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Coastal and Marine Resources Management in Indonesia: Legal and Institutional Aspects

***TOMMY H. PURWAKA
SUNOTO***

Policy Research and Impact Assessment Program



International Center for Living Aquatic
Resources Management



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COASTAL AND MARINE RESOURCES
MANAGEMENT IN INDONESIA:
LEGAL AND INSTITUTIONAL ASPECTS

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Tommy H. Purwaka
and
Sunoto

Pusat Studi Wawasan Nusantara, Hukum Dan Pembangunan
Center for Archipelago, Law and Development Studies



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Editor's Preface

This working paper is an output of the project entitled "Management of Fisheries, Coastal Resources and the Coastal Environment in Indonesia: Institutional, Legal and Policy Perspectives". The overall objective of this project is to look into the elements that are instrumental in formulating the rights and rules (laws, customs, traditions etc.) which provide the legal, institutional and policy framework for the implementation of locally-based (resources) management systems in marine and coastal areas. Other names for these systems include "co-management", "community based management", and "integrated coastal resources management". Special attention is given to fisheries and other types of aquatic resources as well as coastal environmental protection.

The project involves various case studies carried out by national collaborators. Specifically, the case studies were undertaken in order to generate information on the legal, institutional and policy frameworks on environmental and natural resource management, to describe and analyze conflicting uses of natural resources in coastal areas, to review and identify the role of stakeholders and interest groups, and to assess the impacts of culture, religion, and tradition on natural resource management and environmental protection.

This working paper is conceived in order to disseminate the results of the country case studies to a wider audience. The findings in this working paper will be included in a regional synthesis report that will include Bangladesh, Cambodia, Philippines, Thailand and Vietnam. The regional study is a joint effort of the International Center for Living Aquatic Resources Management (ICLARM) and the World Resources Institute (WRI).

In this working paper, Dr. Tommy Purwaka and Sunoto provided a good review and analysis of the legal, institutional and policy framework of coastal resources management in Indonesia as well as the patterns of resource use of the country's coastal and marine resources. In addition, they have also reviewed and identified the role of stakeholders in coastal resources management. Finally, the authors discussed the contribution of religion, traditional values, beliefs and practices to effective resource management. The authors envisaged that by reviewing and analysing the legal, institutional and policy framework of marine and coastal management a comprehensive understanding of laws and regulations, including traditional ones, will result.

Three case studies were selected in various parts of the country to explore the main theme of the research project. These sites were selected based on several criteria. Among these criteria are: the presence of a government development program, the presence of a fisheries management scheme, the existence of overlapping jurisdictions and conflicts of interest, and the existence of *adat* laws. The result of the case studies is summarised in this working paper.

As shown in this working paper, complex problems in coastal and marine resources management arise in Indonesia due to the poor implementation of existing laws. This has worsened environmental and

natural resource conditions. Laws on coastal and marine resources management are insufficient to provide the legal basis for an integrated coastal and marine resources management that promote sustainable use of natural resources. Furthermore, the authors contended that overlapping jurisdictions among government institutions and agencies tasked with implementing coastal and marine resources management has led to confusion in the implementation of laws, regulations and policies. This, in turn, has resulted in uncertainty and inconsistency in law enforcement. Such lack of coordination and cooperation among government institutions has hampered the process of an integrated coastal and marine resources management.

Another critical issue raised by the authors is the potential conflicts among stakeholders arising from the problems of granting licenses and permits on the utilization of marine resources. This has resulted in overcapitalization and overexploitation of marine resources, which hastens the degradation of the coastal and marine ecosystems.

The authors further showed that as far as coastal resources management in Indonesia is concerned there is no single national law or state policy which governed how they are to be conducted, encouraged or regulated. There are various acts, regulations, and state policies which can serve as sources on how the coastal and marine resources are to be managed and how the environment can be protected. The authors noted that where such regulations exist they are "mostly couched in general terms [and] are insufficient to promote natural resources and environmental protection". Furthermore, the number of regulations involved implies that various sectoral agencies are also involved in the implementation and management process.

In addition, there are areas in Indonesia where the customary *adat* law is being practiced. The right of a traditional community is called *Hak Ulayat* or traditional community right. In fisheries, this right consists of the traditional rights to explore, exploit, manage and conserve their fishing resources and their environment. These rights are implicitly recognized in the 1945 Constitution. Finally, the authors made a pitch for decentralization and empowerment of local communities. Decentralization, as they contended, "is absolutely required to provide provincial and district governments' authority over coastal and marine resources management" and empowerment is essential in order to improve coastal resources management.

In carrying out the research for this working paper, Dr. Charles V. Barber of the World Resources Institute provided valuable advice and inputs on the structure and content of the research. Without him, the project would not have achieved as much. WRI and Sida provided funds for the research work in Indonesia. The views presented here are those of the authors and do not in any way represent those of ICLARM, Sida or WRI.

Dr. Magnus Torell
Project Leader
Policy Research and Impact Assessment Program

Contents

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Editor's Preface	i
List of Figures	viii
List of Tables	viii
Abstract	1
1 Introduction	3
1.1 Background	3
1.2 Critical Issues	4
1.3 Scope of the Study	8
1.4 Significance of the Study	8
1.5 Locations of the Study	9
1.6 Organization of the Report	9
2 Methodology	11
2.1 Required Data	11
2.2 Data Collection	11
2.3 Methods of data Analysis	11
2.3.1 Legal Approach	12
2.3.2 Institutional Approach	12
2.3.3 System Approach	12
3 Important Marine Resources in Indonesia and their Management Patterns	13
3.1 Natural Resources	13
3.1.1 Mangroves	13
3.1.2 Coral Reefs	14
3.1.3 Seaweeds	14
3.1.4 Fisheries	15
3.1.5 Marine Transportation	17
3.2 Social Aspects	17
3.3 The Patterns of Resource Management	17
3.3.1 Fishery Resource Management Patterns	18
3.3.2 Fishers' Access to Fishery Resources	28
3.3.3 Management Constraints	29

30 Sept. 1999

3.4	Kupang Bay	32
3.4.1	Natural Resources	32
3.4.2	Social Aspects	33
3.5	Sulamu Village	34
3.5.1	Management Patterns	35
3.6	Lease Lands	45
3.6.1	Natural Resources	45
3.6.2	Social Aspects	46
3.7	Ameth Village	47
3.7.1	Management Patterns	48
3.8	Segara Anakan	54
3.8.1	Natural Resources	54
3.8.2	Social Aspects	55
3.9	Kampung Laut	56
3.9.1	Management Patterns	56
4	Legal and Institutional Arrangement	61
4.1	Legal Aspects	61
4.1.1	The Written Laws	61
4.1.2	The Unwritten Laws	65
4.2	Institutional Aspects	69
4.2.1	Institutional Arrangements at the National Levels	69
4.2.2	Institutional Arrangements at the Regional Levels	72
4.2.3	Institutional Arrangements at the Village Levels	73
5	Assessment of Marine Resources Management Patterns	77
5.1	Planning and Organizing	82
5.2	Actuating	83
5.3	Controlling	84
5.4	Integrating Efforts	84
6	Recommendations	85
6.1	Establishing an Integrated Coastal and Marine Resources Management Policy	85
6.2	Decentralization	86
6.3	Improving Management Systems	86
6.4	Empowering Local Community	87
	References	89
	Appendices	93
	Appendix 1: Basic Legal Systems	93
	Appendix 2: Institutional Arrangement	101

List of Figures

Figure 3-1	Map of Kupang Bay: Sulamu Village	31
Figure 3-2	Map of Ameth Village: Lease Lands	44
Figure 3-3	Map of Segara Anakan: Kampung Laut	53
Figure 5-1	Integrated Fisheries Management Matrix	78
Figure 5-2	Resource-Based Management Approach	79
Figure 5-3	Community-Based Management Approach	80
Figure 5-4	Market-Based Management Approach	80
Figure 5-5	Legal Framework	81
Figure 5-6	Institutional Framework	82

List of Tables

Table 3-1	Distribution of Mangrove Forest in Indonesia	14
Table 3-2	Potential Seaweed Production	16
Table 3-3	Fish Production in EEZI in 1993 (in tons)	16
Table 3-4	Pontential and Level of Marine Fishery Utilization in Indonesia	18
Table 3-5	Provincial Fish Production (1991-1992)	19
Table 3-6	List of Legally Protected Marine Animals in Indonesia	20
Table 3-7	Fishing Boats/Ships in Indonesia	21
Table 3-8	Inter-Island and Foreign Loading/Unloading 1993 (000 tons)	21
Table 3-9	Population Density and Growth in Indonesia (1990-1995)	22
Table 3-10	Marine Fishers by Province (1993)	23
Table 3-11	Coral Reef Species in Kupang Bay	32
Table 3-12	Population Distribution by Village in Kupang Bay in 1990	34
Table 3-13	Fish Production	42
Table 3-14	Demographic Characteristics	46
Table 3-15	Potential Coastal and High Seas Fisheries in Cilacap (1996)	55
Table 3-16	Population and Density Rate in Kampung Laut	55
Table 3-17	Distribution of Occupation in Kampung Laut	56

Abstract

This research explores legal and institutional aspects of fisheries and other marine resources management. The analysis is based on the principles of integrated fisheries management which includes seven key management factors: (1) information systems; (2) natural resources assessment; (3) natural resources allocation; (4) natural resources utilization and protection; (5) process of production; (6) marketing; and (7) MCS (monitoring, control and surveillance) systems. This study includes three locations, namely Ameth Village (Nusa Laut Island), Sulamu Village (Kupang Bay) and Kampung Laut (Segara Anakan).

Findings indicate that fisheries, coastal and marine resources management in Indonesia is not yet effective. Laws, regulations and policies have been issued by the Government of Indonesia (GOI) as legal bases for developing marine fisheries management. The General Guidelines of State Policy (GBHN) of 1993 and 1998 provide policy guidelines of coastal marine resources management. Since 1993, implementation and development of integrated fisheries management have been intensified in several coastal and marine areas of Indonesia. However, several problems still exist as a result of conflicting interests among stakeholders and overlapping jurisdictions over marine resources among government institutions and agencies. These problems include coastal and marine resources depletion, degradation of aquatic habitats and marine pollution.

The principles of integrated fisheries, coastal and marine management have been developed, but such actions did not really address the roots of the problems, i.e., conflicts of interest and overlapping jurisdictions among stakeholders, including governments, coastal communities and the private sector. Decentralization is not apparent. The role of provincial and district (regional) governments in managing coastal and marine resources is not significant yet. Even though (*de facto*) regional and local governments have engaged in several marine activities, they do not have jurisdictions (*de jure*) over marine resources. The involvement and participation of local community still need improvement. The revitalization of environment-friendly traditional values and practices is required to improve management that promotes ecological and economic benefits for local community and national interests.

Chapter 1

Introduction

1.1 BACKGROUND

Indonesia is an archipelagic country made up of more than 17 000 islands with a coastline of 81 000 km and 5.8 million km² of marine areas consisting of 0.3 million km² of territorial waters, 2.8 million km² of internal waters and 2.7 million km² of Exclusive Economic Zone. Located in the equator, Indonesia has rich natural resources, such as fish, minerals, mangroves and coral reefs, including a variety of organisms that depends on coastal and marine ecosystems. Unfortunately, pressures upon coastal and marine resources have increased in the past few years. Erosion and pollution have become some of the major problems in most parts of the coastal zone due to inappropriate land-based activities, such as industries, deforestation, agriculture and household waste. Also, inappropriate fishing such as the use of dynamites, poisonous chemicals and gill nets put coastal and marine resources under heavy pressure. Other activities that make significant contributions to the destruction of coastal and marine resources include sea transportation, coral reef mining and the overexploitation of mangroves by both local communities and big business.

INDONESIA IS MADE UP OF:

- more than 17 000 islands;
- coastline of 81 000 km²;
- 5.8 million km² of marine areas—0.3 million km² of territorial waters, 2.8 million km² of internal waters and 2.7 million km² of Exclusive Economic Zone.

Coastal and marine environment problems have mostly occurred in the west coast, including northern and southern Sumatra, Bali and Java Sea. Intensive mariculture projects, coral mining practices and destructive fishing in this region cause serious damage on coral reefs, mangroves and other resources. Pollution and erosion have also become major problems in the west coast due to industrial and household wastes coming from the populated islands of Sumatra and Java. In contrast, land-based activities exert less pressure on the eastern part of Indonesian waters. Most parts of this region are still in good condition with rich resources. However, several big investors have built intensive mariculture projects and the exploitation of fish tends to exceed optimum sustainable yield. The competition between big businesses and local communities is already threatening the local communities' access to coastal and marine resources.

The pressure upon coastal and marine resources will significantly increase as marine-based activities grow rapidly to support development. The contribution of these activities to the national economy has increased from 12% in 1987 to 24% in 1992. More than 60% of the population live in coastal areas. The population is estimated to reach 251 million people in the year 2020 at a growth rate of about 1.5% annually. All these trends will encourage intensive use of coastal and marine resources.

The complexity of coastal and marine resources management has arisen because of poor implementation of existing laws on coastal and marine resources management. The exploitation of coastal and marine resources without an effective environmental protection has worsened environmental and natural resources conditions. Laws that are directly related to coastal and marine resources management are insufficient to provide the legal basis for an integrated coastal and marine resources management. Also, the absence of a clear mandate of responsible institutions brings about ineffective coastal and marine management systems. Each institution tends to focus on particular resources and deal with its own interest. Lack of coordination among interested institutions has brought about policy disintegration and ignorance.

Indonesia needs to develop environmental management policies that promote sustainable development based on two principles: (1) optimum sustainable use of coastal and marine resources; and (2) effective environmental protection. Such policies must satisfy both national and local interests. This research is designed to examine the patterns of coastal and marine resources management, particularly in relation to the existing national and regional policies and institutional arrangements. Moreover, it also intends to explore the potential role of local communities in the protection of coastal and marine resources.

“However, the implementation of such laws and regulations is constrained by misinterpretation, conflict of interests and overlapping jurisdictions.”

1.2 CRITICAL ISSUES

Laws on the management of fisheries and other marine resources and their implementing regulations provide legal bases on how the government should manage these resources. The existing laws and regulations provide private sectors, community members and other legal entities opportunities to participate in utilizing coastal and marine resources. However, the implementation of such laws and regulations is constrained by misinterpretation, conflict of interests and overlapping jurisdictions.

Overlapping jurisdictions among government institutions and agencies has confused implementation of laws, regulations and policies on coastal and marine resources management. This creates uncertainty and inconsistency in law enforcement. Lack of coordination and cooperation among government institutions has hampered the process of promoting an integrated fisheries, coastal and marine resources management. Problems in granting licenses and permits on the utilization of marine resources brought about potential conflicts among stakeholders. This has resulted in overcapitalization and overexploitation of marine resources—a trend that tends to hasten the degradation of coastal and marine ecosystems. Furthermore, this has caused fishery resources depletion, aquatic habitat destruction and pollution.

The complexity of fisheries, coastal and marine resources management as discussed tends to increase since, by law (*de jure*), the regional governments do not have mandates in managing coastal and marine fishery resources. Consequently, the regional governments do not have sufficient legal bases to mobilize efforts to handle the problems. This has resulted in the absence of local government interventions to handle the negative impacts of development on the marine environment. In fact, the regional governments have attempted to respond to several coastal and marine fishery activities but such actions brought about legal and technical constraints. The only legal basis used by the regional government to deal with fisheries is Article 9 Paragraph (1) of Act No. 24/1992 on Spatial Planning, which states that the regional governments have mandates to carry out spatial planning in a marine area up to the limit determined by law. The implementing regulations, however, still have to be issued. In other words, the law does not exist as yet and there is no legal basis for the regional governments to carry out their jurisdiction over coastal and marine fishery resources.

The negligence of communities on their important roles in the management of

fisheries, coastal and marine resources is also a contributing factor to the complexity of the problems. Due to poor understanding of the existing written marine laws and regulations, coastal communities apply their own customary laws, the traditional (unwritten) laws (*hukum adat* or *adat* laws), in fisheries, coastal and marine resources management. Implementation of *sasi* in Haruku, Saparua and Nusa Laut Islands is a classic example. The *adat* (unwritten) laws have been legally recognized in the Indonesian legal system. As an example, Articles 3 and 5 of Act No. 5/1960 explicitly recognize the *adat* laws. These provisions state that the existing *adat* laws can be implemented in agrar-

“...the existing written laws and regulations have promoted the adoption and integration of all positive values and norms of *adat* laws and the accommodation of traditional rights (*hak ulayat*) of the coastal communities.”

ian issues as long as it is in line with the existing written laws and regulations. Therefore, the *adat* laws could be implemented as one of formal legal bases in the management and utilization of coastal and marine fishery resources, provided that, for the sake of the unity of the nation, these have to be in line with the national interest

which are expressed in existing written laws. In other words, their implementation should not contradict with applicable national laws, regulations and policies. In this respect, it should be pointed out here that the existing written laws and regulations have promoted the adoption and integration of all positive values and norms of *adat* laws and the accommodation of traditional rights (*hak ulayat*) of coastal communities.

Several recent studies on legal and institutional aspects of coastal and marine fishery resources management have spawned a false understanding on the application of unwritten *adat* laws in the management of fisheries, coastal and marine resources, such as *sasi* in Haruku Island, without providing readers a comprehensive view on the integration of traditional values and norms within the national legal system, reflected in the concept of *Bhinneka Tunggal Ika* (Unity in Diversity). The application of many different *adat* laws as legal base for marine resources management without considering the national interest may bring about serious legal and social problems. Note that since coastal community development is under the responsibilities of regional governments, the absence of jurisdictions has caused difficulties in bringing the regional governments to mobilize coastal community to participate in managing fisheries, coastal and marine resources. Another problem that makes significant contributions to the increase of conflicts of interest is poverty in coastal communities. This socioeconomic condition has forced residents, mostly small-scale fishers, fish farmers and coastal farmers, to engage in quick yielding coastal and marine fisheries, including destructive and illegal activities such as blast fishing and fishing using poison, coral reef and sand mining, mangrove cutting and coastal land clearing. These may create conflicts of interest among local resource users. In this context, efforts to integrate and incorporate the traditional values and norms of *adat* laws into the national legal system are not an easy task. They will involve in-depth analysis of legal and institutional aspects of integrated coastal and marine resources management, including analysis of private and public interests.

“Two crucial problems that are rarely discussed include overlapping jurisdictions and conflicts of interest. ”

Fisheries, coastal and marine resources management is frequently discussed in several studies, seminars and workshops to promote an integrated coastal and marine fisheries management. However, most of these lack comprehensive data and information which may cause insufficient scientific explanation on legal and institutional aspects of marine resources management. Two crucial

problems that are rarely discussed include overlapping jurisdictions and conflicts of interest. The existing laws and their implementing regulations concerning fisheries, coastal and marine resources provide government agencies and institutions with mandates to carry out certain activities related to exploration, exploitation, management and conservation of coastal and marine resources. These were issued in accordance with the national legal systems. Also, the enactment of each law usually considers the existing laws and regulations in order to avoid contradiction. Unfortunately, laws and regulations are not necessarily integrated and effective. Each party tends to see laws and regulations from different sectoral perspectives and interests.

The above discussion indicates that overlapping jurisdictions and conflicts of interest occur among government institutions, both national and regional governments. According to Act No. 5/1974 on Basic Provisions of Regional Government, the regional governments do not have jurisdictions over fisheries, coastal and marine resources. This Act does not provide the regional governments with mandates to conduct such marine resources management as fishery resources exploration, exploitation, management and conservation. As a matter of fact, the regional governments have carried out several marine activities such as issuing licenses for fishing vessels under 30 GT, coastal aquaculture, cage culture and marine tourism, protecting mangroves, mitigating marine pollution, collecting fees and taxes from several marine activities and resolving socioeconomic problems of coastal communities. In this regard, the regional governments have invoked Article 9 paragraph (1) of Act No. 24/1992 on Spatial Planning as basis to support their marine activities, including fisheries. This condition has created uncertain jurisdictions among regional governments over coastal and marine resources.

Article 9, paragraph 1, of Act No. 24/1992 stipulates that the regional governments have legal mandates to establish spatial planning in coastal and marine areas with outer boundaries delimited by an Act. However, the Act mentioned by this Article does not exist yet. Promulgation of this Act organized by the Ministry of Home Affairs since 1996 on regional governments' jurisdictions over coastal and marine resources management is not established yet. This effort proposes a marine management area of 12 nautical miles limit offshore measured from the coastline. However, this proposed limit apparently has not yet accommodated various traditional maritime boundaries which are determined by *adat* laws as the outer limit of traditional management areas. Within these management areas, *adat* communities have exercise their traditional rights (*bak ulayat*) for the purpose of fishery resources exploration, exploitation, management and conservation. Application of the two different jurisdictions will, of course, lead to the existence of overlapping jurisdictions and conflicts of interest. Combined with socioeconomic conditions of coastal community, the overlapping jurisdiction and conflicts of interest will create problems of marine fisheries and environmental degradation. All these problems will be solved through the development of co-management and community-based management of fisheries, coastal and marine resources. In this respect, Segara Anakan, Kupang Bay and Nusa Laut Island were selected as study areas in the development of co- and community-based fisheries management.

"All these problems will be solved through the development of co-management and community-based management of fisheries, coastal and marine resources."

1.3 SCOPE OF THE STUDY

The purpose of this study is to examine the development and implementation of integrated coastal and marine fisheries management, focusing on co-management and community-based approaches. This includes:

- ❖ Review and analysis of the legal, institutional and policy framework.
- ❖ Review and analysis of the patterns of coastal and marine fisheries management, including the uses of space.
- ❖ Review and identification of the role of interested parties, including government at the national, regional and local levels, private sectors and communities.
- ❖ Review and analysis of the cultural aspects, religion and traditional values, beliefs and practices on the management of coastal and marine fisheries, including environmental protection.

The review and analysis of legal, institutional and policy frameworks for coastal and marine management will lead to a comprehensive understanding of laws and regulations, including the traditional ones, which regulate each activity of fisheries management. This will also elucidate the legal mandates given to various interested parties to carry out specific management activities, including fishery resources exploration, exploitation and conservation. Marine policy frameworks are applied for the purpose of cooperating, coordinating and integrating all these activities. The study identified the patterns of coastal and marine fisheries management, including the use of space and its management, and the roles of stakeholders in accordance with their social and cultural backgrounds.

1.4 SIGNIFICANCE OF THE STUDY

The review and analysis described in the Scope of the Study will provide stakeholders of coastal and marine fisheries, especially relevant government agencies and institutions, with insights on how the legal and policy framework of fishery, coastal marine and resources management work and how these can be improved. This is expected to encourage government agencies and institutions to work together in formulating and implementing integrated management policies. For other interested parties or stakeholders, especially traditional ones, development and implementation of such policies will provide them with a guarantee that their rights and interests will be legally recognized and treated properly in accordance with existing applicable laws and regulations.

1.5 LOCATIONS OF THE STUDY

The study selects three research locations that include: (1) Ameth Village, Nusa Laut Island, Maluku; (2) Sulamu Village, Kupang Bay, Nusa Tenggara Timur; and (3) Kampung Laut, Segara Anakan, Central Java. These were selected based on the following criteria:

- ❖ The presence of government's development program;
- ❖ The presence of a fisheries management scheme;
- ❖ The existence of overlapping jurisdictions and conflicts of interest;
- ❖ The presence of socioeconomic and cultural aspects of coastal community;
- ❖ The existence of *adat* laws' influence on community participation and involvement in the management and utilization of coastal and marine fishery resources;
- ❖ Representation of specific coastal and marine environment (i.e., estuaries, bays and small islands);
- ❖ Time availability and commitment levels of government officials; and
- ❖ Accessibility to the study areas and availability of communication facilities.

1.6 ORGANIZATION OF THE REPORT

Chapter I introduces existing critical issues on coastal and marine management policy. Chapter II provides information on the methodology used in this study. Information on general characteristics of the three case study areas, within the framework of coastal and marine environment of Indonesia, is discussed in Chapter III. Chapter III identifies and discusses the patterns of fisheries, coastal and marine management at the national, regional and local levels from the perspective of legal, institutional, social and cultural aspects. Chapter IV discusses the existing legal and institutional arrangements, including social and cultural aspects of fisheries management. Chapter V discusses the assessment of fisheries, coastal and marine resources management. Chapter VI presents the recommendations.

Chapter 2

Methodology

This study focuses on coastal and marine fisheries management in Segara Anakan, Kupang Bay and Nusa Laut Island, including its legal, institutional, social and cultural aspects. The use of a certain methodology is, therefore, required in conducting this study. The methodology includes methods of data collection and analysis, and legal, institutional and system approaches.

2.1 REQUIRED DATA

The required data consist of primary and secondary information, both quantitative and qualitative. The primary data gathered through field observations and interviews cover all information regarding coastal and marine fisheries management, particularly those of legal and institutional, social and cultural aspects. The secondary data include all reports and publications on coastal and marine resources management. From the legal point of view, the secondary data consist of primary, secondary and tertiary legal materials, such as Act No. 9/1985 on Fisheries, its implementing regulations and guidelines.

2.2 DATA COLLECTION

The primary data were collected through field research and interviews while the secondary data were gathered through library research and interviews to obtain clarity. Field research was conducted twice in Segara Anakan, Kupang Bay and Nusa Laut Island. The first field research was carried out in February 1998 and the second in May 1998.

2.3 METHODS OF DATA ANALYSIS

Data analysis was conducted using qualitative and descriptive methods. The qualitative method analyzed data based on interpretations of the contents of the Acts and their implementing regulations, traditional or customary laws, including legal mandates of government institutions and agencies, local coastal community and other stakeholders. The descriptive method analyzed data on the implementation of the Acts, their implementing regulations, customary laws and legal mandates

in the field, which were reflected in social economy and social-cultural life of the fishing communities. By comparing results of qualitative and descriptive analysis, problems and constraints of integrated coastal and marine fisheries management can be identified and solutions were recommended.

2.3.1 Legal Approach

The legal approach used in this study consists of juridical normative and juridical empiric or sociologic approaches. Juridical normative leads the study to data analysis and discussions such as, on legal principles, history, background and content of an Act and its implementing regulations. Juridical empiric directs data analysis and discussions to the implementations of laws and regulations in the field. Through legal approach, we would know how a law and its implementing regulations should be executed and how these are realized in the field. Through comparative methods, the gap between *das sollen* (the law as it should be) and *das sein* (the law as it is implemented), and the way to bridge the gap could be identified.

2.3.2 Institutional Approach

The institutional approach highlights the legal mandate provided by the laws and regulations to institutions, local coastal community and other stakeholders. The said mandate covers task and function, and competency and responsibility of a stakeholder in managing coastal and marine fisheries. This approach is more focused on inter-institutional relationships, overlapping jurisdiction, and conflicts of interest which occur from the implementation of decentralization, deconcentration and assistantship principles, and on the realization of integrated coastal and marine fisheries management.

2.3.3 Systems Approach

Systems approach views coastal and marine fisheries management as an integrated system whereby existing various activities in the management should be carried out in an integrated manner. This means that an activity should be carried out by considering its relationship with other activities which jointly form coastal and marine fisheries management. To understand the application of this approach, the meaning of integrated coastal and marine fisheries management should first be understood. Coastal and marine fisheries management is a conscious process of decision-making whereby coastal and marine fisheries are allocated over time and space to optimize the attainment of stated objectives of a society within the framework of its science and technology, political and social institutions, legal and administrative arrangements.

Chapter 3

Important Marine Resources in Indonesia and Their Management Patterns

This chapter discusses the important coastal and marine resources in Indonesia. It will also identify important issues affecting these resources. Then, the social aspects affecting the pattern of resource use and management are also described. Finally, the results of the case studies are presented. In this presentation, characteristics of the natural resources in each of the site as well as their social aspects and management patterns are discussed in detail.

3.1 NATURAL RESOURCES

3.1.1 Mangroves

Indonesia has the largest concentration of mangrove forests in Southeast Asia with an estimated area of 3.8 million has. Mangroves are mostly found in Irian Jaya (2 943 000 has), Sumatra (397 000 has), Maluku (100 000 has), Kalimantan (90 000 has), Sulawesi (53 000 has), Java (40 000 has) and Nusa Tenggara (3 600 has) (Table 3-1).

Mangrove forests in Indonesia are highly diverse. There are at least 89 species, dominated by *Rhizophora*, *Avicenia*, *Sonneratia*, *Bruguiera*, *Xylocarpus*, *Ceriops* and *Exoecaria*. Mangrove forests grow mostly well in the estuaries of large rivers and deltas forming main support ecosystems for the marine and coastal areas. Mangrove forests function as breeding areas for several fish species and vertebrates. With its long and submerged roots, it can prevent erosion and coastal damage. Mangrove forests provide additional sources of income, firewood timber and medicinal extracts to coastal communities. Unfortunately, mangrove forests have significantly decreased due to illegal uses, particularly for firewood and building materials. The degradation of mangroves was also caused by intensive mariculture industries, such as the shrimp industry, which has grown in the past few years. In 1982, mangrove forests were estimated at 4 251 011 has and in 1987 it was 3 235 700 has or about 30% were lost. It was estimated that only a small part of Indonesia's mangroves is in excellent condition, 24% good, 28% damaged and 42% is severely damaged (Moosa et.al., 1996). According to Wiroadmodjo and Judi, the production of mangrove wood in the 1970s is more than 500 000 m³ or worth US\$3 million (Moosa et.al, 1996). The degradation of mangroves tends to accelerate due to high mangrove log export and the extension of mangrove production concession both by small- and large-scale businesses.

Table 3-1. Distribution of Mangrove Forest in Indonesia.

Province	Area (ha)	Percentage (%)
Sumatera	400 000	10.5
Aceh	50 000	1.3
North Sumatra	60 000	1.6
Riau	95 000	2.5
South Sumatera	165 000	5.1
Sulawesi	53 000	1.4
North Sulawesi	24 000	0.6
Southeast Sulawesi	29 000	0.8
Maluku	100 000	2.6
Irian Jaya	2 934 000	77.1
Kalimantan	275 000	7.2
East Kalimantan	150 000	3.9
South Kalimantan	75 000	2.0
Central Kalimantan	10 000	0.3
West Kalimantan	40 000	1.1
Java	40 441	1.1
West Java	20 400	0.5
Central Java	14 041	0.4
East Java	6 000	0.2
Nusa Tenggara	3 678	0.1
Indonesia	3 806 119	100.0

Source: Moosa et al. (1996), *Indonesian Country Study on Integrated Coastal and Marine Biodiversity Management*, Jakarta: Ministry of State for Environment Republic of Indonesia in cooperation with Directorate Management Kingdom of Norway, p. 60.

3.1.2 Coral Reefs

Coral reefs are generally found in Indonesian waters, particularly in shallow and calm waters. These cover an estimated area of about 7 500 km². Coral reef ecosystems are very diverse but fragile. It has high organic productivity. Unfortunately, most coral reef ecosystems are threatened by inappropriate practices, such as rock mining for building materials and decorations, fishing with dynamites and poison, pollution from industrial and household sites and sedimentation by land-based activities. In 1996, studies showed that 73% of reefs in Indonesia is considered damaged. Only 22% is considered in good condition while only 5% are excellent. The heaviest damage occurred in Seribu Islands, Bali and Morotai Islands.

3.1.3 Seaweeds

There are at least 7 families and 13 species of seaweeds in the Indonesian waters. They cover the coastal areas of Sumatera, Java, Bali, Kalimantan, Sulawesi, Maluku, Nusa Tenggara and Irian Jaya. In 1991, the potential seaweed production

in Indonesia was 482 400 tons annually from an area of 25 700 has. Seagrass fields are also found in most parts of the coastal areas. Table 3-2 shows the potential seaweed production in each of the provinces and the areas covered.

3.1.4 Fisheries

In the 1980s, potential fish production was estimated at 6.6 million tons per year, consisting of 4.5 million tons per year from territorial waters and 2.1 million tons per year from the EEZ. According to the Research Institute for Marine Fisheries (RIMF) and the Directorate General of Fisheries (DGF) in 1982, the potential fish production, in tons per year, includes: demersal (2.5 million); small pelagic (3.5 million); large pelagic (441 000); skipjack (275 000); tuna (161 000); penaeid (69 000); other crustaceans (25 000); and coral reef fishes (48 000) (Moosa et al., 1996). In 1983, fish production in the EEZ was 250 500 tons (Table 3-3) or about 25% of total potential production. According to Moosa et al. (1996), total fisheries production is around 40% of their maximum sustainable yield (MSY). However, overfishing has occurred in some regions, mostly in the west coast. Overexploitation of shrimp is apparent in the Arafura Sea.

The fish production according to Central Bureau of Statistics (CBS) was 2 537 612 tons and 2 692 068 tons in 1991 and 1992, respectively. The biggest fish producer was Sumatra, 780 742 tons in 1992 and the smallest were Bali and Nusa Tenggara, 271 029 tons. Total fish production is only 30% of what can be potentially produced. This means that the fishery sector has not been optimally exploited. In 1989 to 1993, Indonesia exported 1 908 454 tons of fishery commodities or up to 24.11% per year from 228 590 tons in 1989 to 529,213 tons in 1993. The value of export increased by about 17% from US\$825 125 in 1989 to US\$1 503 748. Fisheries export is still dominated by tuna, skipjack and mackerel contributing 34% of total value and 68% of total export value. Exports of tuna, skipjack and mackerel have increased by 17% from 56 678 tons to 92 764 tons a year or a total value of US\$102 667 million to US\$248 278 million in 1993. Table 3-4 shows the potential and level of marine fishery utilization in Indonesia. The fish production per province in 1991-1992 is shown in Table 3-5.

"In 1996, studies showed that 73% of reefs in Indonesia is considered damaged. Only 22% is considered in good condition while only 5% are excellent."

In order to conserve endangered species, Indonesia protected a number of marine animals, including mammals, birds and reptiles. The list of legally protected marine animals in Indonesia is shown in Table 3-6.

Most of the fishers do not use motorized boats. This condition is one of the main causes why fish production is below its target. In 1993, there were 894 units of motorized ship in Indonesian waters (Table 3-7).

Table 3-2. Potential Seaweed Production.

Province	Area (ha)	Production (tons/year)
Aceh	250	4 700
North Sumatera	150	2 800
West Sumatera	500	9 400
Riau	1 500	28 100
Jambi	0	0
South Sumatera	1 000	18 800
Bengkulu	100	1 900
Lampung	300	5 600
Jakarta	100	1 900
West Java	500	9 400
Central Java	500	9 400
Yogyakarta	0	0
East Java	300	5 600
Bali	1 500	28 100
West Nusa Tenggara	6 000	112 500
East Nusa Tenggara	6 000	112 500
East Timor	0	0
West Kalimantan	0	0
Central Kalimantan	0	0
South Kalimantan	500	9 400
East Kalimantan	1 000	18 800
North Sulawesi	0	0
Central Sulawesi	500	9 400
South Sulawesi	500	9 400
Southeast Sulawesi	1 000	19 000
Maluku	3 000	56 300
Irian Jaya	500	9 400
Indonesia	26 700	482 400

Source : Dahuri et al., *Pengelolaan Sumberdaya Wilayah Pesisir dan Lautan Secara Terpadu*, PT Pradnya Paramita, Jakarta.

Table 3-3. Fish Production in EEZI in 1993 (in tons).

EEZ Waters	Skipjack	Shrimps	Tuna	Total
1. Indian Ocean	20 514	6 513	1 944	28 971
2. North Makasar Strait	2 028	62 548	1 922	66 498
3. South China Sea	-	42 408	-	42 408
4. Sulawesi Sea	22 614	89	13 757	36 460
5. Pacific Ocean	42 772	6 442	15 850	65 064
6. Timor and Arafura Seas	65	10 913	21	10 999
Total	87 993	128 913	33 494	250 400

Source: Agriculture Department, 1993.

3.1.5 Marine Transportation

Marine transportation is very important since Indonesia is an archipelagic state. Trade exists between islands and countries. From the loading (236 748 000 tons) and unloading (160 444 300 tons) activities, the intensity of marine transportation can be seen (Table 3-8). The highest intensity is in Riau, loading 56 618 800 tons and unloading 14 059 000 tons of cargo. However, marine transportation potentially brings about pollution that threatens marine and coastal ecosystems. Marine transportation may not be directly related to fish production but pollution caused by this activity potentially damages fish habitats, namely coral reefs and other associated ecosystems. Therefore, fish production is obviously influenced by the way marine and coastal environment is managed.

3.2 SOCIAL ASPECTS

Indonesia has a population of 179 322 million in 1992 and 200 000 million in 1998 (Table 3-9). Annual population growth rate is 1.7%. Population density in 1992 is 93 persons per square kilometer and this has increased to 102 persons per square kilometer in 1995. However, the distribution of population is not the same among the islands and provinces in Indonesia. About 59% of the population live in Java while Java constitutes only 7% of the whole territory. With 114 987 million population, the density in Java is 870 persons per square kilometer while in Irian Jaya, which has 22% of the area, has a population density of 5 persons per square kilometer. Approximately 70% of the whole population lives in coastal areas.

The Central Bureau of Statistics (CBS) indicates that life expectancy rate is 61.5 years. Mortality rate is 68 persons per 1 000 population. Forty-two percent of the population has access to potable water, 43% to health treatment and 44% to sanitation (HDR, 1993). Literacy rate is 61%. Sixteen percent of the population over five years old do not attend school, while those in school comprise 27% and drop-outs are 57% (CBS, 1994). The livelihood of the population is generally farming, including fishers (54%), services (38%) and industry (8%). Income per capita is US\$560 with Gini Index of 0.31 (HDR, 1993). There are 1 889 538 marine fishers in Indonesia (CBS, 1995). The north coast of Java has the highest number of fisher and East Java has the most fishers than other provinces (Table 3-10).

3.3 THE PATTERNS OF RESOURCE MANAGEMENT

3.3.1 Fishery Resource Management Patterns

Marine fishing has been traditionally done by coastal fishers equipped with small boats. The use of bigger vessels (20-30 GT) was adopted only recently. The use of big vessels and the presence of commercial fishers have increased fish

Table 3-4. Potential and Level of Marine Fishery Utilization in Indonesia.

No.	Area Waters	Demersal		Shrimp		Small Pelagic		Large Pelagic		Coral Fish		Squid	
		MSY (tons/year)	ER (%)	MSY (tons/year)	ER (%)	MSY (tons/year)	ER (%)	MSY (tons/year)	ER (%)	MSY (tons/year)	ER (%)	MSY (tons/year)	ER (%)
1	West Sumatera	78 700	71.3	2 100	97.5	115 000	52.7	-	-	5 144	-	8 990	3.7
2	East Sumatera	219 000	31.3	4 700	129.3	137 000	29.3	-	-	3 917	133.0	13 730	6.4
3	Strait of Malaka	116 000	99.7	22 900	84.4	106 000	115.7	-	-	6 527	137.8	9 330	37.5
4	North Java	362 060	32.0	12 000	96.7	125 000	87.6	-	-	5 512	108.7	64 580	6.1
5	South Java	93 500	47.5	5 500	31.5	61 000	29.3	-	-	1 108	99.5	5 770	6.1
6	South/West Kalimantan	976 340	18.1	14 000	77.1	406 000	32.6	-	-	1 301	125.4	36 200	2.9
7	East Kalimantan	79 920	82.3	12 600	78.4	158 000	18.1	-	-	2 981	143.6	12 040	24.3
8	South Sulawesi	92 160	90.1	8 100	99.5	236 000	81.2	76 424	72.7	11 914	158.8	16 440	6.3
9	North Sulawesi	50 200	29.0	300	19.9	176 000	43.3	76 424	72.7	4 130	125.5	20 170	3.5
10	Bali/Nusa Tenggara Timur	59 800	49.5	500	173.7	121 000	50.1	-	-	30 954	133.0	7 800	22.6
11	Molucca and Irian Jaya	388 800	25.3	18 020	32.4	782 000	5.8	111 598	52.1	6 594	122.9	133 910	0.6
12	Indonesian EEZ	647 150	0.0	-	-	-	-	-	-	-	-	-	-
13	Indian Ocean (West Sumatera, Nusa Tenggara)	-	-	-	-	-	-	33 214	57.5	-	-	-	-
14	EEZ North Sulawesi	-	-	-	-	-	-	24 203	0.0	-	-	-	-
15	EEZ North Irian Jaya	-	-	-	-	-	-	79 019	0.0	-	-	-	-
16	North/West Sulawesi	-	-	-	-	-	-	51 588	59.7	-	-	-	-

Source : Amin et al. (1990), Anonymous (1991), Dwiponggo et al. (1990), Malikusworo et al. (1990), and Uktolsija (1990).

Legend : ER = Exploitation Rate; MSY = Maximum Sustainable Yield

production in the past few years. This trend has also increased the fishing area across national waters. The extension of fishing is also stimulated by customary practices of fishers to go fishing according to seasons. Hence, fishers move from one area to another throughout the year due to seasonal differences. The extension of fishing area and highly mobile fishers bring about potential conflict among fishers, particularly between the local community and fishers coming from other regions. This condition tends to cause the concentration of fishing activities within a particular area and season. The concentration of fishing has exceeded the life support capacity of certain waters which in turn has brought about intense harvesting.

Based on the development as well as the attendant constraints and problems in marine fishery, the Directorate General of Fisheries (DGOF) has developed a fisheries management plan based on zoning systems in 1992. The fishing management zones are divided into seven areas:

- ❖ Malaka Straits waters;
- ❖ Natuna Sea and South China Sea waters;
- ❖ Java Sea waters;

Table 3-5. Provincial Fish Production (1991-1992).

Province	1991 Production (tons)	1992 Production (tons)
1. Aceh	74 701	76 756
2. North Sumatera	222 534	240 076
3. West Sumatera	58 842	59 869
4. Riau	172 821	179 496
5. Jambi	17 508	18 329
6. South Sumatera	92 570	100 895
7. Bengkulu	12 128	n.r
8. Lampung	89 109	n.r
Sumatera	740 695	n.r
9. Jakarta	28 278	31 214
10. West Java	134 417	144 775
11. Central Java	213 620	244 775
12. Yogyakarta	701	965
13. East Java	216 610	218 104
Java	593 626	640 595
14. Bali	130 954	141 299
15. West Nusa Tenggara	64 825	66 510
16. East Nusa Tenggara	56 604	61 862
17. East Timor	944	1 358
Bali and Nusa Tenggara	253 327	271 029
18. West Kalimantan	63 537	65 049
19. East Kalimantan	41 915	41 683
20. South Kalimantan	64 681	68 815
21. Central Kalimantan	60 427	61 865
Kalimantan	230 560	237 412
22. North Sulawesi	73 776	79 877
23. Central Sulawesi	47 726	61 879
24. South Sulawesi	233 396	232 443
25. Southeast Sulawesi	105 795	116 437
Sulawesi	460 693	490 636
26. Maluku	167 851	176 866
27. Irian Jaya	90 860	84 788
Maluku and Irian Jaya	258 711	271 654
Indonesia	2 537 612	2 692 068

Source: Statistics of Indonesia, 1994.

- ❖ Flores and Malaka Straits waters;
- ❖ Maluku Sea, Halmahera Sea and Tomini Bay waters;
- ❖ Banda Sea and Arafura Sea waters;
- ❖ Sulawesi Sea and Pacific Ocean waters; and
- ❖ Indian Ocean waters.

Table 3-6. List of Legally Protected Marine Animals in Indonesia.

	Scientific Name	Common Name	Local Name
MAMMALS			
	CETACEA (all species)	Whales, dolphins	Binatang paus, lumba-lumba, pesut
1	<i>Dugong dugon</i>	Dugong	Duyung
REPTILES			
2	<i>Dermochelys coriacea</i>	Leatherback turtle	Penyu belimbing
3	<i>Lepidochelys olivacea</i>	Olive ridley turtle	Penyu lekang
4	<i>Caretta caretta</i>	Loggerhead turtle	Peny tempayan
5	<i>Eretmochelys imbricata</i>	Hawks bill turtle	Penyu sisik
6	<i>Natator depressus</i>	Flatback turtle	Penyu pipih
7	<i>Crocodylus porosus</i>	Marsh crocodile	Buaya muara
BIRDS			
	PELECANIDAE (all species)	Pelican	Gangsa laut
8	<i>Sula leucogaster</i>	Abbot booby	Gangsa batu
9	<i>S. dactylatra</i>	Blue-faced booby	Gangsa batu muka biru
10	<i>S. abbotti</i>	Abbot booby	Gangsa batu aboti
11	<i>S. a sula</i>	Red-footed booby	Bangsa batu muka merah
12	<i>Anhinga melanogaster</i>	Oriental darter	Pecuk ular
13	<i>Grus spp.</i>	Crane	Jenang
14	<i>Fregarata andrewsi</i>	Christmas Island Frigate bird	Bointayung, Burung gunting
15	<i>Egretta sacra</i>	Pacific reef egret	Kuntul karang
16	<i>Bubulcus ibis</i>	Cattle egret	Kuntul, Bangau putih
17	<i>Nycticorax caledonicus</i>	Rufous night heron	Kowak merah
18	<i>Ibis cinereus</i>	Milky stork	Bluwok, Walangkadak
19	<i>Ibis leucocephalus</i>	Painted stork	Bluwok merah
20	<i>Ciconia episcopus</i>	Wooly-necked stork	Bangau hitam, sindanglawe
21	<i>Nycteria cinerea</i>	Milky stork	Bangau putih susu
22	<i>Pseudibis davisoni</i>	White-shouldered ibis	Ibis hitam punggung putih
23	<i>Leptoptilus javanicus</i>	Chesser adjunct stork	Marabu bangau tontong
24	<i>Threskioris aethiopica</i>	Black-headed ibis	Ibis putih, platuk besi
25	<i>Plegadis falcinellus</i>	Glossy ibis	Ibis hitam, roko-roko
26	<i>Esacus magirostris</i>	Chesser adjunct stork	Willi-willi, aar, bebek laut
	ACCIPITRIDAE	Eagle (all species)	Elang, alap-alap
	FALCONIDAE		
	PANDIONIDAE		
27	<i>Elanus hypoleucus</i>	Black-winged kite	Alap-alap putih, alap-alap tikus
28	<i>Elanus caeruleus</i>	Black-winged kite	
29	<i>Lemnodromus semipalmatus</i>	Asia dowitcher	Blekek Asia
30	<i>Numenius spp</i>	Curfows whimbrel	Gegajahan
31	<i>Tringa guttifer</i>	Spotted green shank	Trinil tutul
32	<i>Himantopus himantopus</i>	Black-winged stilt	Trinil lidi, lilimo
	STERNIDAE (all species)	Tern	Dara laut
33	<i>Sterna zimmermani</i>	Chinese crested tern	Dara laut berjambul
	ALCENINIDAE (all species)	Kingfisher	Raja udang
MOLLUSC			
34	<i>Tridacna gigas</i>	Giant clam	Kima raksasa
35	<i>T. derasa</i>	Southern giant clam	Kima selatan
36	<i>T. crocea</i>	Saffron coloured clam	Kima kunia, lubang
37	<i>T. squamosa</i>	Scaly clam	Kima sisk, kima seruling
38	<i>T. maxima</i>	Small giant clam	Kima kecil

Source: Indonesian Country Study on Integrated Coastal and Marine Biodiversity Management, Ministry of State for Environment, Republic of Indonesia in cooperation with the Directorate for Nature Management, Kingdom of Norway, 1996.

Table 3-7. Fishing Boats/Ships in Indonesian Water (1989-1993).

Year	Boat/Ship Type (in Unit)		
	Without motor	Attached Motor	Motorized Ship
1989	149 070	8 317	368
1990	140 309	8 245	825
1991	141 427	6 524	1 063
1992	124 258	6 554	1 250
1993	132 884	8 732	894

Source: Agriculture Department, Agriculture Statistics, 1989-1993.

Table 3-8. Inter-Island and Foreign Loading/Unloading, 1993 (000 tons).

Province	Inter Island		Inter Country		Total	
	Loading	Unloading	Loading	Unloading	Loading	Unloading
Aceh	2 641.2	1 204.4	34 300.0	46.7	36 941.2	1 251.1
North Sumatera	1 803.7	5 333.0	3 935.4	1 865.8	5 739.1	7 198.8
West Sumatera	1 206.8	1 154.3	1 643.3	87.1	2 850.1	1 241.4
Riau	21 324.8	12 995.5	35 294.0	1 063.8	56 618.8	14 059.3
Jambi	396.2	1 423.5	587.6	292.8	983.8	1 716.3
South Sumatera	9 282.4	5 819.4	4 748.3	1 806.4	14 030.7	7 625.8
Bengkulu	68.2	179.7	270.4	33.2	338.6	212.9
Lampung	4 000.0	1 002.2	1 164.6	4 988.7	5 164.6	5 990.9
Sumatera	40 723.3	29 112.2	81 943.6	10 184.5	122 666.9	39 296.5
Jakarta	4 430.0	13 740.8	6 153.4	12 244.1	10 583.4	25 984.9
West Java	2 501.6	7 417.0	485.1	485.1	2 986.7	12 939.0
Central Java	9 250.1	17 470.0	1 663.7	1 663.7	10 583.4	19 434.1
East Java	5 285.9	13 861.7	2 446.9	5 925.5	7 733.8	19 787.2
Java & Madura	21 468.9	52 489.5	10 749.9	25 655.7	32 217.7	78 145.2
Bali	2 316.4	3 083.9	3 083.9	3.0	2 318.2	3 086.9
West Nusa Tenggara	383.0	665.2	665.2	0.0	383.0	665.2
East Nusa Tenggara	393.6	646.6	646.6	0.0	393.6	646.6
East Timor	10.7	223.3	223.3	9.2	10.8	232.5
Bali, Nusa Tenggara and Timor	3 103.7	4 619.0	4 619.0	12.2	3 105.6	4 631.2
West Kalimantan	746.1	1 798.0	1 798.0	139.1	1 920.9	1 938.0
Central Kalimantan	2 430.5	752.4	302.0	0.6	2 732.5	753.0
South Kalimantan	2 032.1	2 817.6	5 125.1	486.8	7 157.2	3 304.4
East Kalimantan	14 842.3	15 198.9	39 609.2	7 200.5	54 451.5	22 399.4
Kalimantan	20 051.0	20 567.8	46 211.1	7 827.0	66 262.1	28 394.8
North Sulawesi	858.5	1 647.1	225.6	166.8	1 084.1	1 813.9
Central Sulawesi	1 286.2	504.7	0.0	0.0	1 286.2	504.7
South Sulawesi	2 470.1	2 526.7	630.0	830.9	3 100.1	3 357.6
Southeast Sulawesi	257.5	829.0	295.8	2.6	553.3	831.6
Sulawesi	4 872.3	5 507.5	1 151.4	1 000.3	6 023.7	6 507.8
Maluku	567.9	1 089.0	1 905.6	13.6	2 473.5	1 102.6
Irian Jaya	3 028.8	2 100.7	1 005.7	265.5	4 034.5	2 366.2
Maluku and Irian Jaya	3 596.7	3 189.7	2 911.3	279.1	6 508.0	3 468.8
Indonesia	93 815.6	115 485.5	142 968.4	44 958.8	236 784.0	160 444.3

Source: Central Bureau Statistics (CBS), Statistics of Indonesia, 1994.

Table 3-9. Population Density and Growth in Indonesia (1990-1995).

Province	Area (km ²)	%	Total Population (000)		% Population		Density (per km ²)		Growth (%)
Aceh	55 392	2.89	3 416	3 860	1.98	1.98	62	70	2.47
North Sumatera	70 787	3.69	10 252	11 145	5.72	5.71	145	157	1.68
West Sumatera	49 778	2.59	4 000	4 328	2.23	2.22	80	87	1.59
Riau	94 561	4.93	3 179	3 925	1.83	2.01	35	42	3.66
Jambi	44 800	2.33	2 018	2 383	1.13	1.22	45	53	3.38
South Sumatera	103 688	5.40	6 312	7 233	3.52	3.70	61	70	2.76
Bengkulu	21 168	1.10	1 179	1 415	0.66	0.72	56	67	3.72
Lampung	33 307	1.74	6 016	6 680	3.36	3.42	181	200	2.12
Sumatera	473 481	24.67	36 472	40 970	20.35	20.98	77	86	2.35
Jakarta	590	0.03	8 228	9 161	4.59	4.69	13.946	15.526	2.17
West Java	46 300	2.41	35 382	39 337	19.74	20.14	764	850	2.14
Central Java	34 206	1.78	28 516	29 688	15.91	15.20	834	868	0.81
Yogyakarta	3 169	0.16	2 913	2 917	1.63	1.49	919	920	0.02
East Java	47 921	2.50	32 488	33 886	18.12	17.35	678	707	0.85
Java	132 186	6.89	114 988	114 988	59.99	58.87	813	870	1.35
Bali	5 561	0.29	2 902	2 902	1.55	1.55	518	522	0.89
West Nusa Tenggara	20 177	1.05	3 655	3 655	1.88	1.88	178	181	1.64
Tenggara	47 876	2.49	3 583	3 583	1.82	1.83	74	75	1.86
East Nusa Tenggara	14 874	0.77	843	843	0.42	0.43	56	57	2.42
East Timor	88 488	4.61	10 983	10 983	5.67	5.62	122	124	1.57
Nusa Tenggara									
West Kalimantan	146 760	7.65	3 228	3 652	1.80	1.87	22	25	2.50
Central Kalimantan	152 600	7.95	1 396	1 637	0.78	0.84	9	11	3.74
South Kalimantan	37 660	1.96	2 597	2 900	1.45	1.49	69	77	2.23
East Kalimantan	202 440	10.55	1 875	2 331	1.05	1.19	9	12	4.45
Kalimantan	539 460	28.11	9 096	10 521	5.07	5.39	17	20	2.95
North Sulawesi	19 023	0.99	2 477	2 652	1.38	1.36	130	139	1.38
Central Sulawesi	69 726	3.63	1 703	1 948	0.95	1.00	24	28	2.72
South Sulawesi	72 781	3.79	6 980	7 578	3.89	3.88	96	104	1.66
Southeast Sulawesi	27 686	1.44	1 349	1 594	0.75	0.82	49	58	3.39
Sulawesi	189 216	9.86	12 509	13 772	6.98	7.06	66	73	1.94
Maluku	74 505	3.88	1 853	2 095	1.03	1.07	25	28	2.48
Irian Jaya	421 981	21.99	1 630	1 956	0.91	1.00	4	5	3.72
Maluku & Irian Jaya	496 486	25.87	3 483	4 051	1.94	2.07	7	8	3.07
Indonesia	1 919 317	100.00	179 249	195 283	100.00	100.00	93	102	1.73

Source: CBS, Living Environment Statistics, 1995.

The fishery resource management system applied by DGOF is called *Pengelolaan Bersama* (Collective Management System). The implementation of this system is carried out by the Forum of Coordination for Fisheries Resources Utilization, on the *Forum Koordinasi Pengelolaan Pemanfaatan Sumberdaya Ikan* (FKPPS). This consists of representatives from national and local governments, private sectors and local fishers. The main activity of this forum is to organize fisheries exploitation for the interest of all stakeholders and monitor the implementation of the action plan established by the FKPPS. The plan involves information on potential fish stocks, mechanism for allocating resources and supervision. The plan was established based on regular meeting conducted by FKPPS. The main objective of collective management and FKPPS activities is to

Table 3-10. Marine Fishers by Province (1993).

Coastal areas	Province	Total
Western Sumatera	Aceh	51 123
	South Sumatera	36 488
	West Sumatera	31 164
	Bengkulu	6 659
	Lampung	3 621
	Sub total	129 055
Southern Java	West Java	36 691
	Central Java	12 856
	Yogyakarta	21 166
	East Java	124 207
	Sub total	194 920
Malaka Strait	Aceh	39 218
	North Sumatera	104 797
	Riau	68 764
	Sub total	212 779
Eastern Sumatera	Jambi	9 792
	South Sumatera	44 989
	Lampung	31 241
	Sub total	86 022
Northern Java	Jakarta	30 874
	West Java	39 266
	Central Java	113 084
	East Java	233 618
	Sub total	416 802
Bali and Nusa Tenggara	Bali	23 707
	West Nusa Tenggara	55 447
	East Nusa Tenggara	63 091
	East Timor	7 398
	Sub total	149 643
Southwestern Kalimantan	West Kalimantan	33 546
	Central Kalimantan	15 640
	Sub total	49 186
Eastern Kalimantan	South Kalimantan	35 980
	East Kalimantan	77 658
	Sub total	133 638
Southern Sulawesi	South Sulawesi	136 730
	Southeast Sulawesi	15 850
	Sub total	152 580
Northern Sulawesi	North Sulawesi	98 032
	South Sulawesi	70 539
	Sub total	168 571
Maluku and Irian Jaya	Maluku	104 600
	Irian Jaya	111 728
	Sub total	216 328
Indonesia		1 889 528

Source: CBS, Living Environment Statistics, 1995.

"The main objective of collective management and FKPPS activities is to provide information on fish stocks and to integrate the interest of all stakeholders, including national and local governments, private sectors and local communities. "

provide information on fish stocks and to integrate the interest of all stakeholders, including national and local governments, private sectors and local communities. FKPPS involves other institutions such as DGOF, Local Fishery Agency, Fishery Research and Development, Scientific Commission, Fishery Companies, Fishers Community and Sea Security.

FKPPS activities involve members interested in the utilization of fishery resources including fishing companies and directly involved fishers in the utilization of fishery resources. In connection with the work mechanism of FKPPS, a problem faced by an area may be put forward in a FKPPS meeting and together identify the best solution.

Technical meetings are usually held to discuss the development of fishing activities that include the following issues:

- ❖ Estimation of fishery resource potential, types of fishes and its distribution;
 - ❖ Allocation of fishery resources and catching system plan;
 - ❖ Arrangement of resource allocation and utilization plan;
 - ❖ Assessment of migrating fishers and *andon* or permanent fishers;
 - ❖ Arrangement of the use of devices such as *payous*;
 - ❖ Arrangement of the harvesting of certain commercial fishes and fishery preservation area; and
 - ❖ Control of the utilization of fishery resources.
- a) Estimation of fishery resources potential, types of fishes and its distribution.

The Commission of Research and Fishery Resources Development (CRFR) estimates potential resources and conducts regular research to provide information on fisheries management. Information provided by CRFR is often used by FKPPS and in other technical meetings held by CRFR to assess the fishery resources, estimate stocks, determine types

of fish and its distribution. Information concerning potential fisheries resources includes:

- ❖ types of fish and its size;
- ❖ estimation of the fishery potential; and
- ❖ distribution area of the fish and catching season.

b) Allocation of fisheries resources and catching efforts development.

The allocation of fishery resources is determined by FKPPS through a technical meeting that involves all members, including Local Fishery Agency and fishing companies. The agreement usually covers data and information regarding the potential resources and catch, total production and further development plan. Such information is important in determining the allocation of resources and action plan on fish exploitation with respect to a particular catching area and fishing companies involved.

c) Arrangement of utilization of development allocation.

Distribution of fish catching activities is not equal since the distribution of fishers in the area is not similar. This resulted in the unbalanced relation between the capacity of certain catching area and fish production. This highlights the fact that some locations are intensively exploited while others are not. In order to maintain a balanced system of fisheries exploitation, the government encourages fishing companies or local fishers to fish in underexploited waters. In order to encourage partnerships in fisheries resources exploitation, the National Government established the Decree of the Minister of Agriculture No. 509, 1995 concerning Core Community Business Development (*Perusahaan Inti Rakyat*). This was meant to develop a partnership in fisheries management between big business and small-scale fishers.

d) Arrangement of migrating fishers and *andon* fishers.

The development of sea fishing activities resulted in a wider area of fishing for fishers and created two types of fishers called migrating and *andon* or permanent fishers.

- ❖ Migrating fishers are those who fish in other areas or provinces but return to their origins since they use relatively big vessels (20-30 GT).

- ❖ *Andon* or permanent fishers are those who go fishing using temporary base outside their origins since they use relatively smaller vessels (5-10GT) and might not be able to return back and forth to their fishing areas.

The arrangement of migrating and *andon* fishers is adjusted according to the allocated development area (potential resources) and the total fishers in the location. This is usually arranged by the Collective Management Board through FKPPS meetings. The agreement on this issue includes:

- ❖ The migrating fishers must bring a recommendation letter from the Local Fishery Agency (LFA) nearest to the origin of the fishers, then the LFA of the origin informs the LFA nearest to the fishers' catching area.
- ❖ *Andon* fishers must bring a recommendation letter from the LFA nearest to the origin of the fishers or if the location is far, the local government of the fishers' area may issue a recommendation letter. Then the *andon* fishers must report to the LFA official or local government official in the area where the fishers visit. The local government official issues the recommendation letter. The fisher is required to send a report to the local government and LFA.

This system provides an opportunity for fishers to produce optimum production of fish as well as equity and equality of opportunity. Unfortunately, this system is not effectively implemented because local fishers tend to disregard such administration systems. The system is also hampered by ineffective law enforcement.

e) Arrangement of *payous* (*rumpon*).

The use of *payous* among fishers has increased in the past few years. This trend may cause environmental damage and conflict among fishers. In order to control the development of *payous*, the national government issued the Decree of Agriculture Minister No. 51 of 1997 regarding installation and utilization of *payous*. The decree regulates the licensing system of *payous*. It also regulates the installation and utilization by fishing companies and fishers. This regulation is not well implemented. Findings indicate that local fishers still engage in illegal fishing by using *payous* in the waters near their village, threatening local community interest.

f) Arrangement for the harvesting of certain commercial fishes in fishery preservation areas.

Certain commercial fishing regulations are generally aimed at areas with limited resources. The aim of this regulation is to prevent the harvesting of endangered species such as napoleon wrasse. The regulation regarding fishery preservation is aimed at certain areas where fishery resources utilization is prohibited in order to protect the fishery resources. Unfortunately, illegal fishing of endangered species still occur due to ineffective law enforcement.

g) Controlling utilization of fishery resources.

The purpose of the policies on controlling fishery resources utilization is to ensure the implementation of all fisheries policies and achieve effective law enforcement. In order to achieve law enforcement, DGOF and the Navy established joint programs. Also, the Department of Agriculture assigns coastguards. However, the implementation of a control system is extremely ineffective. The use of destructive fishing devices such as dynamite, poison and inappropriate nets have continued to increase. Illegal fishing by foreign fishers is still a serious threat. Also, transshipment in the sea is still present.

FKPPS continues to coordinate by conducting meetings, preparing materials on the implementation of agreed results and in identifying problems and solutions in the field. During its meetings, the FKPPS also discusses development opportunities and inter-area cooperation so that optimal resources utilization may be reached while considering the preservation of fishery resources in the area.

FKPPS handles law enforcement. A number of legal issues is referred to the technical meeting, particularly in relation to laws and regulations as follows:

- ❖ Law no. 9/1985 on Fisheries
- ❖ Law no. 5/1990 on Conservation and Ecosystem of Natural Resources
- ❖ Government Regulation No. 15/1984
 - Management on Fishery Resources in Indonesia's EEZ
 - Cooperation with foreign companies as well as issuance of license for resources utilization
 - Agriculture Minister established TAC, fishing allocation, numbers of fishing vessel and fishing gears
 - Fishing fee

- ❖ Government Regulation No. 15/1990:
 - Fisheries activities
 - Fisheries activities: Fishing activities and fish culture
 - Fisheries Licensing: Central and Local Government
 - Fisheries fee
- ❖ Decree of Agriculture Minister No. 01/1975
- ❖ Agriculture Minister Decree No. 607/1976 concerning Fishing Zonation

According to this regulation, Indonesian waters is divided into three zones as follows:

- Zone I: Fishing vessels 5 GT/10 HP is prohibited within 3 miles from shorelines.
- Zone II: 4 miles from Zone I is closed for fishing vessel over 25 GT/50 HP.
- Zone III: 5 miles from Zone II is closed for fishing vessel over 100 GT/200 HP.

Fishing nets with mesh size less than 25 mm and purse seine (for tuna/cakalang) with mesh size less than 60 mm are prohibited in all fishing zone.

- ❖ Agriculture Minister Decree No. 509/1995 concerning Core Community Business Development;
- ❖ Decree of Agriculture Minister No. 8056/1995 concerning the Use of fish Transport Vessel; and
- ❖ Decree of Agriculture Minister No 51/1997 concerning *Payous* Utilization and Installations.

3.3.2 *Fishers' Access to Fishery Resources*

The policies on fishery resources utilization always extend access for fishers, but generally this opportunity has not been utilized by all fishers due to some limitations on their part, such as lack of skill, low capital and ineffective fishers'

organizations. In order to protect the interest of fishers, especially small-scale fishers, the government established the following policies:

- ❖ Decree of Agriculture Minister No. 607/1976 regarding fishing path. This regulation is aimed at protecting the fishing ground of small-scale fishers. Large-scale businesses are prohibited from entering fishing grounds of small-scale fishers while small-scale fishers are allowed to enter large-scale fishing grounds (high seas).
- ❖ Decree of Agriculture Minister No. 509/1975 regarding partnership on fisheries management. This regulation deals with the principles of management that promote small-scale fishers' interests.
- ❖ Decree of Agriculture Minister No. 51/1997 regarding *payous* installation and utilization, regulating the area for *payous* installation by fishers and *payous* installed by fishing companies and fishers may utilize the *payous* installed by fishing companies.
- ❖ Arrangement of Migrating and *Andon* Fishers by simplifying the licensing system so that the fishers can directly operate in the area benefiting the fishers.
- ❖ Establishment of fishers' organization (HNSI and Fishery Cooperative), through fisher organizations, the fishers have actively participated in the fishery resources management conducted by DGOF such as Collective Management and FKPPS meetings.
- ❖ Training conducted by DGOF and Local Fishery Agency to enhance the fishers' skills in fishery resources activities.

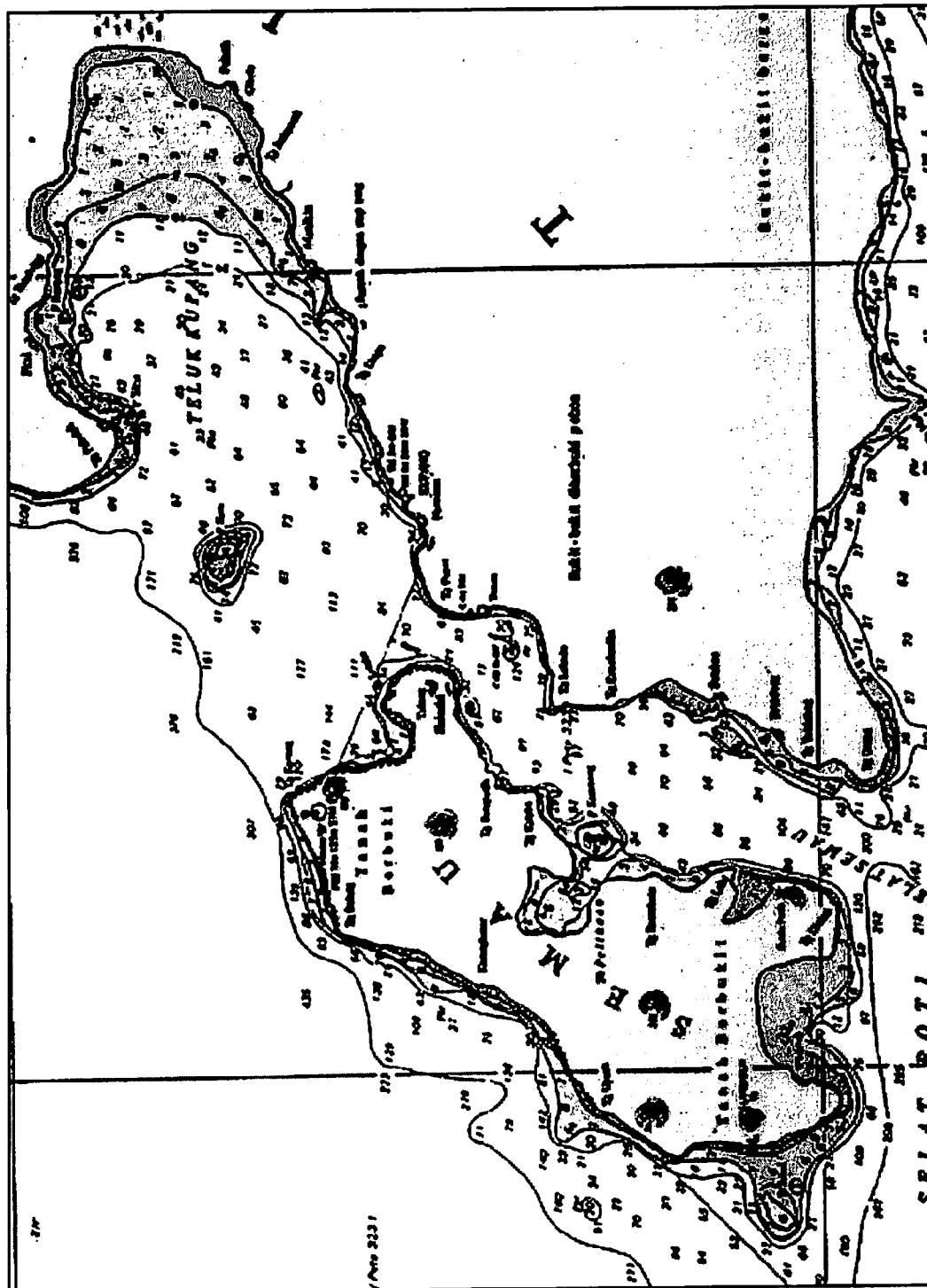
3.3.3 *Management Constraints*

As known, Indonesia consists of thousands of islands with diverse cultures and different traditional laws (*adat* law). These differences often create conflicts among the fishers since the fishers put their interests above others. This happened in some areas when, for the sake of the area and fisher's interest, an *adat* law was applied to the disadvantage of fishers in other areas. Other field issues include the spread of human settlements, remote locations and low education of the fishers that make it difficult for them to overcome limitations in the utilization of fishery resources. This also lowers the fishers' position in the utilization and management of fishery resources.

In order to develop small-scale fishers, the government established programs such as:

- ❖ training for fishers;
- ❖ giving technology package to fishers;
- ❖ pilot projects for fishers;
- ❖ extending loans to fishers; and
- ❖ developing partnership activities with PIR Pattern.

Figure 3-1. Map of Kupang Bay: Sulamu Village.



3.4 KUPANG BAY

Kupang Bay is part of Nusa Tenggara Timur waters. Nusa Tenggara Timur waters is divided into two regions. The first covers Kupang Bay including Semau Island. This region is divided into four subregions—three are located in the East Coast and the other in Semau Island. The second region comprises Rote Island which consists of three different subregions—two are located in the west side and another in the east side. The Decree of Minister of Forestry No. 18/KPTS/II/93 designated Kupang Bay, including two of its small islands (Kambing Island and Kera Island) and its resources, especially coral reefs, as a Marine Park. This means that by law Kupang Bay needs a special treatment. The The Coral Reef and Environmental Management Project (COREMAP) project also proposed the bay as one of the pilot projects for coral reef rehabilitation. This project includes: Sulamu, Semau, northwest of Rote and southwest of Rote.

The load of sediments from Timor River is substantial and this influences the water quality of Kupang Bay. Kupang Bay has become shallow due to the long process of sedimentation caused by southeast wind wave. Sedimentation in Kupang Bay has been accelerated by land-based activities such as agriculture. Turbidity of waters along the northern shore up to Selamu is very high, reaching levels of 500 to 100 m.

3.4.1 Natural Resources

a. Coral Reefs

The coral reefs in Kupang Bay are threatened by eutrophication, sedimentation and destructive fishing. This is true in several locations surrounding the fish harbor located in the bay. Coral reefs in Kupang Bay is dominated by the genus *Acropora* and *Montipora*. Some locations possess rich ecosystems with species richness at about 40 to 70 species (Table 3-11).

Table 3-11. Coral Reef Species in Kupang Bay.

Location	Total Species	Dominant Genera
Kera Island (North)	66 and 72	<i>Acropora, Montipora, Porites</i>
Kera Island (South)	36 and 37	<i>Acropora, Montipora, Porites</i>
Lime Shore (Sulamu)	32 and 41	<i>Acropora, Montipora, Porites, Favites</i>
Toda Cape (Sulamu)	49 and 51	<i>Acropora, Montipora, Porites</i>
Kupang	46 and 47	<i>Acropora, Porites</i>
Kupang Harbor	23 and 36	<i>Acropora, Porites</i>
Kurung Cape (Semau)	33 and 42	<i>Acropora, Montipora, Porites</i>
Teddy's Cottage (Semau)	42 and 43	<i>Acropora, Porites, Favites</i>

Source: Rahardjo, Yulfita et al. (see Table 3-13).

An MREP report (1995) indicates that there are 160 hard species from 15 genera in Kupang Bay. This survey also shows a hard coral cover of 45% to 59%. Soft corals are seldom found in this area but algae is dominant. The COREMAP team also recorded that scleratinian species varied from 23 to 27 species in some locations.

b. Fishery

Demersal species and ornamental fishes are generally abundant. Shellfish has declined in the last five years in Kupang Bay due to inappropriate fishing techniques. COREMAP also reported that there are no large serranids recorded during their 20-hour dive. Kupang Bay has potential fisheries commodities such as: *napoleon wrasse, kerapu, gergaheng, kabaak, lorak, lobster, kombong, tongkol, nipi, tembang, mano, kepala batu, hidung muda* and *paparek*. There are also other marine resources such as *batu laga, batu lola*, sea cucumber and seaweed.

b. Mangrove

Mangroves grow well in the north and east coasts of Kupang Bay. The COREMAP team recorded 17 species of mangroves in certain locations in the bay. Mangroves in this area have decreased drastically due to increasing use for firewood and building materials. Remaining mangrove forests are mostly found far from populated villages.

3.4.2 Social Aspects

More than 300 000 people live in Kupang Bay. Semau Island which is composed of six small regions is inhabited by 9 000 people. A 1990 census in seven locations shows that Sulamu is the more populated region compared to the three other villages (Table 3-12).

Kupang Bay has attracted many outsiders since the 1920s. The Portuguese monks has succeeded in establishing a mission in the 16th century and built the Concordia, a Dutch-Indies Fortress many years ago. With this success, many people from different islands come to live around the Concordia. In the 18th century, the Dutch encouraged Helong groups from Timor to move to Semau Island. Large-scale migration occurred in the 19th century from Rote Island to Kupang Bay. Also, large numbers of Bajo tribe, Buton tribe and Bugis fishers and traders migrated to Kupang Bay. The Rote, Bajo, Buton and Bugis tribes have utilized the resources of the bay in various ways. Reports say that more than 20 000 tons of fish and other marine commodities have been transported from the bay.

Table 3-12. Population Distribution by Village in Kupang Bay in 1990.

Semau		Sulamu		East Kupang		West Kupang	
Village	Population	Village	Population	Village	Population	Village	Population
Hanssisi	803	Sulamu	3 491	Nunkurus	2 072	Lifeleu	1.216
Uiasa	761	Pitai	1 068	Naibonat	2 553	Tesabela	991
Uitao	1 000	Pariti	2 072	Tuapukan	993	Oemata-nunu	898
Otan	987	Oeteta	1 672	Merdeka	2 128	Kuan-Heun	
Huiletot	612	Bipolo	888			Bolok	943
Bokunusan	1 226					Nitneo	1.202
Uitiuhana	990						3 179
Uitiuhtian	963						
Akle	936						
Total	8 278		9 191		7 746		8 429

Source: Rahardjo, Yulfita et al. *Laporan Hasil Kegiatan Survei Baseline Sosial Ekonomi, Program Rehabilitasi dan Pengelolaan Terumbu Karang (Coremap), Nusa Tenggara Timur, LIPI, Jakarta*.

Various ethnic groups and religions exist in this area. Migrants from Rote Island are mostly Christian, while Bajo, Buton and Bugis ethnic groups are Moslems. The educational level in this area is relatively low. Only 70% of the coastal community has finished grade school. In 1995, the research institute (PSL) of the University of Cendana found that 66% of the coastal community in 12 villages in Kupang Bay has finished grade school, 20% dropped out, 8% finished secondary schools and 6% high school. Residents of the local community are not interested in attending formal education, such as the training and fishing techniques provided by the government. They believe that traditional practices learned from their parents are sufficient. Health facilities are quite reasonable, particularly in areas near Kupang. Malaria is the most common disease, followed by influenza and eye infection. This indicates the limited supply of potable water and their level of vulnerability to health risks.

3.5 SULAMU VILLAGE

As a small vilage in Kupang Bay, Timor Island, Sulamu is part of Sulamu District, Kupang Regency, Nusa Tenggara Timur. The community consists of two major migrating groups which come from Rote Island and Bajo tribe from as early as the 1800s and 1920s, respectively. The Timor tribe, which is the original inhabitants of the island, is gradually evacuating the island. The inhabitants of Rote originally depend on the land-based economy, while the Bajos, on sea-based economy. Although some Rote people work as fishers, they regard it as an extra job since their main line of work is farming.

Sulamu village has 3 556 inhabitants with 789 family heads in 1997. Most of them (62%) work as fishers and the rest (38%) are farmers and breeders. The educational level in Sulamu is low as shown by the following figures—5% are out of

"Sulamu village...
...62% work as fishers and
38% are farmers and
breeders.
...5% are out of school, 41%
attended primary school, 48%
finished primary school, 3%
finished secondary school and
4% finished high school."

school, 41% attended primary school, 48% finished primary school, 3% finished secondary school and 4% finished high school. One of the obstacles to education is the habit of employing young children to help their parents, particularly in the fishing communities. The health condition in Sulamu is also not so good; but the sanitation practices of farmers are much better than the fishers. In general, the economic condition of the farmers and breeders are much better than the fishers since the farmers are also usually the breeders and have fields for farming activities. On the other hand, the fishers, particularly the Bajos, eke out a living from

marine resources. Among the fishers themselves, living conditions differ. Fishers who own boats and fishing gears have higher income levels compared to those hiring boats.

The economic status of hiring boat fishers are better than the working fishers. Among the boat owner fishers, economic status also varies. The motorized boat owner fishers have better economic condition than the non-motorized boat owner fishers. The economic condition and income of the inhabitants also vary. The farmers, in general, have better income compared to fishers, particularly for the fishers who do not own appropriate motorized boats and fishing gears. Average monthly income per capita is Rp. 92 773 while the boat owner and fishing gear owner fishers have a monthly income ranging from Rp. 300 000 to Rp. 3 000 000 far above the non-motorized boats and appropriate fishing gear owners.

3.5.1 Management Patterns

a. Resource Access

The Rote community depends on poor land resources for a living. Their main economic resources are coconut plants, excavation of mountain rocks for building material and plantation of turi tree (*Sesbania grandiflora*) for cows. A high concentration of quartz results in low fertility of land making it unreliable for community welfare. The dry season, which lasts for eight months from April to November, does not optimally support potential land resources management either. Under these circumstances, part of Sulamu community depends on cattle or farming and household scale cattle raising. The poor land resources do not encourage the Rote community to shift to marine resources. Some Rote family heads become fishers but only for extra income. On the contrary, the Bajos are highly dependent on marine resources since they live in groups along the shore and separated from the Rote community which is quite far from the shore. The main livelihood of the Bajos is

"The main livelihood of the Bajos is fishing, particularly fish catching, a skill handed from generations. The Bajos are well known as roving sea people who sail far away from their native village."

fishing, particularly fish catching, a skill handed from generations. The Bajos are well known as roving sea people who sail far away from their native village. One of the prominent Bajo figure in Sulamu said that, the sea is their main source of life of the Bajos. Although he admitted that he owns a field planted with hundreds of coconut trees, it is nothing compared to the sea. The Bajo prominent figure referred to his field as an "economicless and socialless" panorama. He does not utilize his field but preferring fishing as a livelihood.

Some fishers operate in the Kupang Bay waters and the coastal area around the village while a bigger part operate in the catching area far away from the village. Bajo fishers in Sulamu usually sail for days, even weeks, to catch fish away from their village. The shark fishers operate even farther to the east in the Irian Jaya waters. There are several groups of fishers who return home once a month or once every three months. They usually sell their fresh catch at the location nearest to the fishing area so that there is no single family that processes the catch commercially. Sales of the Kupang Bay catch are made at the nearest market—Oeba Market Kupang. There is no market in Sulamu, therefore, there is no economic activity center which can be used to sell fish to the fishers. Also, there is no fish processing industry either at the household level, or in medium- and large-scale business. Fish drying and smoking is geared for daily consumption. This condition does not open opportunities for the fishers for value adding. Further, they have a very low bargaining power because buyers determine the selling price of fish. The fishers normally refrain from sailing during the west monsoon, taking rest instead and mending fishing gears. Practically, there are almost no activities related to fish production during this time.

Land ownership status among farmers are generally well-defined while there are no written laws on land ownership for fisher communities. The fishers only have a small lot for their houses and a narrow garden with unclear ownership status. Although most fisher households have no garden space, those who have plant their gardens with coconuts for their daily needs. Ownership seems to be far from the mind of fishers since they spend most of their lives at sea and little dependence on land resources. This is understandable since they are "fish catcher fishers" and not "mariculture fishers". However, there are some fishers in recent years who started developing turtle breeding and rumpon (*payous*) which introduced the Sulamu fishers to coastal area management limits, although the limits are not yet clear. Every fisher may adhere to the limits of sea management up to the area where the fish *payous* and turtle breedings are located.

Turtle breeding uses a simple method (i.e., fencing a space on shore without appropriate technology) and without status and clear legal authority, making it economically and legally vulnerable. To support the fish catching activities, the fishers build their own boats and other required gears. Some people established a boat building business for local fishers and those from outside Sulamu village. Boats can be quite expensive for small-scale fishers: 20-meter long boat costs Rp. 7 million. Boat construction uses a very simple technology and is done in open spaces along the shores of Kupang Bay.

Research conducted by Rahardjo (1997) shows that the Sulamu fishers' infrastructures are inadequate. They have 38 rowing boats and 22 tree-trunk canoes, all non-motorized. There are about 29 motorized boats as well—27 wooden and two fiberglass boats. The latter were obtained through a fishery loan facility. Many fishers (98%) own boats and a few (2%) hire boats. Most of the motorized boat users (52%) are owners. The same research also shows that 31% use fish nets, hooks 41%, fish trap (*bubu*) 1% and other gears 28%. Fish net owners consist of 60 monofilament gill net, 60 *pukat anyo*, 20 *lampara*, 20 gill nets, 10 long lines, 60 *binca-binca*, 15 *tonda-tonda* and 15 *pancing buang*.

**INVENTORY OF SULAWU
FISHERS' GEAR**

- 38 rowing boats and 22 tree-trunk canoes, all non-motorized;
- 29 motorized boats—27 wooden and two fiberglass boats;
- many fishers (98%) own boats and a few (2%) hire boats;
- most of the motorized boat users (52%) are owners;
- 31% use fish nets;
- 41% use hooks;
- 1% uses fish trap (*bubu*);
- 28% uses other gears; and
- fish nets' owners—60 gill net mono filament, 60 *pukat anyo*, 20 *lampara*, 20 gill nets, 10 long lines, 60 *binca-binca*, 15 *tonda-tonda* and 15 *pancing buang*.

Access to the coasts and seas of Kupang Bay is open to members of Sulamu community and other villages nearby. There are no formal or traditional rules granting special authorization or traditional limits on community rights to use coastal and marine resources in Kupang Bay. Every member of the community has the right to utilize the coastal and marine resources without liability to protect it or the right to watch over others' interest. There is no need for fishers or small-scale fishing enterprises to obtain license unlike medium- and large-scale fishing enterprises. They are obliged to seek licenses from authorized institutions, i.e., Agriculture Ministry (fishery service).

Kupang Bay is under the authority of the Forestry Ministry considering that it has been determined as a marine tourism area. However, coastal and marine resources management in Kupang Bay is not effective. The bay is a fragile area threatened by destructive fishing activities using poison and dynamite due to ineffective control and lack of law enforcement. Destructive activities have damaged fragile natural resources, particularly the coral reef ecosystem. Coral reefs in Kupang Bay have been damaged 20 years ago due to coral mining, poison and dynamite fishing. Residents of communities close to Kupang Bay mine corals for building materials, particularly for house foundation,

paving streets and as lime material. At the time of this research, the threats to coral reefs were rising since fish bombing in Kupang Bay is still practiced. Reef quality is also threatened by the degradation of local water quality caused by the increasing household wastes from residential areas. Economic development activities in Kupang and its surrounding areas can be considered as one of the reasons for the degradation of the environment in Kupang Bay.

"Economic development activities in Kupang and its surrounding areas can be considered as one of the reasons for the degradation of the environment in Kupang Bay."

Local and outside fishers used poison and dynamites and there are no efforts to effectively control and prevent these destructive fishing activities. Responsible government institutions, fishery and security in particular, were not able to prevent and control those activities as expected while the community around the location did not do anything. Some cases of destructive fishing were reported by the local community to the police. But the latter admitted that the control and prevention efforts of the police were not sufficient. In several cases, the fishers were disappointed when violators escape prosecution or punishment by bribing the officer.

This experience discouraged the community to be vigilant against fishing violations in their area. One village in the bay is known as the center of dynamite production, yet this has not attracted the attention of law enforcers and there has been no effective way to solve this matter. That is why the activity still exists until now. Residents regard the illegal dynamite production as a regular activity. From the law enforcement side, officers are not keen on conducting operations to stop illegal dynamite production.

Destructive utilization of natural resources are threatening the sustainability of the fishers' economy, particularly local fishers and damaging the ecological potentials and natural resources as well. The Bajo fishers in Sulamu seem less affected because they generally fish in the high seas and some Maluku islands, far away from Kupang Bay. It seems that a part of Bajo fishing communities was not affected by the negative impact of coral reefs and ecosystem damages in Kupang Bay. Dynamite fishing in the bay occurs almost everyday during a season (i.e., when the weather is calm). It has become a common site in the bay that the community no longer worries about the effects of the blasting on marine natural resources.

The Bajo community in Sulamu recognizes a system called *dirarangan* (prohibition), which restrains Bajo fishers from sailing on Fridays, particularly from morning up to 1400H due to religious reasons. As a Moslem community, they expect that everybody recites the Friday prayer at

1100H to 1330H but the effectiveness of this prohibition is diminishing. Sulamu community members, either from the Bajos or Rotes, do not recognize specific values on regulating ways of managing and controlling coastal and marine natural resources.

Fishers, especially the Bajos, consider the sea as an open asset which can be widely utilized by anybody, and that it does not require attention and special treatment to guarantee the security and continuity of its utilization. They fish widely. In other words, Sulamu fishers do not entirely depend on fishing resources in Kupang Bay. This situation does not seem to foster community values in protecting marine natural resources for the sake of sustaining their economic interests. Findings show that the level of community awareness toward fish habitat and other sea creatures is quite low. Neither are there traditional values nor formal rules at the village level that promote best practices in the utilization of marine natural resources to protect their marine wealth from damage. Fishing using poison and dynamites are regarded as a habit. Even though there were some fishers who claimed not to have used poison and dynamites, they admitted not having done anything to prevent other fishers from doing so. Generally, they believe that blast fishing and poisoning are done by fishers outside their village. The Sulamu fishers

have realized the serious threat on the marine natural resources in Kupang Bay, but they never did anything to prevent or prohibit it since this is the responsibility of the government.

"Findings show that the level of community awareness toward fish habitat and other sea creatures is quite low."

Heterogeneity of Sulamu community and other communities around the bay do not allow for the emergence of traditional values on marine resources management that binds and

forces the community to protect their natural resources. LIPI research findings conducted by Rahardjo (1997) showed that the public authorities, either from Bajo or Rote, are in agreements to control fishing on certain hours and determine appropriate gear. Nevertheless, these did not work well and was eventually disregarded in the early 1980s.

Raharjo (1997) reports that there was an agreement between Rote and Bajos regarding fishing. Rotes were allowed to use *dai (sasoro)* while the Bajos were allowed to use *pukat senar* and *bubu*. The agreement did not last long due to the presence of fishers from outside the village, even far from Kupang Bay, using bigger boats and better gear. Besides, the agreement became moot after the introduction of a boat and fishing gear loan program through a cooperative. The program gave opportunity to improve fish catching by using boats and fishing gears with bigger capacity. But this did not limit the fishers from sticking to simple gears as previously agreed. Other problems that hampered implementation of

the agreement is the boundary problems of the marine management area. There are no clear marine management area boundaries that would have allowed the local community and outside fishers to arrange fish catching among the fishers in Sulamu.

The Rotes have a negative view against the Bajos, particularly on the Bajo's way of life that did not match with Rote's values. Bajo's living environment is considered not as clean as that of the Rotes (LIPI, 1997). Besides, there is a notion that Bajos are outsiders. Although the Rotes are also incoming inhabitants in Sulamu, they regard themselves as native people. This is understandable since the Rotes came earlier and Rote Island is located near Sulamu. There is also an opinion in the non-fishing community that fishing is a less respected job based on the fact that the fishers have different habit, particularly in the Rote origin community.

Religious differences of the two community groups seem to hamper the socialization of these groups. Conflicts exist due to prejudice and the different ways of life of the two groups. Open conflicts however rarely occur. Conflicts between Sulamu fishers and outside fishers are insignificant since Sulamu deepsea fishers do not care about the natural resources in Kupang Bay. The habit of Bajo fishers of sailing far away in Indonesian waters, and even up to Australian waters, do not encourage the Bajos in Sulamu to defend their fishing area from outside threats. As has been described earlier, local fishers have not even challenged poison and blast fishing that damage Kupang Bay.

b. Constraints

The fishers' economy is part of a broad economic fish production system. Some components of the fishing business are known, such as *punggawa*, *sawi* (fishers) and consumers. *Punggawa* consists of local businessmen or businessmen operating and living near Sulamu. They usually provide capital for *sawi* (fishers) in the form of aid or loan to purchase or hire boats and fishing gear. They also provide sea-going fishers with capital for logistics. They can also act either as donors without direct involvement in fishing operations or as donors who directly coordinate fishing and the provision of boat, gear and logistics. The *punggawa* also usually handles direct marketing to consumers. In general, the *punggawa* does not only act as donor, but also participate in fish production including catching and marketing. Often the *punggawa* exploit the fishers using a loan system that requires borrowers to sell their catch to *punggawa*. This system does not give freedom to the fishers and limits their bargaining power. The *punggawa* often dictates the price by manipulating quality standards. Also, they often find ways to keep the fishers in debt even though the fishers are capable of meeting their

**SOME LOCAL
FISHING-RELATED TERMS**

- *Punggawa*—local businessmen or businessmen operating and living in Sulamu.
- *Juragan*—manager of a group of fishers while sailing or in fishing expedition.
- *Sawi*—fisher hired by the *juragan* and is paid through yield sharing.
- *Papalele*—retailer who sails fish directly to household consumers.

obligations and willing to do so to maintain good relation. This has made the fishers dependent on the *punggawa*.

Another component in fisheries production systems is *juragan*. The *juragan* serves as the manager of a group of fishers while sailing or in fishing expedition. *Juragan* and *sawi* (labor fishers) are known among the fishers themselves. *Juragan* is a fisher who owns a boat and fishing gears and generally leads the fishing operation. *Sawi* is a worker hired by *juragan* and is usually paid through yield sharing. Some fishers use a union system while the *juragan* and *sawi* share the yield equally. In some cases, the *juragan* and *sawi* fish together without a *punggawa*; but most of the time, they work with a *punggawa*.

Patron-client system is a system where there is an exploitative economic relationship between *punggawa*, *juragan* and *sawi*. For most of the fishers, the patron-client system is not profitable and creates tight competition between groups of fishers. Every fisher or group of fishers fiercely competes to achieve high production levels in reaching the target determined by the *punggawa*. They compete to earn the sympathy of the *punggawa* so that they will be given high production levels. In some cases, this system encourages the fishers to work hard; but at the same time, fostering selfishness among them. It can also heighten potential conflict among fishers, particularly among small fishers and fishers owning fishing facilities such as higher capacity motorized boat and better gear.

Another component of marine natural resources (fish) management (production) is *papalele*, who is a middleman trader between producing fishers and a *punggawa* or between a *punggawa* and consumers, particularly household consumers. A *papalele* is a retailer who sells fish directly to household consumers. The role of a *papalele* in purchasing fish catch is quite big but is generally small-scale. In some cases, the *papalele* practices price manipulation particularly to small-scale fishers by delaying the purchase of fresh fishes several hours after the ship/boats lands in the morning. The *papalele* often buys "second-class" fresh fish as the "first-class" fishes are directly purchased by big companies and restaurants and the price is cheaper. Prices are low not only because of the *papalele*'s price manipulation scheme but also due to the late landing of catch. The fishers often sell the fishes cheap since they do not have fish preservation equipment and they are used to selling fresh fishes. Having no alternative, the fishers' bargaining power is low.

Enormous collector ships often do business in Kupang Bay and this creates more problems in fish management. Collector ships owned by national large-scale companies act as fish receiving stations. They transact in the middle of the sea at collector ship price. Often, ship operators buy only half of the fishers' catch due to the limited space in the ship. The remaining catch has to be disposed to the sea because the fishers possess no preservation technique that enables them to sell the remaining produce in the market. Large disposal of remaining fish to the sea is economically not good and ecologically harmful (Table 3-13).

Table 3-13. Fish Production.

No.	Marine Living Resources	Trend of Production	Trend of Demand	Price Trend	Pricing Determination Process
1	Shark's fin	Decrease	Increase	12 500 to 300 000	Buyer
2	Batu laga	Decrease	Increase	kg	Seller
3	Kerapu fish	Increase	Increase	50 000/kg	Seller
4	Batu lola	Decrease	Increase	15 000 /piece	Seller
5	Sea cucumber	Decrease	Increase	12 500/kg	Seller
6	Napoleon fish	Decrease	Decrease	12 500/kg	Seller
7	Lobster	Fix	Decrease	10 000/piece	Seller
8	Seaweeds	Decrease	Fix	5 000/piece	local buyer
9	Gargaheng fish	Fix	Fix	250/kg	buyer
10	Kombong fish	Fix	Fix	7 500/piece	buyer
11	Tongkol fish	Fix	Fix	1 000/piece	buyer
12	Red fish	Fix	Fix	1 000/piece	buyer
13	Red kakap	Fix	Fix	1 000/piece	buyer
14	Nipi fish	Fix	Fix	1 000/piece	buyer
15	Tembang fish	Fix	Fix	1 500/piece	buyer
16	Mano fish	Fix	Fix	1 000/6 pieces	buyer
17	Kabaak fish	Fix	Fix	1 000/8 pieces	buyer
18	Dusu fish	Fix	Fix	1 000/4 pieces	buyer
19	Lorak fish	Fix	Decrease	1 000/piece	buyer
20	Stone head	Fix	Fix	1 000/piece	buyer
21	Fish	Fix	Fix	1 000/3 pieces	buyer
22	Young nose Fish Paperek fish	Fix	Fix	1 000/piece 1 000/4 pieces	buyer

Source: Rahardjo, Yulfita et al. Laporan Hasil Kegiatan Survei Baseline Sosial Ekonomi, Program Rehabilitasi dan Pengelolaan Terumbu Karang (Coremap), Nusa Tenggara Timur, LIPI, Jakarta.

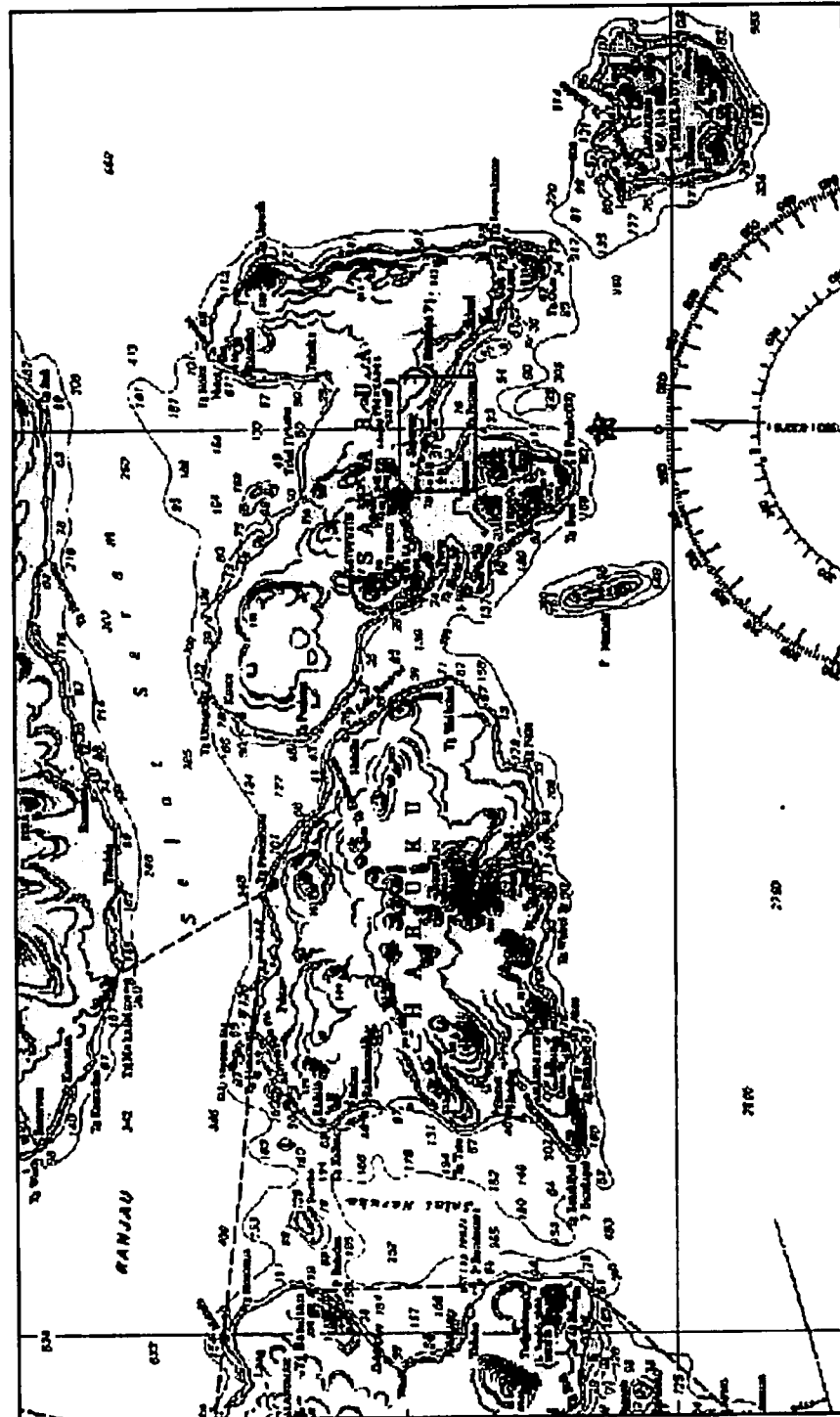
Bargaining power is very low as buyers determine the prices of most fish and other commodities. Some prices of commodities are determined by the sellers, but their production decreases while demand increases. The most profitable commodity considered by the fishers is sharks fin.

c. *Management Opportunity*

Sulamu fishers, the Bajos in particular, are hardworking and adept at seafaring. Their fishing skills and perseverance have encouraged enhancement of marine resources utilization. Their big role may extend the expectation of the fishing sector's development in Indonesia. In order to add value to fishing products, development efforts should not only be focused on the catching level, but more on the manufacturing process. Attention should also be given to economic and trading relationship between fishers and donors. A patron-client system that is beneficial to small-scale fishers has to be developed.

Local governments and NGOs assisted the fishers in Sulamu in recent years. NGOs, such as Yayasan Alfa Omega, took part in education and training of the fishers. However, the interventions did not effect any fundamental change in the local fishers' community because these failed to change the economic and fish trading structures.

Figure 3-2. Map of Ameth Village; Lease Lands.



3.6 LEASE ISLANDS

Lease Islands are part of Maluku Province. This province has the largest waters in Indonesia (765 272 km² or 90% of its total area and the rest, 10%, is land area with 85 728 km²). Lease Islands consist of Pombo Island, Haruku Island, Saparua Island, Maulana Island and Nusa Laut Island. These are part of the Central Maluku Regency and are located east of Ambon. There are two subdistricts: Haruku and Saparua. The topography is generally sloping with some hills of about 50 m above sea level. The coastal area is a lowland area and is the center of activities of the citizens and where settlements are located. The topography of Lease Islands' shores is sloping with wide tidal area. A small part of the hilly area has a rather rough topography with cliffs along the shores. The depth of the sea varies between sloping and steep.

Like other regions in Maluku, Lease Islands generally have a tropical climate influenced by monsoon winds. From October to February, the wind blows from the west, northwest and north with relatively low rainfall. In this season, the water is calm and the wind is weak, allowing for trouble-free fishing. In the east monsoon, from April to August, the wind blows from the east and southeast with high rainfall (3 000 mm). From May to August, the strong wind causes high waves (4 m), rendering fishing impossible. In this season, fishers mostly suspend themselves from fishing activities. The transition period occurs around March and September when the direction of wind and the waves are uncertain.

3.6.1 *Natural Resources*

a. *Coral Reefs*

Lease Islands has a wide coral reef area with high biodiversity. Brain corals, tabulate corals, needle corals and mushroom corals are mostly found along the islands. The existence of rich coral reefs in this area contributes to the high diversity of fishes and other organisms. However, this ecosystem is very sensitive to physical and chemical disturbances so that inappropriate fishing using destructive devices may threaten this ecosystem. Fortunately, coral reefs in Lease Islands are relatively free from destructive fishing activities. Generally, coral reefs in this area are in good condition. There are some locations though which are being threatened by dynamites, tunnel nets and boat traffic. Meanwhile, the disturbance from land, such as sedimentation and chemical waste, is still tolerable.

b. *Mangroves*

A MREP research in 1996 reports that the level of mangrove diversity is around 0.51 with genus *Rhizophora* and *Avecinia* dominating the

coastal area of these islands. Local citizens have utilized mangrove as their source of income. The local community makes use of the mangrove for firewood and the area as potential fishing ground. Unfortunately, the use of mangroves for firewood tends to increase and it certainly threatens the existing mangroves in this region.

c. *Seagrasses*

Seagrasses function as nursery grounds and feeding areas for several fish species and other organisms. Seagrasses generally grow in the intertidal areas. There are two types of seagrasses in Lease Islands, namely *Thalassia hemprichii* and *Enhalus acoroides* growing at a density of 100 to 400 grasses/m². The condition of seagrasses in this area is quite good. Sea star and sea cucumber are some of the organisms found in seagrass beds.

d. *Fisheries*

Lease Islands possess a relatively big fish supply compared to other areas. Most fish types found in this region are pelagic and demersals. Some of the demersal fish species found in the islands are *tatu*, *Chaetodon sp.*, *Upeneus sp.*, *Nasso sp.*, *Caesio sp.*, *Katsuwonus pelamis* and *Cyplilurus poecilopterus*.

3.6.2 *Social Aspects*

Lease Islands consists of three populated islands: Haruku, Saparua and Nusa Laut island. Haruku has a population of 24 651, Saparua has 37 114 and Nusa Laut has 6 087. Haruku is the largest area with 479 km², followed by Saparua with 243 km² and the smallest one is Nusa Laut Island with 36 km². Population densities in these islands are 51 179 persons/km² and 174 persons/km², respectively. Hence, it is obvious that Haruku has the least population density of the three (Table 3-14).

Table 3-14. Demographic Characteristics.

Island	Area in km ²	Population	Density
1. Haruku	479	24 651	51
2. Saparua	243	37 114	179
3. Nusa Laut	36	6 087	174
Total	896	68 852	

Source: Haruku Sub-district in Figures, 1996.
Saparua Subdistrict in Figures, 1994.

Most of the people in Lease Islands are farmers and the rest are fishers, traders and government servants. According to the 1975 statistics, 75% of Haruku residents are farmers while the rest are fishers. This indicates that the community depends mostly on land-based activities. It seems that coastal and marine resources are not optimally used by the local community yet. Secondary crop cultivated includes corn, peanuts,

tubers, coconuts, coffee and clove. They are also the main commodity in Lease Islands while cattle breeding, goats raising and poultry raising are also undertaken for home consumption. They fish in the area surrounding coral reefs and mangroves.

3.7 AMETH VILLAGE

Ameth village is one of the small villages in Nusa Laut Island. It is part of the Saparua subdistrict. The area covers 6 000 km² with population of 1 580 people. Population density is 263 persons/km². The average population growth rate from 1991 to 1995 was 2.9%. More people from other villages came to Ameth village in the past few years, as encouraged by the prosperity of the village and the presence of secondary and high school education facilities. Dependency ratio of Ameth village is 23, meaning that every 100 people of productive age are responsible for 23 non-productive people. The population is dominated by the age group 15 to 19 years old (10%) while the age group 20 to 24 is the lowest (4%). Like in other villages in Maluku, the education level in Ameth village is low. Less than half (40%) graduated elementary school, about 2% are drop-outs, 27% completed secondary school, 26% finished high school and 5% are university graduates.

The main livelihood is farming (43%) and fishing (36%). Farming and fishing are complementary depending on sea conditions. Some farmers fish while some fishers farm. The average income of these sectors are almost the same—Rp. 73 661 per month for fishers and Rp. 74 808 per month for farmers. Some community members work in trade, transportation and government services. Contribution of these activities to the community economy is bigger than fishing and farming. The annual per capita income of Ameth is Rp. 14 707 annually which shows that the economic condition in Ameth is relatively poor.

The education facilities are better than in other villages in Nusa Laut. There is only one play group school, two elementary schools, one secondary school and one high school. Other community members of surrounding villages also attend schools in Ameth. Since the health facilities are adequate, villagers from surrounding villages also enjoy the benefits. There is one public health center, with 12 nursing-lodging rooms and one integrated health service and three family planning posts. The health center has one physician, five nurses, two midwives and three trained traditional

“Ameth village is one of the small villages in Nusa Laut Island. It is part of the Saparua subdistrict.”

medicine men. The housing conditions are good with very good sanitation. About 147 out of 231 houses are permanent (63%); 63 houses (27%) are semi-permanent; and 21 houses (9%) are non-permanent. The most commonly used transportation in Ameth is the sea. There is one motorized passenger boat capable of carrying 40 people and five tons of luggage. They use bicycles and motorcycles for intervillage

transportation. There is a small market in Ameth, which opens on Wednesdays and Saturdays, where local villagers and outsiders transact business.

3.7.1 Management Patterns

a. Resource Access

Most of Ameth Village residents are farmers and fishers, 45% and 36% respectively. There are farmers who work on the side as fishers and fishers with additional jobs. They work as farmers and fishers alternately depending on weather conditions. Some farmers also go to the sea while waiting for the harvest time while some fishers engage in farming when the sea is rough.

Fishing activities until recently do not contribute to income optimization of the local community since their operations are not market-driven. This condition is mentioned in COREMAP research (1996/1997) which states that income contribution from the fishery sector averages Rp. 73 611 monthly or Rp. 883 300 annually. This amount is slightly lower than the agriculture sector which averages Rp. 74 808 monthly or Rp. 897 700 annually. Compared to the service sector, which averages Rp. 283 500 monthly or Rp. 3 402 000 annually, the fishery sector is far below.

The marine wealth in Ameth village encourages the community to depend on the sea for livelihood. Marine resources of this village have high livelihood potential since the water is calm and shallow and the village is part of the group of islands. There are also coral reefs and mangrove forests. A MREP study (1996) shows that the index rating of mangrove forest in Ameth village is 0.66 with diversity value of 0.51 and is dominated by *Rhizophora* and *Avicenia*. Macro density is very high at 433 ind/m² and diversity value of species is 0.97. Various coral reef fishes, such as *Decapterus sp.*, *Auxithazard*, *Caesio sp.* and *Selaroides sp.*, are also found.

Community access to marine resources seems to be influenced by the following factors. Ameth village is basically an inland community of Seram Island. During the Dutch colonial time, migration occurred with the issuance of a policy that required inland communities to reside in coastal areas. Although the marine resources became the second source of income, planting clove, sago tree and other plants were the main income sources in the beginning. The land-based cultural pattern was the main concern of the local community since clove became its prime commodity. The shift to sea-oriented cultural pattern was a long process which started during the decline of clove prices. This forced the local community to turn to the sea.

This village has quite a high population growth with high dependency ratios of 0.23. Human resource quality is low. About half of the population are primary school graduates but some of them did not finish primary school. This shows that with such a heavy burden, the community residents have no suitable skill to fulfill their needs, let alone attain self-improvement. This situation may hamper the local community's ability to further utilize marine resources to increase income. With insufficient skills and poor technology, it would be impossible for them to optimize potential returns and improve post harvest handling to meet market standards. Fishing facilities are below standards. Each household has two rumpon, 27% of fishers' households own on the average of one or two nets, 36% owns fishing rods and about 2% owns one or two *bubu*. Boats owned by fishers are non-motorized. It can be estimated how much the fishers earn from the sea compared to the risk they have to face. On the other hand, their facilities are worth only when the wind is slow, therefore, making it impossible to fully utilize the marine resources.

Ameth Village and the capital city of Saparua district can only be accessed through the sea. The village has only one long motorized boat with a passenger capacity of 40 and five tons of cargo. This constrains the exchange of goods and services with the surrounding villages, especially since the long boat only operates on market days in Saparua, i.e., Wednesdays and Saturdays. Practically there is no movement of people and goods the rest of the week. To guarantee that fishers can sell their catch, at least the market should be open everyday so that the fishers can sell their catch right away and avoid wastage. This is one of the obstacles facing the Ameth Village community in utilizing their marine resources efficiently.

b. Constraints

The Ameth community has a binding formal rule in natural resources management known as *sasi*. In order to implement the *sasi* system, the community established *kewang*, a person or a group of individuals who is/are responsible for enforcing the *sasi* system. The *sasi* is only applied to deal with land-based natural resources. There is no *sasi* for marine resources so far since the local community depends less on the sea. Villagers have only paid attention to coastal and marine resources about three years ago when the prices of the main land-based resource, the clove, dropped. The plantations protected by the *sasi* include coconut, nutmeg and clove. However, in its implementation, the *sasi* is applied also to other plantations, such as tubers, banana and *Colocasia antiquorum*. Prior to execution of *sasi*, a *matakan* or a prohibition is posted to warn villagers not to damage or to pick plants. Local residents believe that anybody who violates the rules deliberately or otherwise, will fall into disgrace or meet an accident.

"...has only one motorized boat with a passenger capacity of 40 and five tons of cargo,
...the long boat operates only on market days,
...there is no movement of people and goods the rest of the week..."

"This is one of the obstacles facing the Ameth Village community in utilizing marine resources efficiently."

The village head is recognized as a traditional head who controls the execution of *sasi*. In practice, the village head delegates his authority to his assistant, *kewang*. A *kewang* is accountable to the village head. However, as an unwritten customary rule, the consistency of the existence of the *sasi* depends on how the value system transferred from the old generation to the younger ones. It also depends on the charisma and legitimate authority of the traditional leaders.

The *sasi* may be effective to control the use of certain resources but it will not be that effective for natural resources management due to the absence of clear management systems. Also, the *sasi* is not applicable for marine and coastal resources management which require institutions and rules recognized by both the local community and outsiders.

There is one rule of the community of Ameth Village related to marine living resources management particularly mangrove forests. This rule points out that there will be sanctions for those who cause damage to the mangrove forests. The sanction is in the form of submission of 3 m³ building stones. This is sometimes adjusted according to the degree of damage inflicted. However, this is an unwritten rule and although the penalty is used for village development, the execution of this sanction is not effective.

Another existing system in the Ameth community is *pela* which bridges the diversity of culture in the local community through *adat* alliance. This is still maintained until now through the *panas pela* ceremony and commences once in five or 20 years depending on the community's collective decision. This ceremony is aimed at reminding the alliance between the existing villages whose relations were previously strained. Villages with *pela* are not bound by religion. Many Moslem villages practice *pela* with Christian villages. The *adat* alliance is manifested in activities such as building worship houses, helping communities under disaster, etc. So far, however, there is no formal rule on marine living resources. Although the *sasi* relates to natural resources management, it has to do only with land-based resources. The *sasi* for marine living resources has never been applied until now so that it cannot be used as reference in the utilization of fishes, coral reefs, marine living creature and other marine living resources.

Other than being an unwritten *adat* law, its existence depends on how it is being transferred through generations and as well as on the leadership of the *adat* leader enforcing the said rule. It seems that it is ineffective to make this rule as a pattern in natural resources management and marine living resources. The sustainability of marine living resources cannot be guaranteed only by unwritten formal rule but also requires rule and legal institutions which can be used as basis for natural resources development. Therefore, the *adat* law in the community is not effective, but as long as it is used as an alternative then this might be possible.

Like other villages in the area, Ameth Village has its management limit which is the traditional right (*bak ulayat*) of the local community. For Ameth community, the marine traditional right (*bak ulayat laut*) covers an area from the edge of the coast up to the boundary of *tubir* edge along the village coastline to the next neighboring village. This management area is for the community to utilize. Usually, the community residents fish in this area using *bameti*, *sosoki*, rod and other fishing gear. Beyond the *tubir* edge is a high sea that may be utilized by anybody from any village. In the case of the *bak ulayat* limitation, there is no boundary line that prohibits other village people from catching fish. However, the local community obey this limitation strictly. There has been no sanction given so far on violations of the *ulayat* area.

Although the Ameth community has already several *adat* laws relating to natural resource management, marine living resource management are still emerging as the community culture is land-oriented. The community has no capability to utilize the marine living resources effectively. The limitation of the *ulayat* area is not written; if violations occur, there is no fixed and consistent sanction given. On top of this, the community has minimum knowledge and capital for marine living resources management.

Another issue on marine living resources management involves the lack of definite law that the community can rely on. Existing laws relating to marine living resources management cannot solve the problems in Ameth since these cannot be clearly and effectively applied at the lowest level. This has, until now, obstructed efforts by the local community to manage and protect marine living resources. The local community can hardly prevent marine living resources exploitation by anybody who has a permit from the government such as at the district level or higher.

c. *Opportunities*

Even though the *sasi* is not an *adat* law regulating the use of marine living resources, it may be of potential use in marine living resources management because at least it is accepted by the local culture. The *adat*

head is a key figure to influence acceptance of change. *Kewang*, as an institution can also promote community obedience to existing rules. If the *sasi* is an *adat* law relating not only to land-based natural resources, then the *adat* law may foster fairness and equal opportunity in marine living resources management.

Cooperation in the Ameth community has been reflected in the *sasi adat* law as applied in the local community. The village head, acting as *adat* head, is an informal and formal leader. This implies the possibility for inter-institutional coordination either at the community or higher formal institution. This is a big opportunity in creating good coordination in marine living resources management if the *kewang* institution may be used according to the interests of and issues existing in the community. Besides, *pela* is a form of intervillage cooperation agreed for years by the local community. The advantage of *pela* is that it can bridge the differences in the local community so conflict of interests among groups may be solved by the agreement made in the community. In such a way, the *pela* cooperation, with *pela panas* ceremony routinely performed if the transformation done consistently, can be a model for cooperation in marine living resources management.

Even though the *hak ulayat* in the Ameth community and its surroundings is unwritten, it is also of good use in marine living resources management. *Hak ulayat* shows the inter-area cooperation and respect for each other's existence so that each member of the community have to harvest living marine resources according to agreed rules.

The Ameth Village has an inherent advantage in marine living resources management; it is relatively homogeneous in terms of ethnicity and religion. Such homogeneity brings about strong communal spirit, which can be harnessed to manage their natural resources. Besides, the existence of *adat* law and institution on natural resources management is a powerful support to ensure the sustainability of natural resources. Village rules regulate the utilization of living marine resources for diving and tourism activities. Although it is only verbal, these rules contribute to the village income and the sustainability of coral reefs is guarded.

High tariff is also imposed on the harvest of *lokan* and sea cucumber in Ameth Village in order to prevent overexploitation. Although this hampers village income, this policy is very helpful in protecting these resources.

"Village rules regulate the utilization of living marine resources for diving and tourism activities."

3.8 SEGARA ANAKAN

Segara Anakan is part of the Cilacap District, Central Java. It consists of estuaries and rivers, including Citanduy, Cikonde, Cibeureum and Ujung Alang Rivers. According to Napitupulu and Ramu (1980), Segara Anakan consists of 28% forests and plants, 15% of upland areas, 12% settlements and plantations, 24% farm land and 33% mangrove and lagoon. Segara Anakan, which is surrounded by 96 000 has wetlands, has gone through ecological changes particularly due to the increase in farming activities and settlement areas. Segara Anakan hosts local and migratory birds. Its estuary is also considered rich in biodiversity. However, the lagoon has been threatened by sedimentation and the extension of destructive land-based activities. In 1903, the lagoon of Segara Anakan was about 6 450 has and it decreased to 1 800 has in 1992. This condition has changed the patterns of marine resources exploitation in the area including the social and economic activities of local fishers. National and local governments have struggled to protect and rehabilitate Segara Anakan in order to maintain its ecological and economic functions by establishing a "Segara Anakan Rehabilitation mega-Project."

SEGARA ANAKAN CONSISTS OF:

- 28% forests and plants;
- 15% upland areas;
- 12% settlements and plantations;
- 24% farm land;
- 33% mangrove and lagoon;
- 41% use hooks;
- 96 000 has wetlands.

3.8.1 *Natural Resources*

a. *Mangrove*

The mangrove forest in Segara Anakan is the largest in Java. However, its area has significantly decreased in the past few years from 15 551 has in 1974 to 8 957 has in 1994. About 25% or 2 457 has of mangroves are damaged. The decrease is due to the use of mangrove for firewood and building materials, both by local and neighboring communities. Also the massive expansion of fishponds has accelerated the damage to the mangrove forests. According to Pudjorianto (1982), about 23 species and 14 families of mangroves grow in this area. Dominant species are *Rhizophora apiculata*, *Rhizophora mucronata* and *Bruguiera gymnorhiza*.

b. *Fisheries*

There are about 45 species of fish from 37 families. This consists of 17 migratory species, 13 local species and 17 limited migratory species. The migratory species include freshwater and marine fish entering the lagoon. The presence of migratory fish in this area is possible due to the existence of a number of small rivers and canals connecting the lagoon to the Indian Ocean. A number of planktivorous and microcarnivorous

fish, such as *Crossorhombus azureus*, *Mugil cephalus* and *Mugil buehanan* inhabit the lagoon, but some detritivorous species such as *Rataboura bicolor* and *Cynoglossus lingua*. The exploitation rate of fish is 37%. Fish catching in the Indian Ocean, particularly in Cilacap waters, is usually done in 3-100 m in depth with the distance of about 25 km. The average stocking density in this waters is 9.1 tons per km² within a maximum area of 12 800 km². The potential resources in this area are estimated at around 52 680 tons while potential maximum sustainable yield is 31 716 tons (Table 3-15). According Dinas Perikanan Cilacap, the production of fish and shrimp has increased from 13 764.9 tons in 1995 to 18 718.7 tons in 1996 or about 35.99%.

3.8.2 Social Aspects

Table 3-15. Potential Coastal and High Seas Fisheries in Cilacap (1996).

Fish	Stock Density (ton/km ²)	Size of Catching Area (km ²)	Estimated Potential Catch (ton)	Potency (MSY)
Large Pelagic	0.7	12 800	9 000	5 500
Small Pelagic	2.5	5 200	13 000	7 800
Demersal Fish	4.3	5 200	22 360	13 416
Shrimp	1.6	5 200	8 320	5 000
Total	9.1	-	52 680	31 716

Source: Dinas Perikanan, 1996.

Segara Anakan is surrounded by 14 villages. Three of these villages are located near the lagoon, namely Ujung Gagak, Ujung Alang and Panikel. These are known as Kampung Laut (marine village). Most of the people in Kampung Laut are employed as farmers but the total number of fishers in these three villages is higher than in other villages. In addition, most fishers in Segara Anakan live in Kampung Laut. In 1995, the population of Segara Anakan was 38 452 people living in an area of 264.99 km² with a density of 529.62 person per km² (Table 3-16). The population growth rate is relatively low (0.51%). Kampung Laut has the lowest density rate.

Table 3-16. Population and Density Rate in Kampung Laut.

Village	Size of Area (km ²)	Total Population (People)	Population Density/km ²
Ujung Gagak	21.32	2 909	136
Ujung Alang	95.17	4 343	46
Panikel	29.65	9 931	122
Total	146.14	17 183	

Source: Statistik Kabupaten Cilacap, 1995.

Most villagers of Kampung Laut work as farmers and fishers. Fishers in each of Ujung Gagak, Ujung Alang and Panikel village comprise 27%, 18% and 4% of the population, respectively (Table 3-17). Most people work as farmers, while others work in private firms, such as in construction, trade, transportation and civil service sectors.

Table 3-17. Distribution of Occupation in Kampung Laut.

Village	Farmer/ Owner	%	Farmer/ Labor	%	Total	%	Fisher	%
Ujung Gagak	652	22.41	473	16.26	1 125	38.67	773	4.17
Ujung Alang	678	15.82	347	7.99	1 034	23.81	794	18.28
Panikel	668	18.43	564	15.56	1 034	23.81	794	18.28
Total	1 998		1 384		3 482		1 718	

Source: Statistik Kabupaten Cilacap, 1995.

The level of education in Kampung Laut is very low. The highest educational attainment of more than 75% of the population is elementary education. This indicates that the quality of human resources in this area is very low and this condition has certainly constrained efforts by many to improve their social and economic status. This has become a serious social constraint that hampers the process of development in this area. Availability of health and sanitation services as well as potable water is very low.

Rice is the main commodity in Kampung Laut and most villages in Segara Anakan have an average farm size of about 5 254 has. Other potential land-based resources are coconut, coffee and clove. Livestock raising particularly small-scale cattle breeding is a secondary source of livelihood. Small-scale household industry accounts for only about 2% of the economy.

3.9 KAMPUNG LAUT

3.9.1 Management Patterns

a. Resources Access

Segara Anakan is considered a unique ecosystem with specific characteristics and a combination of coastal, marine and terrestrial ecosystems. It is a large lagoon surrounded by a large mangrove forest. This area has high potential for fisheries, agriculture, forestry, industry, tourism and marine transportation. The local community exploits the natural resources of Segara Anakan mostly through traditional practices of inferior technology. Very simple tools and technology are used to exploit the fisheries. The local community and other villagers surrounding the area use mangroves for firewood and building material needs. Such activities have caused the degradation of the mangrove forests. Findings indicate that 68% of mangroves is in various stages of degradation. Only 32% is in very good condition.

Fishpond expansion, particularly shrimp, has been rapid in the past few years. Further, more migrants are coming in to seek business opportunities in the fisheries sector. Massive projects by both small and big investors have developed the shrimp farming business in the area. The investors usually come to Segara Anakan to take over the local community's traditionally owned fishponds, which resulted in new fishponds being established in mangrove forest areas. This trend has caused serious damaged to the environment of almost the entire Segara Anakan.

Another serious problem faced by the local community is sedimentation brought by at least three big rivers, namely Citanduy, Cikone and Cibeureum Rivers. This has led to the decrease of the lagoon area from 6 450 has in 1903 to 1 800 has in 1992. The degradation rate of the lagoon is about 500 has per year. The sedimentation has caused the emergence of new land in the lagoon. This has rendered the lagoon not only ecologically vulnerable, but has also brought about cultural and economic changes. Many fishers have shifted to land-based or agriculture activities. A number of fishers in the area fish in the Indian Ocean.

b. Constraints

The exploitation of fish and other marine resources in Segara Anakan is traditionally carried out by both capture and mariculture fisheries. Capture fishers usually fish in the Indian Ocean and the Segara Anakan lagoon, while mariculture fishers mainly depend on resources within the lagoon. A few fishers are equipped with small motorized boats, while most have no motorized boats at all. A number of fishers do not even have simple boats. They usually use small fish traps made of bamboo and homemade nets. Mariculture fishers build their own fishponds with very limited resources and technology.

Small-scale fishponds owned by local fishers are mostly located in the area within the mangrove forest. The legal status of the land used for fishponds is generally unclear because the state has claimed ownership over most lands in the area. Moreover, these lands are managed by sectoral agencies such as the Department of Forestry. New land that emerges due to sedimentation is also claimed by the national government as legally owned by the state. Disagreements among related parties, including national agencies, the local government and the community over the land highlights unclear ownership and management authority. Despite this, outside investors have built massive fishponds with the support of village heads (*Lurah*) and government institutions at

the *kecamatan* and *kabupaten* (district) levels. Stiff competition to exploit the resources between the local community and investors puts the local fishers in a vulnerable position. This has encouraged the local people to sell their fishponds to investors. In addition, most investors employ outsiders, who are considered to be more skilled than local fishers. This further erodes the employment opportunities for local fishers.

"The conflict of interest between government agencies and undefined authority of the local government over the lagoon and its natural resources have worsened the condition of the area both ecologically and economically."

Segara Anakan fishers have no distinct traditional values and practices in managing fisheries and other marine resources. Findings indicate that the exploitation of marine resources in this area takes place with no particular values and norms underlying actions to prevent natural resources destruction. It seems that everyone has an equal right and opportunity to access all kinds of marine resources in this area. Illegal exploitation of mangrove and the rise of ownership claims to "new land" have occurred for years. Unfortunately, the local government and other relevant government agencies are unable to resolve this problem. Even two national government agencies, responsible for fisheries

and the mangrove forest, namely the Department of Agriculture and the Department of Forestry, have failed to reach agreement on their authority over Segara Anakan. The conflict of interest between government agencies and undefined authority of the local government over the lagoon and its natural resources have worsened the condition of the area, both ecologically and economically.

Potential conflict between "new land hunters" and local fishers tends to increase and illegal practices of resource exploitation, such as shrimp fishponds and mangroves have significantly prevented local fishers from enjoying the benefits of Segara Anakan. Illegal trading of new land in the lagoon has created unclear property rights and ownership as well as complicating jurisdiction problems.

One of the traditional ways of fishing by local fishers is the use of floating nets. Every fisher freely locates his floating net(s) in the lagoon equipped with a special sign (usually a piece of floating object) above their installed nets. Most local villagers observe rules (unwritten rules) concerning others' property (installed nets). The commitment of local fishers not to violate any form of traditional rule with regard to marine resources is influenced by their belief system. They believe that any marine resource belongs to the Queen of the Indian Ocean, a traditional and powerful metaphysical figure. In order to gain protection from the

Queen, fishers carry out a ceremony in the beach before they go fishing. However, such a belief system has faded away due to cultural change. Intensive exploitation of marine resources by outsiders (investors), which has brought about tough competition, might force local people to ignore totally their own traditional values.

Sedimentation has caused the degradation of Segara Anakan which in turn decreased its fishery production. The emergence of "new land" due to sedimentation has forced local people to shift from marine-based to land-based activities. This has put fishers in a difficult situation since such a change brings with it a change in the fishers' culture. On the other hand, those who stick to their existing job as fishers must struggle to compete with others who possess more advanced equipment and technology. Unlike fishers in other locations (Sulamu and Nusa Laut), the main challenge of Segara Anakan fishers is to fight for their authority to enjoy Segara Anakan and its resources particularly preventing further deterioration of the lagoon and its resources. The occupational shift among local fishers requires cultural change and orientation. The increase in population, local migrations and unfair competition between small-scale and big-scale fisheries production calls for government efforts to promote equity and equality for the sake of small-scale fisheries.

b. Opportunities

Until the beginning of the 20th Century, Segara Anakan was ecologically and economically sound. Population was quite small then and people were able to maintain sustainable use of their natural resources. Fishers used natural resources only to meet their household needs. In the later years, however, intensive exploitation of natural resources and sedimentation have prevented them from improving their lives. On the other hand, the presence of big investors in the fisheries sector did not buy favorable opportunities to the local fishers.

In order to protect Segara Anakan while improving its economy, the government has established an integrated action plan. The action plan is proposed to restore the condition of Segara Anakan's estuary. This plan intends to provide a development framework that promotes community interests dubbed as community-based lagoon management. According to this plan, the rehabilitation and the management of Segara Anakan should promote protection of the environment as well as community development. The empowerment of the local community is aimed at developing community role in protecting the lagoon and its environment. This plan seems to provide the local community the opportunity to benefit from the resources of the lagoon. However, rapid

population growth and the competition between the local community and migrants are still major problems that hamper local community development.

There have been efforts to develop the local economy, but such actions have not yet resolved the main problems, particularly sedimentation and the domination by outsiders on the use of their natural resources including land. Human resources development and infrastructure improvement have not been accorded due importance. This condition prevents local fishers from being able to develop their own social and economic status. The empowerment of local fishers needs to focus on developing their capacity to utilize their high seas fisheries.

"This plan intends to provide a development framework that promotes community interests dubbed as community-based lagoon management."

"... the rehabilitation and the management of Segara Anakan should promote protection of the environment as well as community development."

"The empowerment of the local community is aimed at developing community role in protecting the lagoon and its environment."

Chapter 4

Legal and Institutional Arrangement

4.1 LEGAL ASPECTS

4.1.1 *The Written Laws*

Based on the 1982, the United Nations Convention on the Law of the Sea (UNCLOS) ratified by the Government of Indonesia through Act No. 17 of 1985, Indonesia has sovereignty over internal waters, archipelago waters, and territorial seas. Also, Indonesia has sovereign rights to carry out exploration and exploitation of marine resources within the 200 nautical miles exclusive economic zone (EEZ).

The implementation of sovereignty and sovereign rights of coastal and marine management is primarily based on a number of regulations and government policies. These are: (1) the Constitution of Indonesia 1945; (2) Guidelines of State Policy (GBHN) 1998; (3) Act No. 1 of 1973 on continental shelf; (4) Act No. 5 of 1983 on Indonesia's EEZ; (5) Act No. 9 of 1985 on fisheries; (6) Act No. 17 of 1985 on ratification of the 1982 UNCLOS; (7) Act No. 5 of 1990 on conservation of natural resources and their ecosystems, Act No. 21 of 1992 on navigation (sea transportation); (8) Act No. 24 of 1992 on spatial planning; (9) Act No. 6 of 1996 on Indonesia's waters; and (10) Act No. 23 of 1997 on environmental management. Other laws and regulations related to these legal bases include: (1) Act No. 5 of 1960 on agrarian basic provisions; (2) Act No. 5 of 1967 on forestry; (3) Act No. 11 of 1967 on mining; and (4) Act No. 5 of 1974 on the basic provisions of regional government. These laws and state policies provide legal bases of coastal and marine resources management and assign a number of government institutions with mandates of managing coastal and marine resources, including exploration and exploitation.

Most of the laws and policies mentioned earlier mainly pertain to economic interests. A number of laws, such as regulations on fisheries, forestry, mining, sea transportation, tourism, spatial planning and environmental management have basic provisions on managing coastal and marine resources and environmental protection. However, such regulations, mostly couched in general terms, are insufficient to promote natural resources and environmental

protection. Another major issue on coastal and marine resources management is the allocation of resources, especially related to national, regional and local interests. The 1945 Constitution of Indonesia mandates that land, water and natural resources are under the authority of state and are to be used for the prosperity of the people. The constitution is frequently referred to as a basic principle in policy-making processes, particularly on natural resources management and development. The other legal instrument used to establish government policies is the GBHN. Established every five years by the House of People Representatives (MPR), it puts emphasis on promoting natural resources management with a view to bring about community prosperity. GBHN includes all strategic resources management, like fisheries and other coastal and marine resources management. Also, GBHN sets the principle that development needs to consider the environment. According to this principle, the environment is an integral part of development to promote sustainable development. This provides a legal basis for fisheries and other coastal and marine resources management.

"The 1945 Constitution of Indonesia mandates that land, water and natural resources are under the authority of state and are to be used for the prosperity of the people."

The GBHN is usually translated further to more operational development policies, contained in the Five-Year Development Plan (REPELITA). REPELITA provides much more detailed development programs and projects, including the management of fisheries and other coastal and marine resources. These policies are used by respective government institutions to establish operational activities (projects) at the sector and regional government levels. At the provincial levels, the government establishes Regional REPELITA. Unfortunately, disintegration between National REPELITA and Regional REPELITA frequently occurred because the National REPELITA is

implemented only by national institutions, while the Regional REPELITA is considered only by regional governments. Lack of coordination between the two levels of policies and implementing agencies has caused disintegration in project implementation. As such, the implementation of development policies, including fisheries and other coastal and marine resources management has not been effective. The effectiveness of fisheries and other coastal and marine resources management is also influenced by the absence of clear policies related to these issues. The implementation of policies on coastal and marine resources is not likely to increase the contribution of this sector to national economy. It is not effective in promoting the local economy. Also, it is ineffective in fostering fair competition between capital-intensive investors and small-scale fisheries. Eventhough regulations mandate particular consideration to community interests, there is still an apparent disintegration in policies and their implementation.

Managing coastal and marine resources involves a number of regulations and sectoral agencies with varied interests. Fisheries management has something to do with the use of coastal and marine resources (fish) and environmental

protection. Act No. 9 of 1985 concerning fisheries and other implementing regulations provide legal bases for coastal and marine resources management, particularly on fish, that promote both economic and environmental interests. The interest of community is recognized by these regulations. According to the Fisheries Law, anyone can access coastal and marine resources. In order to protect the interests of small-scale fishers, the government prohibits big-scale fishing in the coastal area and any practices that threaten local fishers. The Fisheries Law, which was established to deal with the exploration and exploitation of fish includes several articles that promote ecologically safe fishing, particularly preventing the negative impacts of fishing on the environment. This law mandates the protection of fish and coral reefs from destructive fishing, such as the use of dynamites, poisonous chemicals, high-pressured compressors and gill nets. It is concerned with integrated management of coastal and marine ecosystems. However, this law primarily focuses on sustainable exploitation of fish and as such pays less attention to fish habitats, especially coral reefs and mangroves as part of the whole marine ecosystem.

Another regulation relevant to coastal and marine management is Act No. 5 of 1967 on forestry. The Forestry Law mainly deals with coastal and marine resources within protected areas, including forest and coral reefs. This law is not applicable in most cases to the coastal and marine zone since the establishment of a protected area is often determined by using land-based jurisdictions. So far, only a small number of coastal and marine protected areas has already been established. This means that agencies responsible for managing forests may not be interested in non-protected coral reefs and mangroves. The implementation of this law and other implementing regulations related to forest management within coastal areas is not effective due to unclear jurisdiction or boundaries and institutional capacity. The Forestry Law may not be effective in preventing the coastal and marine environment from sedimentation and coastal erosion caused by inappropriate practices in forest areas due to the differences between forest management and coastal area management. On the other hand, there is no single regulation and policy available to deal with sedimentation and erosion issues. Another regulation that is closely related to forestry and natural resources conservation is Act No. 5 of 1990 on the conservation of natural resources and their ecosystems. This act is concerned with biodiversity conservation. Eventhough this regulation does not specifically mention coastal and marine resources, it provides a potential legal basis for the interest of coastal and marine resources management that is ecologically sustainable. This regulation is legally appropriate to protect mangroves and coral reefs from any form of destructive activity. Since this law is not specifically established to deal with coastal and marine management, the use of this act may not be effective due to ignorance, misinterpretation and misperception among responsible institutions. Also, the Indonesian government has ratified the International Convention of Biodiversity by establishing Act No. 5 of 1995, but its implementation is not yet apparent.

Mining is one of the important issues affecting the management of the coastal and marine resources. One of the main issues related to the exploitation of

minerals such as oil, natural gas and coral is the negative impact of mining on the marine environment. Unfortunately, Act No. 11 of 1967 on mining does not include coastal and marine environmental considerations. This Act contains some articles that protect coral reefs from destructive activities related to mining, but it does not provide comprehensive rules for coral reef protection. A number of regulations related to mining like Act No. 1 of 1973 on Indonesian continental shelf mandates the protection of the environment from destructive impacts of mining in the sea. Also, the Government Decree No. 17 of 1974 requires the protection of the environment from the destructive impacts of oil and natural gas exploration and exploitation. Policies need to be integrated in order to promote environmentally sound mining, including the principles of efficiency for the interest of sustainable use of natural resources.

Act No. 23 of 1997 on environmental management provides a legal basis for integrated environmental management. This law consists of basic principles in integrated environmental management and is expected to be the umbrella of sustainable development policies. However, an environmental law that was initially established in 1982 has no influence on regulations previously established. This law applies to environmental pollution and destruction of land-based environmental management issues and its implementation in coastal and marine environment is ineffective. Also, the effectiveness of this law apparently does not deal with issues on sustainable use of natural resources.

Another regulation that is concerned with coastal and marine resources has something to do with tourism. Act No. 9 of 1990 seeks to accommodate environmental considerations in tourism. According to this act, the tourism industry needs to maintain and protect the quality and the beauty of the environment. Marine-based tourism has significantly developed in the past few years. Coastal communities enjoy the benefit of marine-based tourism in most locations. But competition between big investors and local communities is ensued. Another problem is that, the tourism policy that is under the national government's jurisdiction lacks provincial and district governments' participation. The absence of such participation in developing marine-based tourism has spawned ignorance and created serious environmental problems.

As mentioned earlier, the principles of sustainable use of natural resources are adopted by the GBHN. It says that the exploitation of coastal and marine resources needs to maintain the existence of life support systems and protect the marine environment from pollution and destructive actions by developing effective law enforcement and control systems. The GBHN provides legal frameworks for developing environmentally sound coastal and marine resources management. Furthermore, it confirms that the use of natural resources, including coastal and marine resources is for the benefit of the people. In order to implement this basic policy, the government included coastal and marine issues in the Five-year Development Plan (REPELITA) 1993-1998.

According to the REPELITA, the exploitation of coastal and marine resources needs to consider environmental protection in order to maintain sustainable development. As such, the use of coastal and marine resources and environmental protection have become a priority in the five-year development plan. But the implementation of this policy has been ineffective. The exploitation of coastal and marine resources has increased and tends to cause environmental degradation. Furthermore, most development policies are more concerned with land-based development issues. This has led to the underdevelopment of policies and institutions related to coastal and marine resources management.

Overlapping jurisdictions among government institutions has blurred areas of responsibility and has led to uncertainty and inconsistency, discouraging effective implementation of laws and policies on coastal and marine issues. Also a source of concern is that most regulations on coastal and marine resources management are established by the national government and implemented by national government agencies at the regional levels. No regulation mandates provincial and district governments to manage the coastal and marine resources but there are regulations on fisheries particularly on the operation of small-scale fishing industries and small-scale mining. Fishing licenses are mostly issued by the national government, but only for small-scale fishing using vessels less than 30 GT.

In general, regulations and state policies provide legal frameworks for coastal and marine resources protection, but there is no adequate regulation promoting an integrated coastal and marine resources management that legally require provincial and district governments' participation. The absence of an integrated coastal and marine resources management has caused uncertainty in management, responsibility, and authority among government institutions both at the national and regional levels.

4.1.2 *The Unwritten Laws*

The customary *adat* law is a set of unwritten laws which regulate the rights and duties of a traditional community, specifically in relation to land, water and resources contained therein. The right of a traditional community are called *Hak Ulayat* or traditional community right. In fisheries, the traditional community right consists of the traditional rights of the local community to explore, exploit, manage and conserve fishing resources and their environment. These are implicitly recognized by the 1945 Constitution of Indonesia. Article 1, paragraph 2, of the Constitution stipulates that sovereignty of the state shall be in the hands of the people and shall be exercised in full by the People's General Assembly (MPR : *Majelis Permusyawaratan Rakyat*). The MPR determines the general guidelines of the state policy (GBHN: *Garis-Garis Besar Haluan Negara*) (Article 3). The GBHN provides guidelines to the State (Government) in the formulation and implementation of policies, including the realization of Article 33, paragraph 3, which stipulates that land, water and resources contained therein

shall be controlled by the State and shall be made available for the best use of the people.

The *adat* law is also recognized by Act No. 5 of 1960 on agrarian basic provisions (Agrarian Act). Article 5 of the Agrarian Act states explicitly that the applicable law for land, water and airspace is the *adat* law, provided that this law does not contradict with the national interests of the State and the unity of the nation. Therefore, the implementation of the traditional community rights have to be in line with the national interests and have to be in accordance with the existing written laws and regulations (Article 2, paragraph 4 and Article 3).

According to Van Vollen Hoven (in Soepomo, 1993), various *adat* laws in Indonesia exist in 19 regions. The regions are:

- a) Aceh
- b) Tasnah Gayo-Alas, Batak and Nias
- c) Minangkabau and Mentawai
- d) South Sumatera
- e) Melayu (Riau)
- f) Bangka and Belitung
- g) Kalimantan (Dayak)
- h) Minahasa
- i) Toraja
- j) South Sulawesi
- k) Ternate Islands
- l) Moluccas
- m) Irian
- n) Timor Islands
- o) Bali, Lombok and Sumbawa
- p) Central Java, East Java and Madura
- q) North Sulawesi
- r) Surakarta and Yogyakarta
- s) West Java

All *adat* laws within the above regions are adopted and integrated in the implementation of the national concept called *Bhineka Tunggal Ika*, meaning unity in diversity. The *adat* laws are, therefore, considered national assets for national unity in which each *adat* law is equally treated.

The *adat* law of Segara Anakan falls within the regions of Central Java, East Java and Madura. To be more specific, the *adat* law in Segara Anakan is part of the *Banyumas adat* law which is influenced by the *Yogyakarta adat* law. The applicable *adat* law in Segara Anakan recognizes that marine biological resources in the lagoon of Segara Anakan and in the Indian Ocean and other natural land resources in the surrounding area of the lagoon and in Nusa Kambangan Island are controlled by the Queen of the Indian Ocean called *Nyai Loro Kidul*.

"A permit will be granted to fishers and other resource users through a mediator called *pawang*. In this respect, the *pawang* functions as resources exploitation regulator, so that exploitation would not exceed the carrying capacity of the resources."

According to the traditional beliefs of the people in Segara Anakan, which have been transformed into the *adat* law, before exploiting resources, one should obtain permission from the Indian Ocean Queen. A permit will be granted to fishers and other resource users through a mediator called *pawang*. In this respect, the *pawang* functions as resources exploitation regulator, so that exploitation would not exceed the carrying capacity of the environment.

The above traditional norms were gradually phased out since the Dutch Government introduced and applied the concept of open prison in Nusa Kambangan Island in 1901. The development of open prison ruled out the myths of the people concerning control of the Indian Ocean Queen on natural resources in Nusa Kambangan Island. The entry of people with different cultural background to Segara Anakan has changed the *adat* law. Fishers no longer have to ask assistance from the *pawang* when they want to catch fish, to develop aquaculture, to cut mangrove and to use other natural resources. Up to now, however, assistance from the *pawang* is still required when they face natural phenomena which are deemed beyond their capability to handle, such as strong winds, waves and currents.

The *adat* law in Segara Anakan has almost disappeared if it is not able to protect the traditional community rights from various problems which occur in Segara Anakan. The trigger of existing problems is sedimentation. It occurs annually from Citanduy in the Segara Anakan river basin and in fact, has created "new land" and narrowed the area of the lagoon. As a consequence, the fishing ground in the lagoon has become very limited and the targeted fish-species has decreased due to the changing water quality and the environment. Many fishers have resorted to agriculture. Clearing a mangrove area for agriculture, particularly on the new land, has caused conflicts between the newcomers in agriculture and Perhutani, a state-owned forest enterprise. It has also created delimitation problems of land boundaries, overlapping claims on "new land" and its resources and overlapping jurisdiction among government institutions. The most serious problem caused by the emergence of new land is the deterioration of socioeconomic conditions of the people of Segara Anakan. This has led to uncontrolled utilization of fisheries, mangroves, land and other natural resources, which worsen environmental conditions. All these prove that the *adat* laws in Segara Anakan no longer function well.

Sasi is the applicable *adat* law concerning utilization of natural living resources in Nusa Laut Island and in other islands of Maluku. Its implementation is aimed at regulating and controlling the exercise of traditional rights within a certain space and a limited time in the utilization of natural living resources. *Sasi* is also intended to avoid conflicts of interest and to guarantee a proportional distribution

of traditional rights to utilize national living resources among community members (Dajaan Imami, 1996). According to Kissya (1993), *sasi* in Haruku Island consists of *sasi laut* (Marine *Sasi*), *sasi kali* (River *Sasi*), *S. H.* (Forest *Sasi*) and *Sasi Dalam Negeri* (Village *Sasi*). In Nusa Laut Island, however, *sasi laut* is not applied since the activities of the Nusa Laut Island people are basically land-based. Species such as cloves, cinnamon and nutmeg are among the most common land-based resources that help people improve their socioeconomic conditions. Three years

after the collapse of clove trading in 1995, the people of Nusa Laut Island turned to marine-based activities, primarily fisheries (Rahardjo, 1997). This shows that villages vary in the application of *sasi* depending on how they view natural living resources. However, similarities can be observed in terms of a set of rules on prohibitions and sanctions applied in the use of natural living resources within a zonation scheme. Like the *adat* law in Segara Anakan, *sasi* focuses more on resource utilization and exploitation than on other resource management activities.

"...it is assumed that the Christian Moluccans developed *Sasi adat* into *Sasi gereja* because Christian values are more effective than *adat* norms in providing the people with rational conflict resolution skills when dealing with conflicts arising from competition due to a growing population."

In Lease Islands, *sasi adat*, which regulates land-based activity, was modified into *sasi gereja* (church *sasi*) by Christian Moluccans and into *sasi lelang* (auction *sasi*) by Moslem migrants consisting primarily of *Bajo*, *Bugis* and *Makasar*. Based on a legal review and analysis, it is assumed that the Christian Moluccans developed *sasi adat* into *Sasi gereja* because Christian values are more effective than *adat* norms in providing the people with rational conflict resolution skills when dealing with conflicts arising from competition due to a growing population.

The Moslem migrants who have lived for years in Nusa Laut, Haruku and Saparua Island have adopted the traditional values of *sasi adat* and have transformed this into *sasi lelang*. By so doing, the Moslem migrants were recognized and accepted as members of the local community. On the other hand, Moslem migrants have influenced the local traditional values, which are land-based oriented, with their own values which are marine-based and business-oriented. Since the Moslem migrants are more interested in marine-based activities, they auction off their rights over land living resources. As a proof of their compliance with the local *adat* law, Moslem migrants submit the auction process to a *musyawarah desa* (Village Community Forum). After the auction, traders who bought land living resources hire workers as *kewang* for a certain period of time agreed in *sasi lelang*.

In Kupang Bay, the applicable *adat* law concerning the utilization of marine living resources exists as a result of an agreement between the local people and migrants, i.e., *Bajo*, *Bugis*, *Buton*, *Makasar* and *Madura*. The local people are mostly

"Since the *adat* law is unwritten with a high degree of variation among villages, not well documented and subject to change over time, it is hardly used as a legal basis for the management of marine living resources. This indicates that the unwritten law has a potential for creating legal uncertainty, thus, it is not used at all as legal basis for business transactions between local people and outsiders."

Christian Rotenese and are originally land-based oriented people. On the other hand, the migrants who are mostly Moslem are basically marine-based oriented people, who as such do not care about preservation of marine environment in Kupang Bay. Since the *Bajo* fish offshore beyond Kupang Bay, they also do not care about the protection of the marine environment in Kupang Bay. Meanwhile, the *Bugis*, *Buton*, *Makasar* and *Madura* only transit in Rite Island on their way to their fishing grounds in Australian waters. The *Bajo* people have agreed on certain rules to be applied in their fishing grounds. These rules protect the marine environment from such activities as waste dumping and blast fishing which will hamper their fishing activity. In 1980, the Rotenese and *Bajo* agreed on the use of certain types of fishing gear in Kupang Bay. The agreement which involved four villages ran only for two years. This was because many outsiders fished in Kupang Bay.

The above discussion shows that the *adat* law implemented in Segara Anakan, Nusa Laut Island and Kupang Bay is more concerned with control of resource utilization. Other management activities are only implicitly regulated in the *adat* law. Since the *adat* law is unwritten with a high degree of variation among villages, not well documented and subject to change over time, it is hardly used as a legal basis for the management of marine living resources. This indicates that the unwritten law has a potential for creating legal uncertainty, thus, it is not used at all as legal basis for business transactions between local people and outsiders. However, the integration of unwritten laws and principles into written laws would be valuable.

4.2 INSTITUTIONAL ASPECTS

4.2.1 Institutional Arrangements at the National Levels

Existing laws and other regulations mandate government institutions to carry out coastal and marine resources management with varying levels of authority. The leading government institutions that are legally authorized to manage coastal and marine resources are: (1) Department of Agriculture; (2) Department of Mining and Energy; (3) Department of Forestry; (4) Department of Tourism, Arts and Culture; and (5) Department of Communication. Other relevant institutions formally responsible for coastal and marine management are: (1) the

Navy; (2) State Ministry for Environment; (3) Environmental Impact Management Agency; (4) Department of Home Affairs; and (5) Indonesian Institute of Science (LIPI). The following section will discuss institutional arrangements at the national level based on the types of natural resources, particularly fisheries, coral reefs and mangroves.

a. Fisheries

Fisheries management is mainly under the jurisdiction of the Department of Agriculture and carried out by the General Directorate of Fisheries. According to the Fisheries Law, management of fisheries includes policy formulation, planning, organizing, actuating and control. The Department of Agriculture deals not only with fish, but also shelves, seagrass and other resources related to coastal and marine-based food production. This Department is responsible for issuing licenses for any form of activities as regard the exploitation of fish and other resources related to food production in internal waters, territorial waters and the EEZ of Indonesia. Also, this Department is authorized to develop fish production systems to support development, including resource allocation, stock assessment, exploitation, marketing and protection of fish from inappropriate actions. However, the effectiveness of the control systems has yet to be felt. Eventhough this system is equipped with moderately sufficient technical facilities and human resources, there is still room for improvement in management control. Since fisheries management involves various government institutions, such as the Navy, Departments of Forestry, Communication and Mining and Energy, coordination is a crucial issue. It is needed not only for the benefit of the Department of Agriculture but also for national development. The role of provincial governments in managing fisheries is clear as these are authorized to handle small-scale fishing or the use of vessels that are less than 30 GT. The provincial governments are also expected to restrict any inappropriate fishing practices that threaten the interest of small-scale fishers and the local community.

b. Mangroves

Mangrove management involves the Departments of Forestry, Agriculture, Tourism and Home Affairs. Other relevant institutions that are expected to make significant contributions to mangrove management include State Ministry for Environment and Environmental Impacts Management Agency (BAPEDAL), particularly in dealing with environmental protection issues. These institutions, focused mainly on land-based activities, give less attention to the protection of mangroves. The role of the Department of Forestry in managing mangroves is crucial since this department is legally authorized to protect mangroves. However, the role of the Department of Forestry is mainly effective within protected areas because this department has no authority in dealing with coastal resources outside protected areas. The

interest of the Department of Forestry in mangroves is also related to the preservation of endangered species that ecologically depend on them.

The Department of Agriculture plays an important role in the management of mangroves in all coastal zones, except protected areas. It is responsible for the exploitation of mangroves or mangrove areas for fish production or mariculture. The attention of this department to mangrove conservation is absolutely important to preserve the habitats of fish and other microorganisms.

The role of the Department of Tourism is related to the use of coastal areas (frequently within mangrove areas) for tourism and natural resources conservation to maintain and protect the quality of natural resources (including mangroves) from destructive tourism activities. The Department of Home Affairs is indirectly responsible for mangrove protection. The main responsibility of this department is to improve the quality of life of coastal communities. The role of the Department of Home Affairs in managing (protecting) mangroves is needed to safeguard the economic interest of the local community.

The discussion above indicates that the management of mangrove involving various institutions with different interests implies potential conflict of interest and ignorance. Mangrove conservation might be incompatible with mangrove utilization and this will become complicated when the issues of community development emerge. The conflict of interest between conservation and utilization is one of the significant factors that caused mangrove degradation. Ignorance is also widespread due to overlapping authority and misinterpretation of policies.

c. *Coral Reefs*

Coral reef protection is one of the priorities in coastal and marine resources management in the next five years. The Coral Reef and Environmental Management Project (COREMAP) is one of the strategic projects expected to promote an integrated coral reef management. This project involves a comprehensive approach using the principles of integration of economic and ecological interests to benefit the local community. This approach requires support not only from government agencies and social institutions but also from the private sector. Coral reef management is shared among relevant government institutions, including the Departments of Forestry, Agriculture, Mining and Energy and Communication. These departments mainly deal with the exploitation of resources, not necessarily coral reef management. The Department of Forestry, mainly responsible for the management of protected areas, has a potential role in maintaining coral reef protection, except those beyond protected areas.

The Department of Agriculture is expected to protect coral reefs to maintain the quality of fish habitats and other organisms dependent on coral reef ecosystems. This department is by law required to protect coral reefs from destructive fishing activities (mostly control system), instead of coral reef management. Therefore, effective elimination of destructive fishing does not necessarily ensure adequate protection of coral reef. The Department of Agriculture cannot impose coral reef protection since it has no authority (or attention) to develop strategic coral reef management systems.

The Department of Energy and Mining has the same predicament in dealing with coral reefs. There is a law requiring protection of coral reefs from the negative impacts of mining but there is no regulation that mandates the Department of Mining and Energy to manage coral reefs. The Department of Tourism has a potential role in managing coral reefs in order to maintain the quality of these reefs. This department has its own interest to manage coral reefs particularly in relation to tourism industries to preserve the beauty of nature. However, such role is effective only in tourism areas.

By law, the Department of Communication is assigned to protect the marine environment from pollution and all negative impacts of marine-based transportation, but this department is not specifically concerned with coral reef management. Other government institutions like the State Ministry of Environment and Environmental Impact Management Agency (BAPEDAL) are also expected to take part in protecting coral reefs but these institutions are not ready yet. The State Ministry of Environment is not an implementing agency while BAPEDAL is relatively new and pays less attention to coastal and marine issues.

4.2.2 *Institutional Arrangements at the Regional Levels*

Policy implementation related to coastal and marine resources management falls under the national government and this responsibility has been delegated to various departments and relevant institutions mentioned earlier. To carry out this authority, each department established working units at the provincial levels, namely *kantor wilayah* or KANWIL. Each KANWIL represents and is accountable to the national office of the department to which it belongs. KANWILs are under the coordination of the Governors but these working units are not accountable to the Governor. In many cases, therefore, KANWILs tend to ignore the interests of the Governors since the latter have no authority over KANWILs. At the district level, each department is represented by *kantor perwakilan*. This unit works with KANWIL and is under the coordination of the *bupati*/mayor, the head of the district government.

“...KANWIL and *kantor perwakilan* established by the national government have played a crucial role not only in the utilization of resources but in the entire management process, including planning, organizing, actuating and controlling.”

Provincial governments established implementing agencies called DINAS, a working unit that implements policies and carries out development programs of the provincial government. DINAS may work with KANWIL but these two working units have no formal structural ties. DINAS is established based on the type of development sectors used by the national government. This means that within the same province more than one institution (KANWIL and DINAS) exist with the same responsibility. Eventhough the two institutions perform different levels of responsibilities, their existence is often confusing. At the district level, the *Bupati* or Mayor established working units,

also called DINAS. This has similarities with DINAS at the provincial levels, but they differ in levels and types of activity.

The discussion above indicates that such complex institutional arrangements have the potential of generating overlapping administration systems that may hinder the implementation of development policies. With regard to coastal and marine resources management, KANWIL and *kantor perwakilan* established by the national government have played a crucial role not only in the utilization of resources but in the entire management process, including planning, organizing, actuating and controlling. As mentioned earlier, provincial and district governments have no authority over coastal and marine management. There are no regional institutions assigned to manage coastal and marine resources. The role of KANWIL and other national institutions at the provincial and district level is also ineffective due to the lack of priority and institutional capacity. Therefore, coastal and marine resources management is not effectively implemented.

4.2.3 Institutional Arrangement at the Village Levels

Coastal and marine resources management is traditionally used and controlled by local communities based on customary laws. Customary laws on coastal and marine resources mostly exist in East Indonesia, namely Irian Jaya, Maluku and some regions in Nusa Tenggara Timur (NTT). A community develops customary law based on their own belief and value systems with respect to local conditions and specific cultural experience. Therefore, a customary law is potentially effective within a particular community and certain territory traditionally under its jurisdiction. Also, a customary law is likely to be effective within a certain community with certain cultural boundaries. Eventhough there are similar traditional values and practices, each community has its own traditional norms and cultural practices in controlling natural resources. One of the well-known customary laws concerning natural resources management in Indonesia is *sasi*. *Sasi* is considered a unique traditional system of resource management adopted

...*sasi* systems mandate that anyone who violates *sasi* will be fined and will be subjected to public humiliation. A punishment is usually carried out by traditional leaders or village administrators."

by most communities in Maluku. Each small group (tribe) applies its own *sasi*. Therefore, in some cases various *sasi* may be imposed within a small island. *Sasi* can be applied to deal with resources belonging to individuals (e.g., on coconut) and land (and water) resources that traditionally belong to *adat* (community as a group). There are at least three different *sasi* systems, namely *sasi adat*, *sasi gereja* and *sasi lelang*. Firstly, *sasi adat* refers to a traditional *sasi* that is imposed and controlled by a *kewang*, a person or a group of individuals assigned representing traditional institution. Secondly, *sasi gereja* means church *sasi*, a system imposed and controlled by the church. In this system, the church has rights to control certain resources and, in turn, the community must share harvested resources with the church. Thirdly, *sasi lelang* is a system based on "contract." This is applied only in Moslem communities. In this system, the community sells their rights to harvest resources to local traders or outsiders. The trader employs a person or a group of people as *kewang* to guard resources under his authority and impose his rules.

In order to impose the rules, *sasi* systems mandate that anyone who violates *sasi* will be fined and will be subjected to public humiliation. A punishment is usually carried out by traditional leaders or village administrators. Punishment systems vary from one community to another because these are established based on agreements among leaders, certain value systems and cultural experience.

Most *sasi* systems deal with land-based resources, while some are related to coastal resources. The latter type deals with a certain type of fish (resources) or some resources in the same area and time or in the same area at different time. The implementation of most *sasi* on coastal resources is problematic because of unclear boundaries between the coastline and the open sea, and between one village to another. The Haruku community, one of many groups living in the Lease Islands, has successfully applied *sasi* for *ikan lomp*a (*Trissina baelama*) in the estuary area, extending to the river 200 m from the shore. The *kewang* guards the estuary (and river) from any form of fishing until the fish has matured. The community harvests the fish by sweeping the river using large nets catching all available fishes in just half a day. However, the benefit of such practice is still ecologically questionable. The implementation of *sasi* for coastal and marine resources management tends to be ineffective because it is not traditionally recognized by outsiders even from neighboring villages. Findings indicate that the effectiveness of *Sasi* is threatened by cultural change among the younger generations with a high level of education and those educated in distant schools or universities. Education and the different cultural experience among younger generations have changed their views on traditional value systems. Also, *sasi* is not likely to be effective in a community that is culturally heterogeneous, especially in a village that consists of local community members and emigrants.

Other customary laws have been enforced in other regions, such as Nusa Tenggara Timur. A number of local communities in Nusa Tenggara Timur have traditional practices in controlling coastal and marine resources called *buka* (open). Community members are only allowed to harvest natural resources (mostly fish) during the *buka* period that usually lasts for one to two weeks. The implementation of this tradition is not effective and in most cases, this has been considered history. Eventhough community members believe that *buka* is beneficial, they tend to be skeptical about such a tradition. Issues such as boundaries and cultural change are perceived as two major problems that further the decline of the effectiveness of the *buka* systems. Customary laws or any form of traditional practices in coastal and marine resources management do not exist in most communities in the west coast, particularly in Java. For example, the community in Segara Anakan, Cilacap, Java has no environmentally sound tradition in managing coastal and marine resources.

Findings indicate that customary laws known as *sasi* or *buka* mainly deal with control systems for natural resources. Such traditional practices do not provide sufficient management principles that allow the community to manage their resources. *Sasi* and *buka* are systems applied to control rather than to manage resources. A customary law constitutes a form of traditional norms and rules that can support written laws in order to promote community participation in managing coastal and marine resources. By law, the existence of customary laws (unwritten laws) is recognized as long as these are complementary with existing written laws and promoting both national and local interests. This recognition should not be confused with establishing customary laws into written laws because such an action will generate disintegration of legal systems, particularly with regard to the compatibility of territorial boundaries of the old villages with traditional boundaries and the new ones established based on national laws. The integration of traditional values and practices into national or written laws will be more valuable in encouraging effective management systems and community empowerment.

"Findings indicate that customary laws known as *sasi* or *buka* mainly deal with control systems for natural resources. Such traditional practices do not provide sufficient management principles that allow the community to manage their resources. "

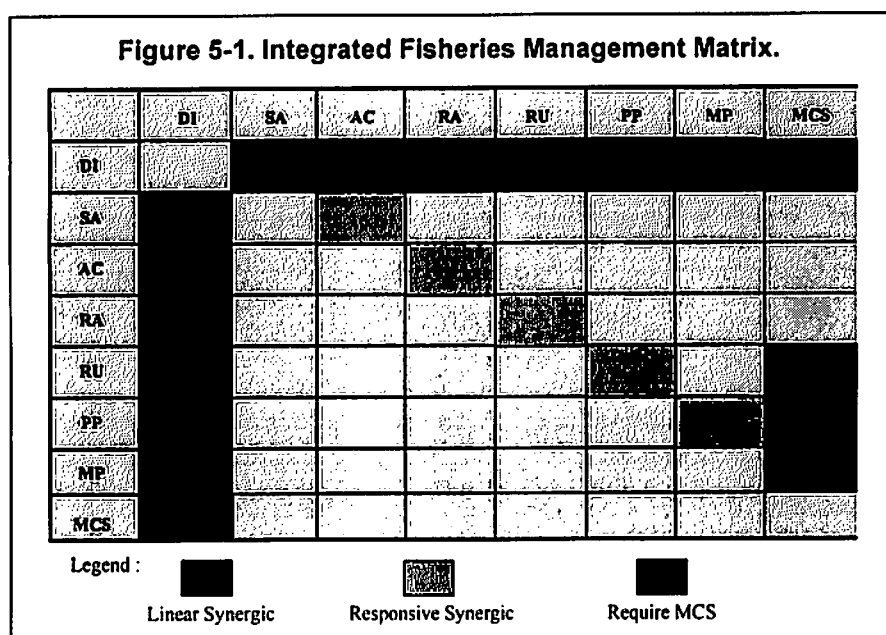
Chapter 5

Assessment of Marine Resources Management Patterns

This chapter discusses the management patterns of marine fisheries and other living resources which includes the legal, institutional, social and cultural aspects. The policy framework and roles of stakeholders will also be taken into consideration. The management patterns discussed in previous chapters, first of all, will be transformed into several management activities indicated in the integrated management matrix (Figure 5-1). These activities will be grouped into three namely, planning and organizing (PO), actuating (A) and controlling (C). Implementation of these activities is actually a process of interaction among legal, institutional, social and cultural aspects of marine fisheries management patterns within each activity. Thus, each activity contains a set of interactions among various relevant laws and regulations and among government, private and local community institutions from different social and cultural backgrounds which obtain legal mandate from laws and regulations. From the sequential patterns of interaction, management activities can be viewed as a process of linear synergic interaction, while from the point of view of reciprocal patterns of interaction, they can be considered as responsive synergic interaction.

The next step is to analyze each group of marine fisheries management activities using resource-based, community-based and market-based approaches (refer to Figures 5-2, 5-3 and 5-4) so that linear and responsive synergic patterns of marine fisheries management can be described. By so doing, strength and weaknesses of marine fisheries management patterns can be identified. Assessment of efforts to integrate the *adat* law principles will be carried out by the use of legal and institutional frameworks (Figures 5-5 and 5-6). These frameworks will be capable of facilitating efforts in the development of co- and community -based management of marine fisheries.

The process commonly used in fisheries management includes planning, organizing, actuating and controlling activities (POAC). All these activities need data and information (DI) from fisheries database. On the other hand, they produce data and information which will become inputs for the database. Reciprocal interaction between DI and each activity of fisheries management creates a responsive synergic relationship (Figure 5-1). Hence, it is obvious that data and information play an important role in the management of fisheries.

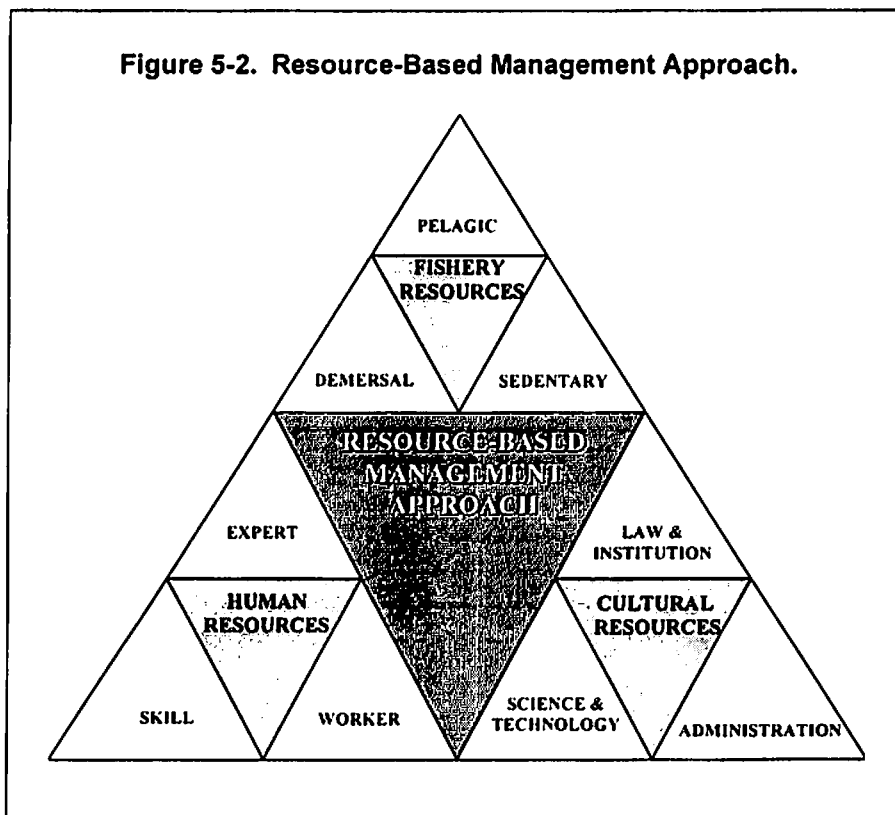


Source: Purwaka, 1997.

In practice, the planning and organizing activities cover stock assessment (SA), determination of absorptive capacity of the marine environment (DI), carrying capacity of fishery resources (AC) and resources allocation (RA). The actuating activities include resources utilization (RU), process of production (PP) and marketing of fishery's product (MP). The controlling activities include monitoring, controlling and surveillance (MCS). As a sequential process, interaction among these activities creates a linear synergic relationship (Figure 5-1). In this respect, MCS plays an important role in preventing RU, PP and MP from inconsistency with AC, RA and existing laws and regulations. MCS also protects fisheries from illegal activities.

The system of fisheries management shown in Figure 5-1 will be used as a framework in discussing fisheries management in each study area. By so doing, legal, institutional, social and cultural interaction among stakeholders and the performance of the local coastal community in the management of fisheries can be described, and traditional wisdom of local fisheries management can be integrated into the national level through the development of community-based and co-management of fisheries. Efforts to integrate fisheries management, including its legal, institutional, social and cultural aspects, in the three study areas will be elaborated by the use of compatibility principles, i.e., complete compatibility, partial compatibility and incompatibility. Complete compatibility exists when two or more activities can be carried out together at the same time and place without creating a conflict. Partial compatibility takes place when two or more activities can be conducted at the same place, but not at the same time (e.g., crops rotation). Incompatibility occurs when an activity can not be executed together with another at the same place, even though not at the same time. Such an incompatible activity should receive specific arrangement in the management of fisheries (e.g., the existence of offshore oil platforms in a fishing ground).

Integrated fisheries management can be explained by the use of resource-based, community-based and market-based management approaches in the form of a triangular system. The triangular system is capable of showing an integrated relationship among the three sides or three components or three groups of factors which form the triangle. This system also considers the possibility of overlapping one triangle with another. From the viewpoint of the triangular system, resource-based fisheries management maintains integrated relationships among fishery resources, human resources and man-made (cultural) resources (Figure 5-2).

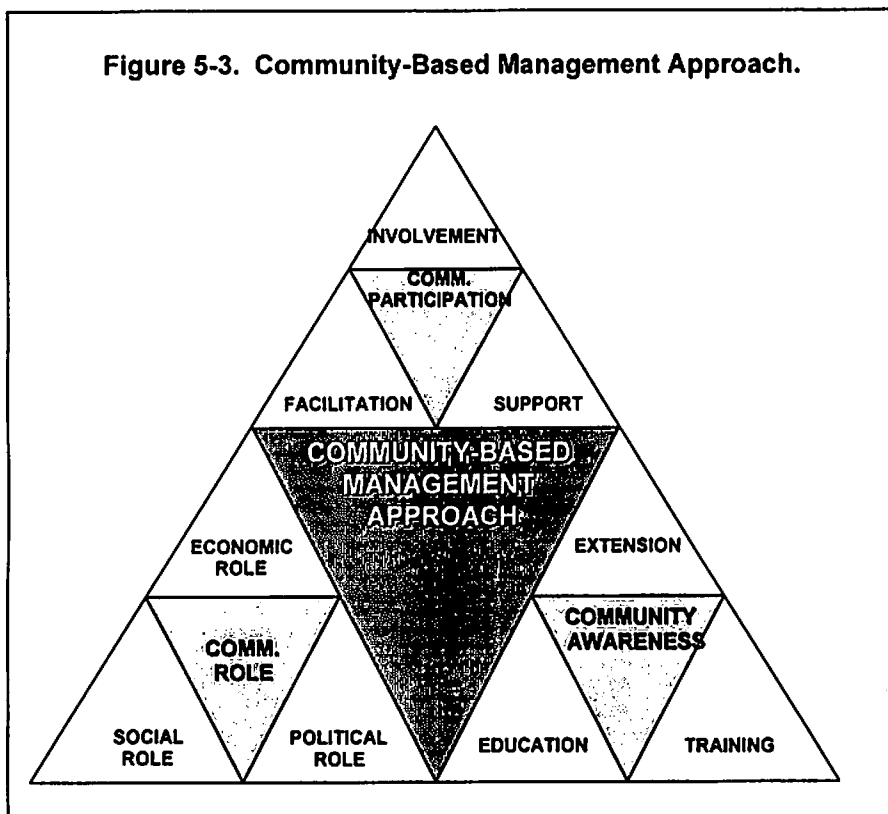


Source: Purwaka, 1997.

Community-based management will manage the fisheries by maintaining integrated mechanism of community awareness, community role and community participation (Figure 5-3).

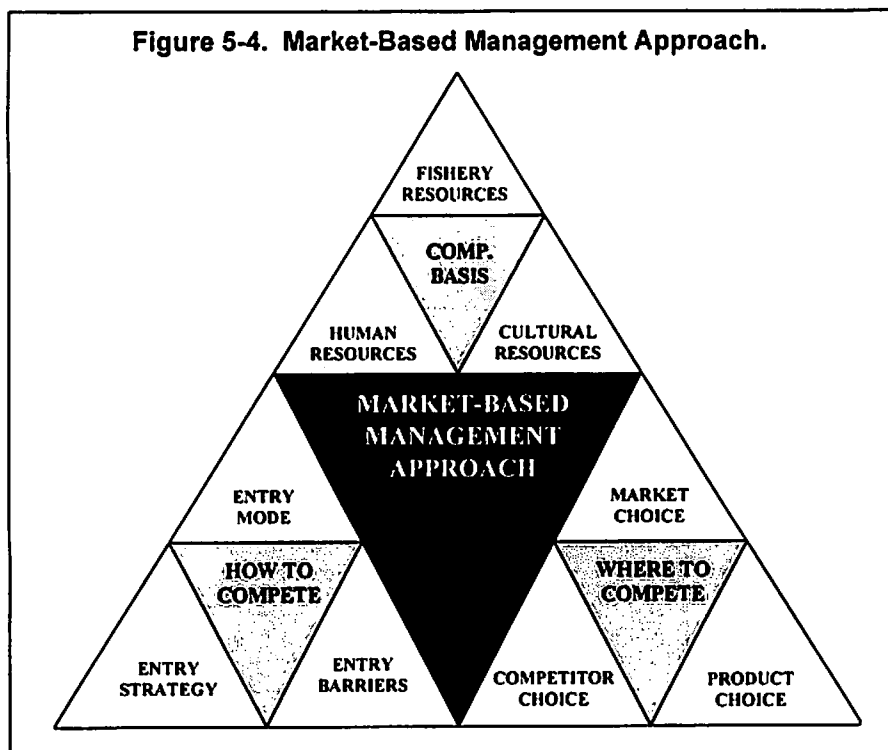
Resource-based and community-based fisheries management will manage the fisheries as bases for competition. To achieve a sustainable competitive advantage of fisheries, resource-based and community-based fisheries management should be wrapped with market-based fisheries management. Market-based fisheries management will manage the fisheries by maintaining integrated relationships among bases for competition, method of competition (how to compete) and place of competition (where to compete) (Figure 5-4).

Figure 5-3. Community-Based Management Approach.



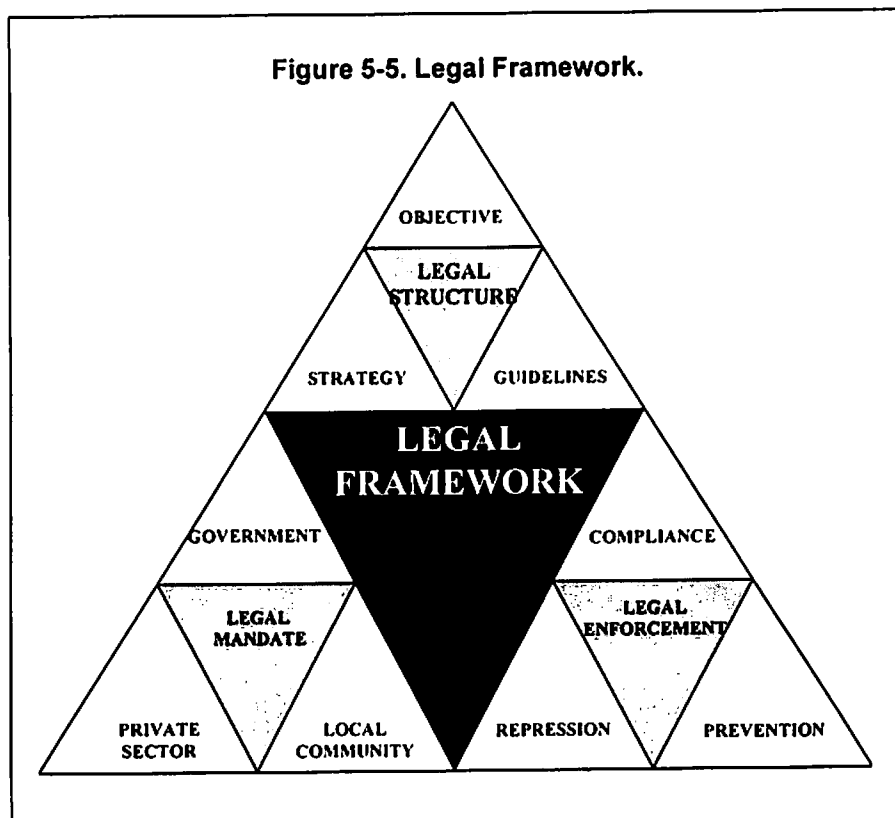
Source: Purwaka, 1997.

Figure 5-4. Market-Based Management Approach.

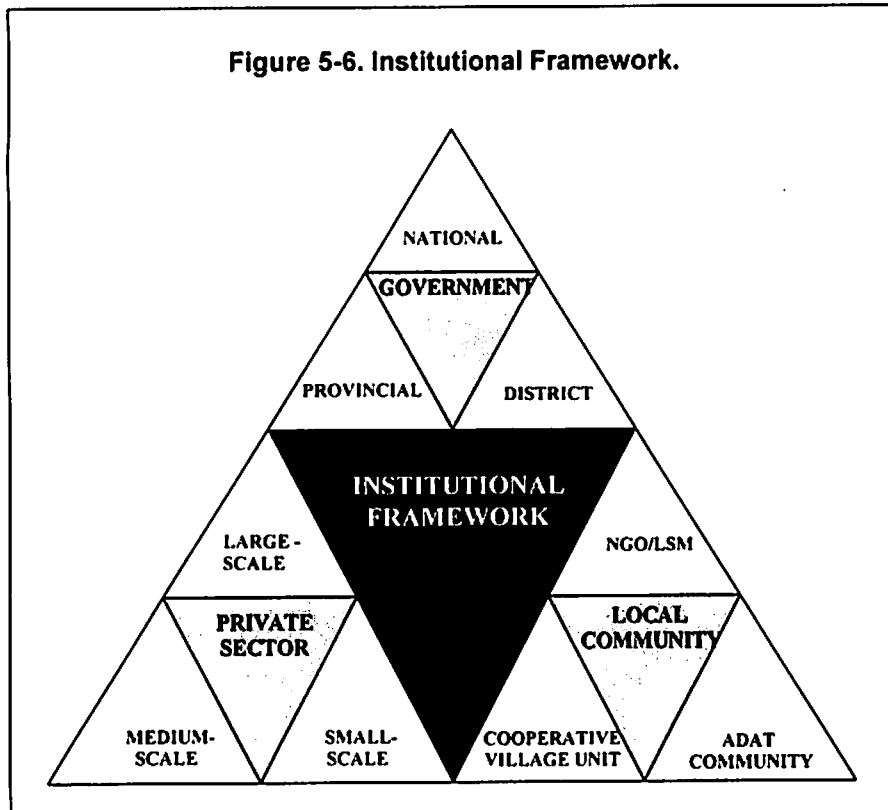


Source: Purwaka, 1997.

The above triangular system will be applied in each box of the integrated management matrix shown in Figure 5-1. In this respect, it should be considered that activities within each box of the matrix are carried out in certain space and time in accordance with the Spatial Planning Act No. 24 of 1992. Interactions between activities within the matrix's boxes will be able to explain the existence of overlapping jurisdiction and conflict of interests among stakeholders in the management of fisheries. Hence, analysis of linear and responsive synergistic relationships (interactions) among fisheries management activities in the matrix will lead to the development of community-based and co-management of fisheries, which will be realized through the integration of the legal framework of fisheries management (legal structure, legal mandate and legal enforcement) (Figure 5-5) and the institutional framework of fisheries management (government, private sectors and local community) (Figure 5-6).



Source: Purwaka, 1997.



Source: Purwaka, 1997.

5.1 PLANNING AND ORGANIZING

Planning and organizing includes the use of data and information (DI), stock assessment (SA), determination of absorptive capacity of the marine environment and carrying capacity of living resources (AC) and resource allocation (RA). Ideally, planning, organizing and other management activities should be based on the best scientific data available. In this respect, it is assumed that DI should contain data and information of all activities specified in the integrated management matrix and of all aspects indicated in the resource-based, community-based and market-based approaches and in the legal and institutional frameworks. However, the fact shows that DI at the national level does not have all the above data and information. This has led to incomplete PO activities, whereas in Segara Anakan, AC and RA are likely to focus mainly on fishery and man-made resources. Human resources are seldom directly involved in the formulation of PO. Components of community-based and market-based approaches are not also considered in the planning and organizing process.

Consequently, the PO formulation at the national level is participated only by institutions having some control over any of marine fisheries. It does not include institutions, which define themselves as significant parties, and/or have the ability to impede the implementation of marine fisheries management. The interest of a

local traditional community engaged in coastal fisheries and their social and cultural aspects are also not taken into consideration in the PO formulation. Therefore, only fishery related laws, regulations, policies and institutions are involved in the patterns of interaction within the PO formulation.

The local traditional community in each of the three study areas has very limited data and information to formulate PO. They do not have the capability to do SA and AC. They do seasonal RA for specific resources in certain time and space. In this respect, if institutions at the national level really want to use all the aspects of the resource-based management approach, they will be capable of assisting the local traditional community in working on SA and in determining AC. As a matter of fact, however, this does not occur in practice, so that community participation and cooperation among all relevant institutions can not be fully realized in the PO formulation. The PO formulation itself is a long process consisting of several stages (Purwaka, 1995). Due to prioritization of certain activities through top-down and bottom-up process, fisheries' planning is not capable of accommodating all the interests of a local traditional community. Sometimes none of their interests can be accepted and formulated in fisheries planning.

5.2 ACTUATING

Actuating (A) is the implementation of fisheries planning which consists of resource utilization (RU), process of production (PP) and marketing the product (MP). From the above discussion on PO, it is obvious that PO formulation at the national, local and village levels stresses RU and the use of incomplete resource-based management approach (because human resources sometimes are not correctly considered in the PO process). Community involvement and institutional partnership arrangement in the patterns of RU, PP and MP activities require not only resource-based management approach, but also community-based and market-based management approaches. Therefore, the patterns of interaction in the actuating process will include not only interaction among fisheries-related aspects, but also legal, institutional, social and cultural interactions between fisheries and other stakeholders. In practice, however, these do not take place. PP and MP are not integrated together with RU in the actuating activity and also not in the PO. The reason: for PP and MP activities to meet the market demand is not an easy task.

The above situation leads to an understanding that the actuating and RU are often considered identical in the PO formulation. Meanwhile, PP and MP stand for themselves and are not included in the PO. As a result, legal, institutional, social and cultural aspects of PP and MP are not involved in the fisheries management patterns. Linear synergistic interaction which starts with DI-SA interaction, ends with RA-RU interaction. At the local and village levels, interaction between RA and RU is regulated by the *adat* law and implemented for specific resources in a certain time and space. In this respect, the *adat* law is transformed into a set of rules such as *sasi* applied through a zonation scheme. These rules do not include the regulation of PP and MP because they contain mainly prohibitions and sanctions.

5.3 CONTROLLING

Controlling activities are carried out by applying monitoring, controlling and surveillance system (MCS). Monitoring activity focuses on physical relationship between fishers or users and the marine living resources. It is applied to detect changing patterns of fishing intensity, so that overexploitation and resource degradation can be avoided. Control activity focuses on administrative relationships between fishers or users and the marine living resources. It is carried out to identify legal and illegal fishing. Surveillance activity focuses on geographical relationships between fishers or users and the marine living resources. It consists of air, sea and land/area surveillance. By applying surveillance, every change in spatial activity and its impact on the environment can be identified. For example, the maneuver of fishing vessels and movement of marine pollution can be easily detected. Since MCS is an integrated system, the three components of controlling activity should be carried out simultaneously.

From the above explanation, it is obvious that the implementation of the MCS system will involve several institutions having MCS capability. At the national level, MCS in fisheries is still insufficient. Institutional cooperation, coordination and integration are not yet well developed in the field. At the local and village levels, however, the people of Ameth Village of Nusa Laut Island have applied traditional marine surveillance to prevent illegal activity in their marine territory. It can be considered as traditional community-based marine surveillance. From the viewpoint of MCS, it can be regarded as an agent of control which can be integrated into the national system.

With respect to the integrated management matrix, DI, SA, AC, RA and MCS are weak or insufficient. On the other hand, however, RU, PP and MP are always reported to be in good condition, regardless of the lack of legal basis of efforts to carry out RU, PP and MP. For this reason, RU, PP and MP need the involvement of MCS to address issues on legality.

5.4 INTEGRATING EFFORTS

As mentioned earlier, legal and institutional frameworks are capable of facilitating efforts to integrate the *adat* law into the national legal system and to develop co- and community-based marine fisheries management. However, the above discussion indicates that such efforts will take time and are possibly costly (Pomeroy and Williams, 1994).

Chapter 6

Recommendations

The discussion in previous chapters indicates that coastal and marine resources management in Indonesia is shared among various national government agencies. There is no single regulation that provides a legal basis for promoting an integrated coastal and marine resources management. The disparity between economic interests and environmental considerations has caused disintegration in policy implementation. Each institution tends to focus on economic interest with less effort in maintaining the principles of sustainable use of resources. Even though environmental issues are legally considered, the implementation of most policies tends to focus on partial environmental protection. In order to maintain the principles of sustainable development, Indonesia needs to establish an integrated coastal and marine resources management that promotes optimum sustainable use and environmental protection and for the benefit of the people, particularly local communities.

6.1 ESTABLISHING A LAW ON INTEGRATED COASTAL AND MARINE RESOURCES MANAGEMENT POLICY

Indonesia needs to establish a national law on integrated coastal and marine resources management. Such a law should provide the legal basis and principles for an integrated and interdependent management systems of natural resources. The principles of integration refer to the notion that coastal and marine resources must be considered as an integral part of ecosystems and the environment. Coastal and marine resources cannot be seen only from the perspective of the economy, but also from the perspective of the environment. The exploitation of natural resources that tends to focus on economic interest only will cause serious problems which, in turn, will threaten the sustainability of the resource. This principle potentially allows the process of maintaining natural resources availability for the benefit of the people while ensuring long-term economic development. This is crucial since the Indonesian economy depends heavily on natural resources. Competition between local and international interests in using natural resources will become apparent. It will put local interests in a disadvantaged position due to lack of capital, knowledge and technology. The competition between economic and environmental interests will cause resource depletion and prevent the younger generations from enjoying nature's bounty. In this regard, the establishment of an integrated policy that enables the participation of all people, particularly local communities, is crucial.

"A coastal and marine resources management policy must be designed and implemented to encourage active participation of all stakeholders, not only among relevant government institutions but also the community and the private sector."

The principle of interdependence constitutes the management system that is developed based on a partnership approach. A coastal and marine resources management policy must be designed and implemented to encourage active participation of all stakeholders, not only among relevant government institutions but also the community and the private sector. This approach is extremely important to promote management which allows each stakeholder to make significant contributions in promoting sustainable use of coastal and marine resources and the protection of the environment. Also, this policy needs to ensure local community participation and the local community's access to the main economic sources—the natural resources.

6.2 DECENTRALIZATION

Decentralization is absolutely required to provide provincial and district governments' authority over coastal and marine resources management. Such authority is needed for three reasons. First, coastal and marine resources are part of marine ecosystems. The management of natural resources is part of the whole development system so that the exploitation of natural resources needs to consider environmental protection in order to preserve every component of the ecosystem. Second, the utilization of coastal and marine resources must consider the interest of the local community. Third, the management of coastal and marine resources is part of the regional development systems. These three principles can be achieved only by strengthening provincial and district governments in managing coastal and marine resources. Providing authority to the regional and local government is expected to encourage the process of local community empowerment since the local governments have mandates to improve the economic well-being of their people (local community). Decentralization will also help the national government to improve coastal and marine resources management systems.

6.3 IMPROVING MANAGEMENT SYSTEMS

The improvement of management systems is crucial due to the fact that the exploitation of coastal and marine resources has caused resources and environmental degradation. The existence of coastal and marine resources is also threatened by the negative impacts of land-based activities with no effective solution. The improvement of management systems needs to consider at least seven management issues as follows: (1) data and information; (2) natural resources assessment; (3) natural resources allocation; (4) natural resources utilization and protection; (5) process of

production; (6) marketing; and (7) MCS (monitoring, control and surveillance). Each management issue needs to be developed based on at least two aspects—legal and institutional. In addition, the development of each management issue (component) has to be complementary and based on the principles of an integrated development policy and the interests of all stakeholders, including government institutions, private sectors and community.

6.4 EMPOWERING THE LOCAL COMMUNITY

Empowering the local community is necessary in order to promote two aspects. First, the local community needs to take an active role in protecting coastal and marine resources since more than 60% of the population lives in coastal areas. Also, the local community has the potential to influence the quality of coastal and marine resources. Second, local community has rights to use natural resources available in their environment for their economic benefit. The empowerment of the local community can be achieved by promoting community-based MCS that is developed based on traditional values and norms. This means that improving the effectiveness of customary laws is required as long as these are compatible with the interests of the nation.

“The empowerment of the local community can be achieved by promoting community-based MCS that is developed based on traditional values and norms. This means that improving the effectiveness of customary laws is required as long as these are compatible with the interests of the nation.”

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Appendix 1

Basic Legal Systems

1. Forestry

A law concerning the basic provisions of forestry is Act No. 5/1967 which cover natural resources management in the forest area, inventory, utilization and protection. There are also several related articles regarding marine and coastal resources management. Article 9 paragraph 2 states that: "Forest management activities covers: (a) regulating and performing protection, firmness, administration, maintenance, forest management and renovation; (b) organizing forest conservation, forest tour and maintain wildlife and hunting; (c) inventory; (d) performing forest study and forest product uses and benefits and social economic study of people living in and around the forest; (e) organizing and providing information and forestry education. This act also regulates the delegation of partial authority of central government to provincial government in forestry management and organization as stated in Articles 12 and 14. Article 12 states: "Central government may transfer part of its authority in forestry to provincial/local government through Government Regulation ". Article 15 regulates the protection of forests. Article 16 regulates wildlife protection according to objectives determined by law. Article 18 regulates the guaranty of execution of forest and forestry protection by delegating authority to the special police. Individual and group civil rights to obtain benefit from the forests including custom law is regulated in Article 17, which states that the "Execution of civil rights, custom law and its members and individual rights to obtain benefit from the forest directly or indirectly based on existing rules and regulation, may not hamper the achievement of objectives as meant by the law ".

Based on Article 9, the Forestry Department deals with forest management, while the Agriculture Department deals with expansion of agriculture fields and estates. The content of Article 15 consequently distributes the authority to the Tourism Department, State Minister for Living Environment and Forestry Department. Delegation of central government authority to local/provincial government makes the Department of Home Affairs directly involved with this law. Government policy on transmigration relates to opening of forestry field, and thereby involving the Transmigration Department. From the above, it is clearly seen that this act/law involves several departments. This act is the basis of forest management including its utilization with respect to conservation and economic sense. It also serves as the basis for community development in forest utilization economically, such as production, industry development, marketing and export.

The authority delegation from central government to local/provincial government as stated in Articles 12 and 14 gives opportunities to local/provincial government in managing and protecting forest in their area. Therefore, the local/provincial government can design the form of management suitable to their area. Article 15 relates to protecting forest from damage by human activities, animal or natural disaster. This article also involves social participation in forest protection. This act also involves custom law relating to management and ownership rights. Based on the existing articles, this act may be used as basis for forestry management including mangrove area conservation, coral reefs and other protected area in relation to tourism. Since this act is valid for general forest management, its use as basis for marine and coastal

management, particularly mangrove and coral reefs, may require more additional articles. This act relates to natural resources law enforcement which can also cover marine and coast, but this is not explicitly stated. As the consequence of authority delegation, the central government has to provide control and maintenance. Furthermore, local/provincial government may not be capable of overcoming problems related to forestry resources management in the area.

To anticipate the weakness of the act, the important thing to be done is to establish a collective interrelated departments' policy such as Forestry, Interior, Post, Telecommunication, Tourism, Mining and Living Environment State Minister. Together with Home Affairs Department, prepare local/provincial government to accept its delegated authority so it can optimally manage the forestry resources. It is wise if policy execution can be done in an integrated approach in order to enhance the management of marine and coastal resources, particularly for mangrove and coral reefs.

2. Mining

Act No. 11/1967 covers categorization of excavation materials, right to excavate and execution of mining rules. Regarding marine and coastal management, the categorization of excavation material stated in Article 3 seems relevant: (1) Excavation material are divided into three categories: (a) strategic material; (b) vital material; and (c) materials not categorized in a and b. The reason for this is that oil and natural gas, which are strategic excavated materials, are mostly found in the marine and coastal area.

Articles 4 and 5 explain that the central government has the authority to excavate strategic materials; vital materials by central and local government and other materials covered in (c) above by local government. The execution may be done either by a state-owned or public company appointed by the central or local government that has authority over the materials to be excavated. Potentially environmental harmful mining materials are regulated in Article 25, which outlines penalties on violations. This liability is imposed on the bearer of the mining authority.

The institution directly involved with this act is the Mining Department, which executes the regulation of mining materials management. Other institution indirectly involved is the Living Environment State Minister, which regulates environmental damage due to mining activities. This act can be used as basis for managing the impacts of mining on the marine and coastal environments. This act does not explain environmental management in detail in its relation to mining activities such as prevention of damage by exploration and exploitation activities. It only explains the economic and political interests of excavated materials, not related to the interest of sustainability of natural resources itself. Delegation of authority from the central government to the local/provincial government regarding the mining of strategic materials may create conflict of interest in marine and coastal management. The local/provincial government is granted authority to manage their marine and coastal areas under their administrative region. On the other hand, should there be oil and natural gas in this region, automatically the local/provincial government loses its rights on the region. To anticipate rejection on environmental exploitation, the Mining Department and State Minister for Environment prepare a detailed joint policy concerning protection of the environment in mining activities and sustaining the availability of mining material source. The delegation of authority from the central government to the local/provincial government is not limited only to

the excavation of materials *b* and *c*, but also *a* and particularly to strategic materials found in the marine and coastal areas so that the local/provincial government can participate in marine and coastal management.

3. DEFENSE AND SECURITY

Act No. 20/1982 states that defense and security effort lies in the people as a source of power. As regulated by Article 10, the marine and coastal areas are one of the state security and power components in the form of natural resources, besides the people, the Armed Forces and civil protection. A related institution with regard to this act is Defense and Security Department. The Department of Home Affairs is indirectly involved in the case of delegation of authority from the central government to the local government, while Post, Telecommunication and Tourism Departments are indirectly involved in the security of information flow in marine and coastal areas. This act guarantees that there will be no outside intervention in utilizing the marine and coastal resources; therefore, the people in that area should not be afraid of any theft of resources by outsiders. It also guarantees no intervention by other nations to seize their marine and coastal areas, or foreign aggression. This act only outlines defense and security against any domestic and foreign threats. So this act does not explain in detail Indonesia's strengths and weaknesses as an archipelago. The policy regarding defense and security of marine and coastal areas should be established so that there will be security and local community rights in utilizing their area. In case of deviation from marine and coastal management, penalty will be imposed based on the policy made.

4. Natural Resources Conservation

The purpose of Act No. 5/1990 is to ensure sustainable utilization of natural resources and their conservation. Natural resources conservation, as mentioned in Articles 2 and 3, covers balanced and matched utilization in order to support community welfare. Article 5 explains conservation activities covering life support, preservation of various flora and fauna and its ecosystem and sustainable utilization. Article 4 states: "Government and the society are responsible for the conservation of natural resources". Article 9 outlines the responsibility of land right holders and marine enterprises to protect the supportive area system. Articles 19 and 21 outline various prohibitions in performing activities causing change to natural resources, while Articles 27 and 28 regulate the utilization of natural resources. Articles 32 and 33 outline the national park management with zone system, which consists of core (main) and utilization zones. Community participation, as mentioned in Article 37, is directed and mobilized by the government through useful and fruitful activities. Article 38 regulates the delegation of authority from the central government to local/provincial government in the execution of natural resources conservation with consideration to Act No. 5/1974. Article 39 regulates the granting of authority to investigating officials covering the maintenance of natural resources conservation.

This act directly involves the State Minister for Environment in natural resources protection. The Forestry Department is involved in biodiversity conservation of forest ecosystems while the Agriculture Department is involved in the preservation of plants and various fish species under its jurisdiction. The Mining Department assists in the conservation of natural resources by regulating the impacts of mining activities. The Department of Home Affairs is involved in the delegation of authority on conservation efforts from the central to the local government as specified in Article 38. Articles 4, 5 and 9 provide

protection as reference to utilization warranting the conservation of natural resources. Articles 19, 21 and 33 provide various prohibitions to ensure the management of natural resources and thereby the authorization limits may be detected.

The zoning system, as mentioned in Article 32, provides real limit on utilization of natural resources since every zone has its own function and jurisdiction and therefore, it can be clearly distinguished which zone is protected and which zone may be utilized. Delegation of authority, as stated in Article 38, gives opportunity to the local government to participate in natural resources conservation in the areas under its administrative jurisdiction. The local government may establish zoning within its respective areas.

This act does not specify the conservation policy for coral reefs, mangroves, fish and other organisms and the determination of the National Marine Park zoning. This act does not regulate in detail how natural resource conservation can be executed either by government or society. In Articles 4 and 16, it is not clearly specified the weight of responsibility between the government and society, although society has no authority to arrange the management of natural resources.

The government may have the opportunity to participate in the management of natural resources but it is not equipped with rules concerning the type and authority delegated. This condition will create conflict on the authority and responsibility of the central government in connection with natural resources conservation in the administrative area of local governments. In addition, the local governments do not know what type of natural resources will be protected or utilized. As a result, misinterpretation may occur. There is a need to prepare a detailed policy on natural resources conservation based on the characteristics of the marine and coastal areas. If this is not possible, at least there should be cooperation between the State Minister for Living Environment and other related Departments such as the Agriculture Department and Forestry Department so that the act can be integrated into their respective policies. In such case, although the act still regulates general matters, each respective department already has guidance. There should be cooperation between central government and local government on natural resources conservation in order to ensure the participation of the local government. Conservation efforts should be explained to clarify which species are to be protected or utilized.

5. Fisheries

Fisheries matters are regulated by Act No. 9/1985. This act is directly related to marine and coastal resources since this act covers the habitats of fishes. It also regulates the protection and management of the fishery resource from pollution. In Article 2, a fishing area covers: (a) sea; (b) river, swamp, reservoir and other water stagnant water; and (c) exclusive economic zone. Article 3 regulates integrated fishery resource management: (1) fishery resource management in the fishing zone of the Republic of Indonesia is aimed at obtaining the maximum utilization for the Indonesian people; and (2) to attain the aim mentioned in Item 1, the government conducts integrated and directed fishery resource management by preserving the fishery resource and its environment continuously for the welfare of Indonesian people.

Article 4 regulates: (1) fishing apparatus; (2) prerequisite fishing technique by the fishing vessels without diminishing the law regulating shipping safety; (3) allowable total catch and size of fish not allowed to be caught; (4) passage and season of fishing; (5) prevention of damage and pollution, rehabilitation and improvement of fishing resources and its environment; (6) new fish species spreading; (7) fish plantation and its protection; (8) prevention and extermination of germs and other diseases; and (9) other related things required in achieving the goal of fishing resources management.

Control of people or institutions in fish catching is regulated in Article 6, while Article 7 regulates polluting and damaging activities as well as research and other scientific activities. Fishery resource management is under the Agriculture Department while the State Minister for Living Environment is involved in living environment protection. The Forestry Department is involved in mangrove and coral reefs. The Department of Home Affairs is involved in the delegation of authority from the central government to the local government regarding fishery resource management.

This act is the basis for fishery management including jurisdiction/authority on utilization and protection of fishery resources. Therefore, it covers the living environment protection. This act serves as the legal instrument in marine and coastal resources management. Article 2 clarifies the opportunities in marine and coastal resources management since it sets the management jurisdiction/authority limit from the territorial water to exclusive zone of Indonesia. This act also provides fishing conservation opportunities mentioned in Articles 3, 4 and 7 to prevent overfishing, pollution and other damages to fishing resources.

However, this act is not a sufficient basis for overall marine and coastal management in almost all the marine and coastal areas. The existing articles only cover the scope (area), fish catching methods and pollution protection or other damages. Should damages occur in mangroves or coral reefs, the act is not able to respond. In practice, jurisdiction/authority of fishing resources is under the Agriculture/ Forestry Department. Thus, appropriate responses to resource damage largely depend on which department is responsible for the resource being damaged.

It is important to formulate a policy directly related to fish habitat management, particularly in the marine and coastal areas. There should be cooperation among departments so management efforts can be complementary even though this act still cannot clarify the jurisdiction/authority in marine and coastal area management involving fishing.

6. Regional Government

Generally, Act No. 5/1974 provides basis for the Regional Government to regulate the right and jurisdiction/authority of local/regional government to handle its own household covering the delegation of authority/jurisdiction from the central government and regional cooperation. Article 7 states that "The region has the authority, jurisdiction and obligation to arrange and handle their own household according to law and regulation".

It also regulates the submission of matters to the region accompanied by a set of equipment and funding source as stated in Article 8. Article 13 regulates that the regional government, consisting of the Governor and the Parliament, supported by the Regional Secretary and the Regional offices. The

Regional Head/Governor has the obligation and duty to guide and control the execution of regional governance based on Article 81. Article 65 states that "Some regional governments may determine Collective Regulation to regulate their respective interests". The Home Affairs Department is the only related institution subordinating the central and regional governments. This act gives opportunities to the regional government to handle its constituents without intervention from the central government. This provides the regional government with full jurisdiction to arrange and plan the marine and coastal resources in its region/area.

It also gives opportunities to the regional government together with the society to formulate and execute policies based on regional characteristics. Article 8 also gives opportunities to the central government to delegate jurisdiction/authorization to the regional government. The regional government has the chance to manage part of the central government's jurisdiction under the latter's supervision. Should there be strategic resources managed by the central government, the regional government still has the opportunity to participate once granted authority/jurisdiction.

This act gives opportunities to some regional governments to cooperate in marine and coastal resources management to solve problems collectively. There will be an overlapping of interest between the central and regional government if there is no clear limitation of jurisdiction, or when the central government interferes with internal regional matters.

Delegation of jurisdiction from the central to the regional government has consequences in wares, equipment, funds and expands the central government management. The central government has to supervise the adoption of policy matters turned over to the regional government.

Regional government policies which are not confirmed by the central government, in some cases, create overlaps with the policies of the central government. Collective decision on marine and coastal management without strong commitment between among the regions concern to solve collective problems will be useless if there are conflicts of interests in the implementation.

Delegation of jurisdiction and its limits should be clearly defined. There should be continued supervision by the central government over the regional government's adoption of the delegated jurisdiction particularly in enhancing human resources. Interregional governments' collective decision should be based on required and collective interests to avoid negligence.

7. Environmental Management

For environmental management purposes, Act No. 23/1997 contains basic provisions. Article 2 defines the scope of the living environment in the Republic of Indonesia as well as its sovereignty, sovereign rights and jurisdictions. All natural resources are controlled by the country/state for the nation's welfare.

Article 9 provides that the "(2) living environment management is conducted integrally by the government institution based on its field of duty and responsibility of each respective society and other development agents taking into consideration integrated plan and execution of national living environment policies". Article 12 explains that integrated execution is partly delegation of jurisdiction in certain matters

regarding living environment management to the region, enabling the regional government to assist the central government in managing the living environment. Article 14 and 15 regulate the prohibition of any effort violating environmental quality standard and the obligation of every plan to have environmental impact analysis.

In this act, the State Ministry for Environment is directly involved with Bappedal as activities planner. This act should be referred to prevent damaging impact on the living environment. The Home Affairs Department is responsible for the delegation of jurisdiction from central to regional governments. Other directly related institutions are Agriculture, Forestry, Energy and Public Works Departments. This act is the basis for policy concerning living environment management. The general management of marine and coasts as living environment space may refer to this act. Integrated management, as stated in Article 9, gives cross-sectoral opportunity in planning management based on inter-sectoral integrated superiority so the said environment management is synergistic.

Article 12 gives opportunity to the regional government to manage according to the region's characteristics and needs. This act guarantees the natural resources, either for business or living in general, in the marine and coastal areas by establishing impact analysis on living environment prior to execution of efforts.

Application of this act in marine and coastal management still has to be more specific/detailed through the formulation of lower-level policies. Integrated management has consequence to the inter-sectoral and collective commitment. Should there be one institution without interest in environmental management, then no integrity can be exercised. Delegation of jurisdiction by central to regional government without effective and intensive supervision, living environment management will not work.

To overcome the obstacles in environmental protection in coastal areas, it is wise to prepare a more specific policy so articles not included in this act may be clarified and specified in detail. To avoid overlapping of interests and misunderstanding in interpretation of this act, the central government should maintain and supervise the regional government in carrying out their delegated jurisdiction.

8. Impact Analysis on Environment

Government Regulation No. 51/1993 is an elaboration of the act concerning living environment management. This act ensures that environmental impact analysis is carried out before the implementation of a regional development plan.

Article 2 explains the efforts and activities that are thought to have important impact on the living environment. Article 14 explains the conduct of impact analysis of the living environment on all planned efforts and activities of the government. Implementation should also consider the suggestions and opinions of responsible institutions. The result of impact analysis on the living environment should be announced by the responsible institution (Article 22). The State Ministry for Living Environment with Bappenas (National Planning and Development Board) serves as planning institution for various activities in Indonesia. Other institutions involved are: Public Works, Agriculture, Forestry and Energy departments.

This regulation can be used as basis for marine and coastal management planning to prevent damaging impact on marine and coastal ecosystems. It may also provide legal power to marine and coastal management, so the enforcement of this regulation can prevent unauthorized use of natural resources. Still, environmental impact analysis cannot adequately clarify significant impacts on marine and coastal areas. There are no specific provisions that can be invoked when coral reefs or mangroves are damaged due to fishing activities and the like. Without suitable penalties and monitoring by the experts, this regulation is a paper without relevance.

This regulation can be explained through an interregional government's collective decision in the marine and coastal areas to make it more operational and effective. Evaluation of the results of environmental impact analysis should be conducted comprehensively and in an integrated manner by the department's concern and field experts, in order to ensure that such analysis (AMDAL) is conducted properly.

Appendix 2

Institutional Arrangement

A. National Levels

1. State Ministry for Environment

The State Ministry for Living Environment is a national level institution responsible for living environment management. In general, it coordinates with other related institutions regarding living environmental management. Since this institution has no lower-level implementing unit, coordination with other institutions, such as Forestry, Agriculture Departments and Bappenas should be done to ensure direct control over implementation.

The State Minister for Living Environment prepares policies based on Act No. 23/1997 concerning environmental management and acts as the coordinator. This institution also has jurisdiction and regulation over marine and coastal area management in order to ensure that the sustainability of the resources found in these areas. Such jurisdiction and regulations may also contribute in the development of strategic planning concerning the protection of marine and coastal resources. This institution also regulates and introduces the implementation policy on marine and coastal management.

2. BAPEDAL (Environment Impact Management Agency)

Bapedal has paid the least attention to marine and coastal environment. But since this institution is established as complementary to the State Ministry for Environment, it is also responsible for the management of marine and coastal areas including environmental rehabilitation and pollution control. Bapedal has two deputies—environment pollution management deputy and environment impact control deputy. Bapedal has three regional offices—West Region in Pekanbaru, Central Region in Bali and East Region in Ujungpandang. Each respective regional office monitors the development of central policies, pollution condition and environment impact.

In marine and coastal area management, Bapedal is tasked to prevent pollution and environmental degradation caused by land/surface activities such as industrial, agricultural, residential and erosion. In this case, Bapedal has responsibilities under the Spatial Planning Act No.24/1992. Even though in the enforcement of the act, the existence of Bapedal has not been fully recognized, it has the potential to increase its capabilities in marine and coastal management, particularly in relation to human resources, facilities and law enforcement. Bapedal also participates in the protection of marine and coastal resources environment.

3. Department of Forestry

General forestry management, including exploitation, conservation and reservation, is the responsibility of the Department of Forestry. In regard to marine and coastal resources, this department is interested in conservation and reservation under the responsibility of Directorate General of Forest Control and Natural Resources Conservation. The Directorate is directly involved in forest preservation and environmental protection.

This institution also has sufficient jurisdiction over law enforcement and forest management institutions. The policies on environmental management are most effective for forest management only. However, as regards to marine and coastal management, Bapedal has relevant interests particularly in coral reefs and mangroves as an important part of marine and coastal resources.

In safeguarding marine and coastal resources, Bapedal has policies on spatial planning such as National Park, Natural Conservation Area and Natural Park to prevent erosion and damage on marine and coastal environment, especially in relation to aquatic biodiversity.

4. Department of Agriculture

Being an institution responsible for fishery resource management and its habitat, it is directly involved in marine and coastal area management. Since this institution is directly involved in fishery resources, it only focuses on fishing matters as stated in the fishery resource policy made exclusive of the fishing habitats. This makes this institution ineffective, as fishery habitats such as coral reefs and mangroves are not considered. Damage on fish habitats is considered beyond its jurisdiction. To prevent damage caused by tunnel nets, dynamites and chemicals in fish capture, this institution coordinates policy implementation with other related departments such as the Forestry Department and State Ministry for Environment.

5. Department of Communication

This department has the jurisdiction and responsibility on all aspects of transportation, either land, air or sea. Act No. 21/1992 regulates navigation concerning pollution from sea transportation which makes this department responsible for marine and coastal area management. This department is directly responsible for the sustainability of marine and coastal ecosystems by preventing pollution. It also participates in marine and coastal environmental law enforcement. It carries out its responsibility by cooperating with other related institutions on the protection and utilization of marine and coastal resources.

6. Department of Mining and Energy

Responsible for utilization and sustainability of mining and energy resources, this institution is also directly responsible for environmental impact of mining and energy activities in order to protect the regional areas. In marine and coastal management, this institution is responsible for the mining activities' environmental damage, but it has to cooperate with other related institutions such as

Forestry and Agriculture. However, this institution only executes large-scale environmental impact control policy while for smaller-scale mining is still under the responsibility of the regional government.

7. Department of Home Affairs

An integral part of its responsibilities and jurisdiction is central and regional government governance and environmental management. Having units from the central to regional level, it implements environmental management policy. The Department of Home Affairs has the responsibility for jurisdictional distribution between central and regional government to avoid overlapping interests on marine and coastal area management. In its implementation, it would be wise if coordination is done to prevent unclear jurisdictional and responsibility distribution between central and regional governments. This institution is also responsible for the development of local community welfare and is effective in the delegation of jurisdiction to I and II regional government as the manager of marine and coastal resources.

8. Department of Tourism, Post and Telecommunication

The department is responsible for tourism development. In this respect, it is interested in the sustainability of natural resources as these are its main tourist attractions. The protection of marine and coastal areas and keeping it beautiful is urgently required in attracting tourists. This institution may not stand alone and has to coordinate with other related institutions.