be left 40 seed trees, so this system called seed trees method.
- Brackish forest green track that may not be cut is 50 m from beach line and 10 m from river side.
- Brackish forest company class divided into mangrove company class and non-mangrove class.
2.2.2. Environment Sector

(1) Law No. 23 year 1997 About Environment Management

a. Chapter 9

Government determine national policy about environment management and landscape but keep considering religious value, culture and other community. Environment management integrated by government institution according to their duty and responsibilities community and development actor by noticing integrated planning and execution of environment management in national policy.

Environment management must be done integratedly with landscape non-living natural resources protection, artificial resources protection, living natural resources and ecosystem conservation, cultural conservation, natural biodiversity and climate changes.

b. Chapter 14

To assure sustainability of environment function, every effort and/or activities are not allowed to violate standard criteria of environment damage.

c. Chapter 16

Every side that in charge in business and/or activities must perform waste management

2.2.3. Agriculture/Fisheries Sectors

a. Instruction of Agricultural Minister No. 13/Ins/Um/1975 about mangrove forest establishment. Following this instruction, Directorate General of Fisheries Instruction No. H.I/4/2/18/1975 was published, which instructed the chief of Regional I/Special Region Fisheries Services in Indonesia to attempt creating green belt across the shore width 400 m that count from lowest point of ebb tide.

b. Letter of join resolution from Ministers of Agriculture and Forestry No. KB.550/246/Kpts/4/1984 and No. 082/Kpts-II/1984 about the arrangement of forest area for developing agricultural efforts which contain that while waiting results from scientific research by related institutions, the width of green belt are 200 meter.
2.2.4. Regional Government (Instruction of Internal Affair Minister No. 26, year 1997 about Establishment of Mangrove Green Belt)

Establishment of mangrove greenbelt adjusted with ecological conditions and local community social economy which considerate:

- Sea tide and width of tide
- Sea wave
- Beach topography
- Type and condition of soil
- Composition type and mangrove vegetation density and fauna diversity
- Type of utilization of the area around the green belt
- Local community social economy

**Technique for Establish Mangrove Green Belt**

In implemented the Internal Affair Minister Instruction No. 26, year 1997:

a. District government/major responsible for mangrove forest green belt management started from planning, implementation, rehabilitation, maintenance, security and usage.

b. On planting, rehabilitation, maintenance and mangrove forest security, district government/major involved community participation in order to create the responsibilities for maintaining, securing and keeping the mangrove forest green line.

c. Land and wood usage in the mangrove forest green belt only possible for corridor establishment as the access to ocean or river
III. MANGROVE FOREST MANAGEMENT INSTITUTIONS

3.1. Associated institutions in Mangrove Forest Management

Nationally, institutions that responsible for mangrove forest management in Indonesia are:

1. Department of Forestry: responsible for technical procedures in managing mangrove forest which include protection, conservation and preservation, rehabilitation, reforestation and usage.

2. Department of Marine and Fisheries Affairs: responsible in facilitating, establishment, and coordination of mangrove forest management as follow up from fisheries activities, shore protection from erosion and natural disaster, coastal region mitigation and coastal environment preservation.

3. Ministry of Environment: responsible in coordinating rules, guidance, monitoring and implementation policies report evaluation and mangrove forest ecosystem management.

4. Internal Affair Minister: has the authority in coordinating and guiding the activities that linked with planning, implementation and controlling mangrove forest ecosystem management in his area.

5. Department of Agriculture: responsible for technical guidance in agriculture commodities management that associated with mangrove forest ecosystem.

6. Department of Industry and Trade: responsible in providing information of standard quality for raw materials, efficiency in usage of recycles products from mangrove ecosystem production system.

7. Department of National Education: responsible for supporting education programs based on knowledge of mangrove ecosystem.

8. Indonesia Science Institution: responsible in coordinating information for development of technology knowledge that associated with mangrove forest management.

10. Ministry of Research and Technology: responsible for analyze and develop research and technology for mangrove ecosystem management.

11. Department of Public Health: responsible in creating quality standard for material processing, procedure for processing and quality supervision for produce medicine with materials from mangrove.

12. Department of Public Work: responsible for developing facilitates in mangrove forest.


14. Ministry of Information and Communication: has role in spreading information about mangrove ecosystem.

15. National Land Institution: responsible in located and usage of area in order to appropriate with on regional space arrangement planning (RTRW) and regulations.

16. National Survey and Mapping Coordination (BAKOSURTANAL): responsible in coordinating mangrove forest inventories and collecting basic data that needed for Geographic Information System (GIS) development.

17. House of Representative (DPR): has an active role in implementation of mangrove ecosystem management trough policies and published law regulation.

18. Regional Parliament has an active role in implementation of mangrove ecosystem management trough policies and published regional law regulation.


3.2 Analysis of Activities of Each Stakeholder

Some of law regulations and responsible institutions, and management analysis of activities that performed by some associated institutions with mangrove management can be seen at Table 1 and Table 2.
<table>
<thead>
<tr>
<th>No.</th>
<th>Type of Regulation</th>
<th>No./Year</th>
<th>Name of Regulation</th>
<th>Institution’s Authority</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Law</td>
<td>5/1965</td>
<td>Principal Law of Agrarian</td>
<td>Committee of Soil</td>
<td>Mangrove Ecosystem included in this law</td>
</tr>
<tr>
<td>2</td>
<td>Law</td>
<td>5/1967</td>
<td>Principal Law of Forestry</td>
<td>Department of Forestry</td>
<td>Mangrove Ecosystem/ Mangrove Forest regulated based by status and it’s function as a area of forestry (forest area, non forest area)</td>
</tr>
<tr>
<td>3</td>
<td>Law</td>
<td>5/1974</td>
<td>Principals of Region Government</td>
<td>Department of Internal Affair</td>
<td>Correlated with region government authority for recommendation/license of mangrove ecosystem usage</td>
</tr>
<tr>
<td>4</td>
<td>Law</td>
<td>11/1974</td>
<td>Irrigation</td>
<td>Department of General Work</td>
<td>Correlated with regulation of river/irrigation canal (Mangrove ecosystem consist of river, channel)</td>
</tr>
<tr>
<td>5</td>
<td>Law</td>
<td>5/1979</td>
<td>Village Government</td>
<td>Department of Internal Affair</td>
<td>Village authority and form of village government (associated with village government role with mangrove ecosystem management)</td>
</tr>
<tr>
<td>6</td>
<td>Law</td>
<td>4/1982</td>
<td>Principal Rule of Bio-environment management</td>
<td>Minister of Bio-Environment</td>
<td>Establishment (management and environment controlling) and control (inspection, punishment and fine) activities of mangrove ecosystem</td>
</tr>
<tr>
<td>7</td>
<td>Law</td>
<td>5/1989</td>
<td>Fisheries</td>
<td>Department of Agriculture</td>
<td>Fishing farm</td>
</tr>
<tr>
<td>8</td>
<td>Law</td>
<td>5/1990</td>
<td>Conservation of Natural Resources and it’s Ecosystem</td>
<td>Department of Forestry</td>
<td>Conservation of natural resources and it’s ecosystem including mangrove ecosystem (forestry area)</td>
</tr>
<tr>
<td>9</td>
<td>Law</td>
<td>9/1990</td>
<td>Tourism</td>
<td>Department of Culture and Tourism</td>
<td>Tourism activity (including natural tourism in mangrove ecosystem)</td>
</tr>
<tr>
<td>10</td>
<td>Law</td>
<td>24/1992</td>
<td>Landscape</td>
<td>BAPENAS</td>
<td>Establishment, regulation and usage (mangrove ecosystem include protected area and developmental area) arrangement (TGHK and region landscape plan)</td>
</tr>
<tr>
<td>12</td>
<td>Law</td>
<td>25/1999</td>
<td>Authority of District Government</td>
<td>Department of Internal Affair</td>
<td>Regulation of authority between central and regional government.</td>
</tr>
<tr>
<td>13</td>
<td>Law</td>
<td>41/1999</td>
<td>Forestry</td>
<td>Department Forestry</td>
<td>Status and forest function, maintenance, forest planning, forest management, supervision, public role include mangrove forest (mangrove ecosystem)</td>
</tr>
<tr>
<td>No.</td>
<td>Institution Name</td>
<td>Authorities (Duties and Responsibilities)</td>
<td>Description</td>
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<tr>
<td>1.</td>
<td>Ministry of Environmental</td>
<td>Responsible in management coordination, monitoring and evaluate implementation of national policy on mangrove management</td>
<td>Join resolution of: 1. Ministers of Forestry/Mining 2. Ministers of Forestry and Agriculture 3. Ministers of Forestry and Transmigration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Department of Forestry</td>
<td>Responsible in establish technical procedures for mangrove forest management for protection, conservation, rehabilitation/reclamation and other usages</td>
<td></td>
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<tr>
<td>3.</td>
<td>BAPEDAL/BAPEDALDA</td>
<td>Responsible in controlling and environment management, approving analysis (AMDAL) of activity that can affect environment, management and environment supervision that propose in usage of mangrove ecosystem</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>BAPPENAS</td>
<td>Responsible in coordinate programs/planning and funding in management of mangrove forest ecosystem resources</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Department of Industry</td>
<td>Responsible in establish industry that use mangrove forest ecosystem resources (chip industries, fisheries industries)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Institutions related in mangrove forest ecosystem management in Indonesia
<table>
<thead>
<tr>
<th>No.</th>
<th>Ministry/Agency</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.</td>
<td>Department of Internal Affair</td>
<td>Has authority in coordinating and directing the planning activities, implementation and control of mangrove forest ecosystem management in region level</td>
</tr>
<tr>
<td>7.</td>
<td>Department of Agriculture</td>
<td>Responsible in establish (technical procedures) in agriculture commodities management that use mangrove forest ecosystem</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Join resolution of Agriculture and Forestry Ministers (Mangrove green line, 200m)</td>
</tr>
<tr>
<td>8.</td>
<td>Department of Education and Culture</td>
<td>Responsible for arranging education program about analysis/knowledge for mangrove ecosystem management</td>
</tr>
<tr>
<td>9.</td>
<td>BPPT</td>
<td>Responsible in analysis and research development and management technology for mangrove ecosystem</td>
</tr>
<tr>
<td>10.</td>
<td>BPN (Soil Committee)</td>
<td>Has direct responsibility in managing every side soil based on Region Landscape Planning and Laws</td>
</tr>
<tr>
<td>11.</td>
<td>Department of Tourism</td>
<td>Associated with development of tourism (ecotourism) in mangrove ecosystem</td>
</tr>
<tr>
<td>12.</td>
<td>Department of Transmigration</td>
<td>Associated with development of transmigrate settlement and forest opener</td>
</tr>
<tr>
<td>13.</td>
<td>Office of State Minister for Housing and Region Development</td>
<td>Associated with area development for development and housing sectors</td>
</tr>
<tr>
<td>14.</td>
<td>Department of Marine and Fisheries</td>
<td>Responsible in directed and established (technical procedures) in fisheries commodities management that use mangrove ecosystem (fishpond, salt industries, supporting utilities for fish farm)</td>
</tr>
<tr>
<td>15.</td>
<td>Bakosurtanal</td>
<td>Associated with development and provide mangrove ecosystem spacial data</td>
</tr>
<tr>
<td>16.</td>
<td>LIPI</td>
<td>Associated with coordinate information about science and technology development for mangrove ecosystem management</td>
</tr>
<tr>
<td>17.</td>
<td>Parliament (DPR)</td>
<td>Associated with controlling function of activities for mangrove ecosystem management appropriate with laws and regulations.</td>
</tr>
</tbody>
</table>
Based on Table 1 and Table 2, Department of Forestry in managing mangrove forest (at forest area and non forest area) has great roles and responsibilities and can be categorized as has main role. Other institutions that have direct responsibilities in mangrove ecosystem management (especially non forest area) are Department of Marine and Fisheries Affairs, Department of Internal Affair. Besides that for cross sector coordination role, Department of Internal Affair and Ministry of Environment has large role (main role).

In its connection to mangrove ecosystem management, the institutions for mangrove ecosystem management according to Law no. 41, year 1999 (about forestry) and Government Regulation No. 34, year 2002, placed Government (Department of Forestry) and stakeholder as follows:

a. **Government as regulator**

   Government can not directly use forest product, so government has role as:
   - Regulate and manage anything that associated with forest, forest area and forest product, establish forest area and or change forest area status.
   - Regulate and make the decision for law connection between people with forest or forest area and forest product.
   - Regulate law act about forestry.
   - Published licenses for party that performs activities in forestry.

b. **Government, University and NGO**

   As facilitator for local community development in partnership with forest utilization license holder.

c. **BUMN, BUMD, BUMS, Corporation, Private**

   As license holder and has obligation to cooperate with local community corporation and developed into strong corporation unit, independent and professional so can be at same level with BUMN, BUMD, BUMS, local community corporation.
Management institution that associated in usage of mangrove forest based on law regulation of forest management as seen at Table 3. Time range for forest usage on every forestry usage license on protected forest area, production forest area and conservation forest can be seen at Table 4

Table 3. Forest Management Institutions according to Law No. 41, year 1999

<table>
<thead>
<tr>
<th>No.</th>
<th>Form of Regulation</th>
<th>Associated Institution</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>License for Forest Usage Law No. 41/1999 and Government Regulation (GR) No. 34, year 2004 Minister of Forestry Decree</td>
<td>Government, Province Government, District/Town Government, University, NGO, BUMN, BUMD, BUMS, Private Cooperation, Local Public Cooperation</td>
<td>Form of Licenses: IUPK, IUPJL, IUPHHK and BK, IPHHK and BK</td>
</tr>
<tr>
<td>3</td>
<td>Conservation Forest Management Unit Protected Forest Management Unit (Forests area outside Java Island) Law No. 41/1999, GR 34, GR 44, year 2004</td>
<td>Government, Province Government, District Government, Operator Institution, Local Public Cooperation</td>
<td>KPHP/KPHL design in most of forest area still unformed</td>
</tr>
</tbody>
</table>
| 4   | a) GR for Forest Management in East Java, Central Java and West Java  
   b) GR No. 53, year 1999 about State Forestry Company  
   c) GR No. 14, year 2001 | Government (Forestry Dept. State Minister of BUMN), Province Government, District Government, Perhutani Unit I, II, III, University, Groups of community around the forest with law based or none | Community and Perhutani cooperate in forest maintenance and security. Community gain forest wood with proportional share |
| 5   | Local community as the license holder/right of usage | Government, Province government, District/Town Government, University, NGO, BUMN, BUMD, BUMS, Private Cooperation, Local Public Cooperation | BUMN, BUMD, BUMS as partner, local community still as the main implementer. This concept is not finished yet because inappropriate with license no. 1. The Right given when community are not able yet to pass the license procedure no. 1 |
Table 4. Time Range for Forest Usage License Published

<table>
<thead>
<tr>
<th>No</th>
<th>Type of Legality and Legality Publisher</th>
<th>License Holder/Responsibility</th>
<th>Time range for legality at Production Forest</th>
<th>Time range for legality at Protection Forest</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Area IUP Publisher District/Major Between District/Town By Governor</td>
<td>Private, Cooperation</td>
<td>5 years with maximal width 50 ha Commodities: Medical plantation, Plantation for decoration, mushroom, bee, animal breeding</td>
<td>5 years with maximal width 50 Ha Commodities: Medical plantation, Plantation for decoration, mushroom, bee, animal breeding</td>
</tr>
<tr>
<td>2</td>
<td>IUPJL</td>
<td>Private, Cooperation, BUMS, BUMN, BUMD</td>
<td>10 years, maximal 1000 ha Commodities: Nature tourism, water processing industry, carbon trading industry</td>
<td>10 years, maximal 1000 ha Commodities: Nature tourism, water processing industry, carbon trading industry</td>
</tr>
<tr>
<td>3</td>
<td>IUPHHK and non wood</td>
<td>Private, Cooperation, BUMS, BUMN, BUMD</td>
<td>Wood at nature forest: 55 years, non wood: 10 years Wood at planted forest: 100 years</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>License for collected HHK and non wood</td>
<td>Private, Cooperation</td>
<td>1 year, wood maximal 20 m³, non wood maximal 20 ton</td>
<td>Only for non wood 1 year maximal 20 ton</td>
</tr>
</tbody>
</table>

From several departments that associated with mangrove ecosystem management, some departments are the main departments that have larger role and responsibilities in mangrove conservation and rehabilitation, which are: Forestry Department, Marine and Fisheries Affairs Department, Agriculture Department, Office of State Minister for Environment, and Department of Internal Affair.

(1) Department of Forestry
At national level Department of Forestry is the main department for mangrove forest conservation. Department of Forestry has large authority for forest areas include mangrove forest. This department consists of three directorate general:
- Directorate General of Land Rehabilitation and Social Forestry
  Directorate General of Land Rehabilitation and Social Forestry responsible for mangrove rehabilitation activities and public development program in order to gain participation support the mangrove management.
o Directorate General of Forestry Production
Directorate General of Forestry Production responsible for preparing and managing mangrove forest product in production forest, and issue license for commercial gathering operation include mangrove exploitation for chips and other product.

o Directorate General of Forest Protection and Nature Conservation
Directorate General of Forest Protection and Nature Conservation organize conservation forest and protection forest issues. This agency responsible in conservation of bio-diversity include mangrove.

o Forestry Planology Agency
Responsible in planning the mangrove forest management in protection forest, production forest and conservation forest areas.

o Research and Forest Development and Nature Conservation Agency
Responsible for supporting mangrove forest management trough research and development of research result activities.

(2) Department of Marine and Fisheries Affairs
Department of Marine and Fisheries Affairs has high interest to mangrove ecosystem conservation in supporting fisheries activities and creation of clean and healthy shore area for public. In its operation the Department has echelon I units, which are:

- Directorate General of Fisheries Fishing
- Directorate General of Fisheries Farm
- Directorate General of Coastal and Small Islands
- Directorate General of Agency Capability Development and Marketing
- Agency of Marine and Fisheries Research

Directorate General of Coastal and Small Islands (P3K) is one of technical implementer unit in the Department that responsible for environment conservation and coastal resources. The Directorate generally has duties for establishment, management, waste control, rehabilitation, usage and mitigation of coastal area. Coastal ecosystem rehabilitation performs with approach for:
a. Support the fisheries farm and fishing
According to its function in supporting fertile water area, mangrove rehabilitation also performed in order to creating new habitat for replacing or as compensatory damage habitat. Rehabilitation in this category aimed to replace the coastal habitat that has damaged by conversion or other development activities.

b. Protect Coastal Areas that at risk for erosion and natural disaster.
Many coastal areas in Indonesia are at risk for erosion because of continuous wave pressure and natural disaster that caused by tropical storm or tsunami. Erosion and this natural disaster can create losses socially such as damaged houses, school, village chief office and economically such as damaged road, fishpond and agriculture.

c. Coastal Area Mitigation Effort
Rehabilitation of mangrove ecosystem performed at coastal areas that will suffer negative effect of development and natural processes. Rehabilitation to this area is purposed to avoid coastal area ecosystem damage because of activities of physic development (jetty, breakwater, harbor, reclamation etc), waste or nature.

(3) Environment Ministry

Since 1992, Office of State Minister for Environment (now ministry of Environment) encourages the effort of form a national strategy for mangrove conservation. State Minister Office for Environment also takes part in forming the national regulation for environment, biodiversity and seasonal changes.

As the duty of Environment Ministry, Environmental Impact Assessment (AMDAL) launched with government regulation number 51, year 1993, as substitute for AMDAL regulation year 1987 and aimed for perform basic regulation of environmental which is law number 23 year 1997 about environmental management. Now government regulation number 51, year 1993 was perfected with government government act number 27, year 1999.

Some opinions considerate that AMDAL process was not fully applied associated with forest management. So, the roles of Ministry of Environment in mangrove ecosystem
management have not defined clearly. For example according to RePPProt studies (19..) AMDAL processes have not performed before conversion of forest management especially for conversion forest.

BAPEDAL forming (since 2001 its function merged in State Minister Office of Environment) in 1990 made the Ministry of Environment has extra operational abilities especially with supervision of AMDAL process. But nowadays, AMDAL performed by each government institution that makes Ministry of Environment loose its authority and only role as coordinator.

(4) Internal Affair Ministry

In order to establish the mangrove ecosystem conservation Internal Affair Ministry also participated and issues Minister Instruction No. 26/1997 about protection of mangrove forest as green belt and forest corridor.

One of the programs of a new directorate general in Internal Affair Ministry (Directorate General of Region Development) is development of area capabilities according to its geographic position which include mangrove conservation.

(5) Agricultural Department

Agricultural Department has responsibilities for development of the agriculture production. This program will create problem in mangrove conservation that caused by land erosion, excessive use of pesticide and insecticide, and mangrove area conversion into rice field.

Agricultural Department has 6 directorate general which are:

- Directorate General of Agriculture Equipment
- Directorate General of Food Plant Production
- Directorate General of Horticulture Production
- Directorate General of Agriculture Production
- Directorate General of Agriculture Production Manufacturing and Marketing
- Directorate General of Plantation Production
In North Sumatera Province some institutions associated with management of mangrove ecosystem are: Forestry Service, Office of Nature Resources Conservation (BKSDA), Office of Riverside Area Management (BP.DAS), Marine and Fisheries Service, Environmental Service or Bapedalda, and Agricultural Service, Industrial Service and Transportation Service.
IV. CONCLUSION

According to analysis of policies and institution of mangrove forest management, conclusions that can be made are:

1. Mangrove Forest Area has 3 main functions, which are: protection function, production function and conservation function. Each function has different regulations, which adjusted with the purpose of mangrove forest management.

2. At protection forest area activities that can be done are usage of the area, non-wood forest product gathering and usage of environmental resources.

3. Activities at production forest area are: usage of the area, usage of environmental resources, wood and non-wood forest products usage and wood and non-wood forest products gathering.

4. Activities at conservation forest are: usage of environmental resources and eco-tourism, except at conservation area and core and forest zone of national park.

5. Mangrove forest as protection area, if it status as protection and conservation forest and located at the green belt (river or sea shore) which arranged in President’s Resolution No. 32, year 1990.

6. Government role in management of mangrove as regulator, which regulate, issues licenses and regulate the act of law of every side (private, public) that involved in mangrove management.

7. Institutions that associated with management of mangrove forest are: Forestry Department, Marine and Fisheries Department, Internal Affair Department, Environmental Department and Agricultural Department.

8. Region government (province and district/town) have important roles in mangrove management, especially in licenses issues for usage of forest and development of community around the mangrove forest.