

Chapter 1

Introduction

Chapter 1

Introduction

1.1 Study Background/ Rational

Indonesia is an archipelagic nation with 17,000 islands. It has an 81,000-kilometer shoreline, which is characterized by diverse and complex physical conditions, and is rich in coastal natural resources such as coral reef, mangroves, and a variety of marine life. Coastal and marine industries such as oil and gas production, transportation, fisheries and tourism account for a quarter of Gross Domestic Product and employ more than 15% of Indonesia's workforce.

In North Sulawesi Province, the importance of coastal and marine industries is apparent from the many stakeholders such as coastal community people, and those in the marine and tourism industries that derive economic benefits from the coastal resources in the area. However, the concept of "coastal management" has not been introduced in North Sulawesi until in very recent years, and as a result, the coastal resources have been exploited by existing stakeholders and are facing serious depletion problems. Especially, destructive fishing such as dynamite fishing and coral mining has resulted in the destruction of a vast area of coral reef and their condition is now very critical.

It is a theoretically sound and crucial idea to introduce a proper coastal management in the area. Integrated Coastal Management (ICM) is of the most important since the coastal area is influenced by both terrestrial and sea areas. The integration of area development plans and regulatory systems, the integration of various sectors in the local governments in terms of making appropriate plans, the integration of stakeholders in terms of implementation of a management plan are the most essential.

The role of local government agencies is becoming very important and crucial in coastal management in the recent transition from a centralized to a decentralized form of government. It will possibly result in good coastal management in the area, since North Sulawesi has been suffering more from isolation and ineffective management due to

inaccessibility to government administration owing to the centralized government regime. However, along with the changing of paradigm, the capacity building for local government officials, which has become essential, and the financing aspect seem to be big issues in the shrinking local government budget.

At the same time, communities' role in coastal management is equally important. There is a serious demand for communities to change their attitude – from waiting for outside interventions in the old government regime to changing the situation by their own efforts in the new government regime. Community capacity building is needed because this is the only way to ease the government's burden in providing basic services and facilitating problem solving in the present situation in the area. Government's role in community empowerment is to provide an enabling policy, institutional framework, legalization, and necessary technical assistance, as a community needs.

In this Study, the vision and objectives of coastal management in North Sulawesi is clearly set and in the process of decentralization of coastal management, the role and responsibility of each stakeholder are clearly identified. The guidelines for coastal management in the area, its methodology and detailed plans are stated in this master plan for coastal management in North Sulawesi.

The master plan is going to play a role in coordinating and integrating all stakeholders in the coastal area management by *guiding the direction and by showing the step-wise approaches and strategies*. The master plan is going to be placed in an important position to complement the area development plan by the provincial government from the aspect of natural environment protection point of view. This master plan and the area development plan will be like two balanced wheels of a vehicle of 'area development.'

1.2 Objectives of the Study

The objectives of the Study are mainly as follows:

- 1) to formulate the master plan for coastal management in North Sulawesi through conservation and sustainable economic utilization of coastal area;
- 2) to find an appropriate and workable implementation mechanism in coastal management in North Sulawesi by looking into existing resources and capability, and by identifying the gaps to be filled; and
- 3) to *transfer the know-how of formulating master plans and other related works to the counterpart personnel and working groups.*

1.3 Study Area

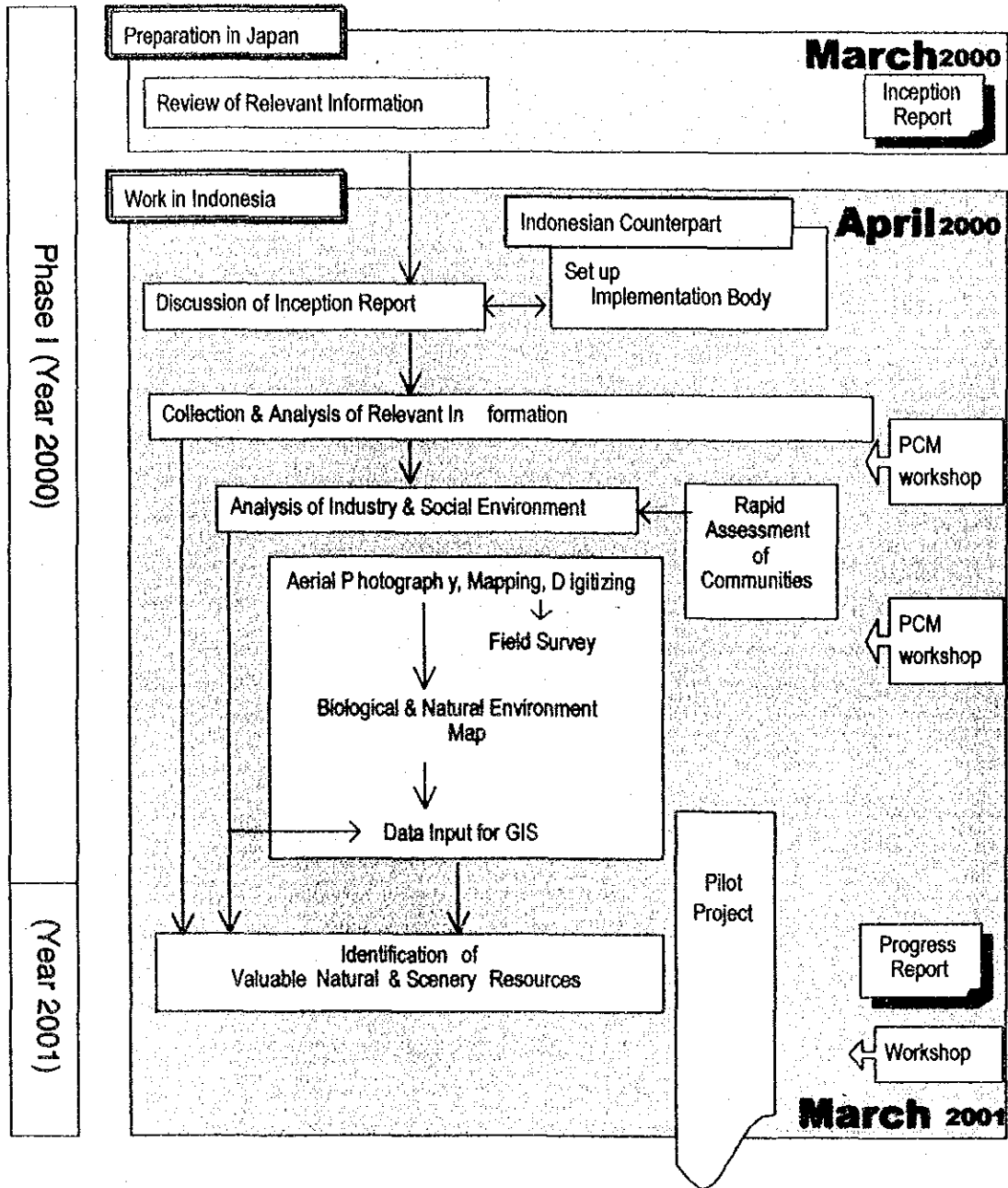
The target area of the study is the northern part of North Sulawesi Province with a land area of 7,800 km². The Study Area includes the whole area of Manado Municipality, Bitung Municipality, Minahasa Regency, and 8 districts in Bolaang Mongondow Regency.

1.4 Phases of the Study

The Study consists of the following two phases:

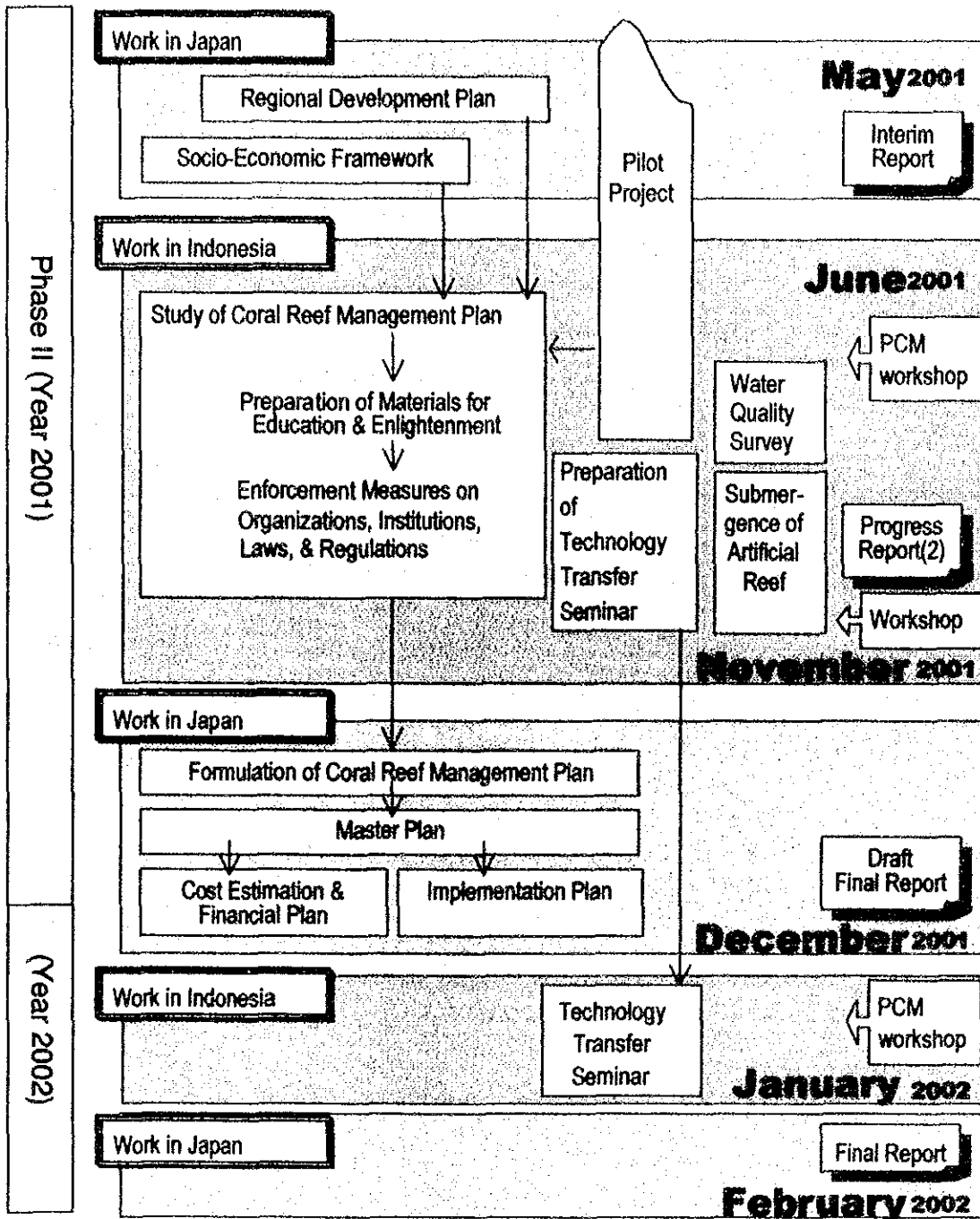
- Phase I (Identification of Existing Conditions) April 2000 – March 2001
- Phase II (Formulation of Master Plan) May 2001 – March 2002

The Study Team commenced the activities on the 8th of April 2000. In Phase I, identification of existing conditions, the Study Team collected necessary data and information through field surveys, interview survey and secondary data collected. Then, these data and information were analyzed in order to identify the existing conditions. In Phase II, the Study Team continued some work conducted in Indonesia and Japan since Phase I and also proceeded in the formulation of the Master Plan. In January 2002, the Study Team explained the Draft Final Report including all the study results, and held a seminar for the Technology Transfer. Then, the Study Team submitted the Final Report in March 2002 after receiving comments from the Indonesian side.



Source: JICA Study Team

Figure 1.1 Flow of the Study (Phase I : Identification of Existing Conditions)



Source: JICA Study Team

(continued) Figure 1.1 Flow of the Study (Phase II : Formulation of Master Plan)

1.5 Information Sources and Supplemental Surveys

(1) Aerial Photography Survey

Aerial photography survey was carried out from July to September 2000, which produced two scales of photographs as follows:

- 1:20,000 for coastal area (colored)
- 1:50,000 for inland area (black & white)

Total length of flight reached 2,800 km and total number of pictures counted at 1,030 pieces.

(2) Sea-truth survey and ground-truth Survey

In addition to the aerial photography survey, sea-truth and ground-truth surveys were also undertaken in order to ensure the precision of aerial photograph analysis. The surveys were conducted at approximately 500 points of inland areas for ground-truth survey and at approximately 500 points in coastal water areas for sea-truth survey consisting of around 2,000 check points

(3) Coastal Natural Environmental / Terrestrial Environmental Survey

Coastal natural environment survey and terrestrial environmental survey were conducted to identify the conditions of coastal environments. The data and information on coral conditions, shoreline forms, seagrass and algae, mangrove, environmental impacts, land use and vegetations were obtained through secondary data collection, interview survey and field survey using Manta-tow method and direct observation from shoreline and from boat.

(4) Rapid Coastal and Inland Community Survey

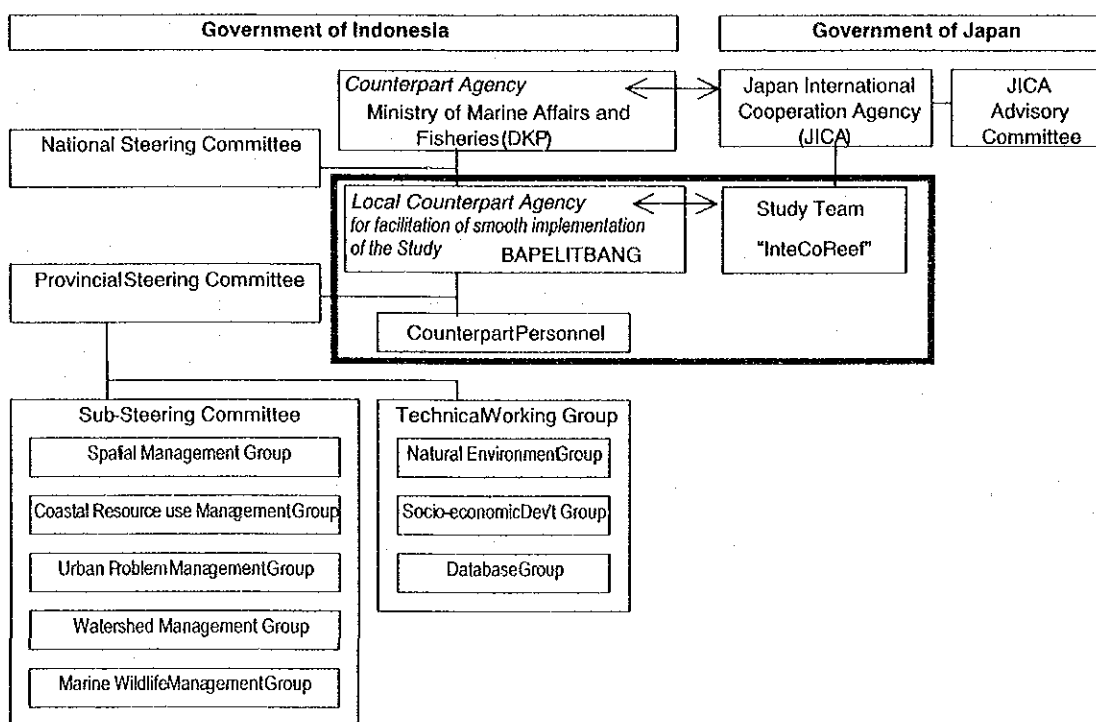
At the beginning of the Study, rapid coastal and inland community survey was conducted to analyze the knowledge, attitude and perception of community people towards coastal resources use. The survey was consisted of two components: quantitative and qualitative surveys. The quantitative survey aimed to obtain general information on villages and detailed socio-economic situation of villages. Qualitative survey aimed to analyze the social anthropological aspect of people's behavior and perception by using focus group discussions and PRA (Participatory Rural Appraisal). The survey was conducted from August to September 2000 at 24 coastal communities and 5 inland communities. Some baseline data has been used for selection of Pilot Project sites and for monitoring the impact of such project.

(5) Water Quality Survey

In accordance with the request from the Indonesian side, the Study Team began a water quality survey in September 2001, although the survey was not included in the scope of work at the beginning of the Study. Water samples and sediment samples were taken at some points on the coastal area of Manado Municipality and Bitung Municipality, and at rivers and river mouths of the basin where the gold refining factories locate.

1.6 Study Organization

Structure of organizations related to the Study is shown in Figure 1.2.



Source: JICA Study Team

Figure 1.2 Study Organization Structure

The Study Team is composed of 18 experts from Pacific Consultants International (PCI). The Ministry of Marine Affairs and Fisheries (DKP) is the counterpart agency on the Indonesian side and Planning, Research, and Development Agency North Sulawesi Province (BAPELITBANG) facilitates smooth implementation of the Study as local counterpart agency. The Indonesian side established two Steering Committees, i.e.

National Steering Committee and Provincial Steering Committee. The members of each committee were as follows:

National Steering Committee	
	National Planning and Development Agency (BAPPENAS), (Chairperson) Ministry of Marine Affairs and Fisheries (DKP), (Vice Chairperson) Center of Oceanology Research and Development (LIPI) Ministry of Forestry and Plantation Estate (DEPHUTBUN) Ministry of Home Affairs (DEPDAGRI) Analysis and Applied Technology Board (BPPT) Regional Planning, Research and Development Agency North Sulawesi (BAPELITBANG North Sulawesi)
Provincial Steering Committee	
	BAPELITBANG North Sulawesi LANAL VI Bitung Faculty of Marine Science and Fisheries of Sam Ratulangi State University BAPEDALDA North Sulawesi Province Fisheries Office North Sulawesi Province Tourism Office North Sulawesi Province Forestry Office North Sulawesi Province Legal Affairs Bureau North Sulawesi Province Water Resource Management Office North Sulawesi Province Bunaken National Park Authority Office of Land Rehabilitation and Soil Conservation Bitung Fishery Academy BAPPEDA Manado Municipality BAPPEDA Bitung Municipality BAPEDA Minahasa Regency BAPPEDA Bolaang Mongondow Regency

The Study has involved a lot of coordination work with government agencies and foreign aid agencies. At the beginning of the Study, three Technical Working Groups, namely, the Natural Environment Group, the Socio-economic Development Group and the Database Working Group were established, in order to facilitate discussion and exchange of information, opinions and ideas, and to build up the capacity of counterpart agencies of the Indonesian side. The members of the Working Groups come from 13 agencies, including central agencies, local agencies, academic institutes and NGOs. Then during the Study of Phase II, Sub Steering Committees consisting of five groups were established to analyze and discuss together with the Study Team and to contribute on formulation of the Master Plan.

1.7 Cooperation with Related Agencies

(1) Cooperation and Coordination with Other Donor Agencies

Donor agencies such as the Asian Development Bank (ADB), the World Bank and the United States Agency for International Development (USAID) have already started several coastal management projects and programs such as the Coral Reef Rehabilitation and Management Project (COREMAP), the Marine Resource Evaluation and Planning (MREP) and Proyek Pesisir. They have accumulated knowledge and experiences through the implementation of projects and programs. The Study Team exchanged information and opinion regarding coastal management with these agencies. Especially, there was close relationship with Proyek Pesisir, which provided human resources and training materials for the training program of Extension Officers of the Pilot Project. The exchange of information and opinion was on a daily basis. The Environmental Policy and Institutional Strengthening Indefinite Quantity (EPIQ/USAID) project also provided a lecturer for the seminar on Establishment of Provincial Protected Areas at Technology Transfer in January 2002. On the other hand, the Study Team cooperated with regard to park management zoning in Manado Tua II of Bunaken National Park with EPIQ/USAID.

(2) Cooperation with Local Academic Institutions

The Study has also seriously taken the role of working towards coordination and cooperation among NGOs, local academic institutions and local government agencies. NGOs whose concerns are natural resources conservation and management and local universities such as UNSRAT, together with local government agencies, have been deeply involved in each step of the study to aim for integration of each stakeholder's interest and for making a realistic and applicable master plan, and also for building the capacity of core personnel in coastal area management.

The combined effort of Sam Ratulangi State University and the Study Team made possible the holding of a workshop on Tourism and Coral Reef Management in August 2000.

1.8 Major Study Activities

(1) Implementation of Pilot Project

One of the outcomes of the master plan would be setting up the Community-Based Management approach called Community Based Coastal Management (CBCM). However, the theoretical model sometimes would not work in reality due to many hidden conditions of local situation. The Study, therefore, decided to implement the Pilot Project of CBM for

coastal resources in the Study Area to find the most appropriate implementation mechanisms, and reflect the result of the Pilot Project to the master plan.

The Pilot Project was implemented in December 2000 in four villages; namely, ManadoTua Dua, Raprap, Basaan, Basaan Satu. The selected Extension Officers (EOs) from each village played a great role to mobilize and organize community people together with the EOs from outside of the communities and the supervisors from the local university (UNSRAT). The Pilot Project showed great success in each village and contributed in community empowerment to strengthen community autonomy and people's participation.

(2) Major Meetings

The Study Team has not only conducted field surveys, interview surveys and data collection but held meetings and workshops as well. Major interactions between the Indonesian side and the Study Team are summarized as follows:

Table 1.1 Major Interactions between the Study Team and Indonesia Side (1)
(Steering Committee Meetings)

Year	Date	Title	Place
2000	May 1	1 st National Steering Committee Meeting	Jakarta
	May 9	Preliminary Provincial Steering Committee Meeting	Manado
	May 27	1 st Provincial Steering Committee Meeting	Manado
	Aug. 11	2 nd Provincial Steering Committee Meeting	Manado
	Oct. 3	3 rd Provincial Steering Committee Meeting	Manado
	Oct. 24	4 th Provincial Steering Committee Meeting	Manado
	Nov. 30	2 nd National Steering Committee Meeting	Jakarta
2001	Mar. 19	5 th Provincial Steering Committee Meeting	Manado
	Mar. 22	3 rd National Steering Committee Meeting	Jakarta
	Jun. 22	4 th National Steering Committee Meeting	Jakarta
	Jul. 5	6 th Provincial Steering Committee Meeting	Manado
	Sep. 25	7 th Provincial Steering Committee Meeting	Manado
	Nov. 2	8 th Provincial Steering Committee Meeting	Manado
2002	Nov. 6	5 th National Steering Committee Meeting	Jakarta
	Jan.24	9 th Provincial Steering Committee Meeting	Manado
	Jan.31	6 th National Steering Committee Meeting	Jakarta

Table1.1 Major Interactions between the Study Team and Indonesia Side (2)
(Sub Steering Committee Meetings)

Year	Date	Title	Place
2001	Jul. 26	Problem and Objective Analysis Topics for Urban Problem Management Group, Spatial Use Management Group and Coastal Resource Use Management Group	Manado
	Jul. 27	Problem and Objective Analysis Topics for Watershed Management Group and Marine Wildlife Management Group	Manado
	Aug. 13	Problem and Objective Analysis Topics for Spatial Use Management Group and Coastal Resource Use Management Group	Manado
	Oct. 9	Management Issue Analysis Meeting for Watershed Management Group and Urban Problem Management Group	Manado
	Oct. 11	Management Issue Analysis Meeting for Marine Wildlife Management Group and Coastal Resource Use Management Group	Manado
	Oct. 12	Management Issue Analysis Meeting for Spatial Use Management Group	Manado

Table1.1 Major Interactions between the Study Team and Indonesia Side (3)
(Workshop)

Year	Date	Title	Place
2000	May 2	PCM Workshop for central governments on stakeholder analysis and problem analysis on coastal management	Jakarta
	May 26	PCM Workshop for local governments on stakeholder analysis and problem analysis on coastal management	Manado
	Aug. 12	Workshop on Tourism and Coral Reef Management (Joint workshop with UNSRAT)	Manado
2001	Feb. 18	PCM Workshop for local community members	Raprap
	Feb. 21	PCM Workshop for local community members	Basaan
	Feb. 22	PCM Workshop for local community members	Manado Tua
2002	Feb. 2	PCM Workshop for local governments on coastal management planning	Manado

Table1.1 Major Interactions between the Study Team and Indonesia Side (4)
(Technical Working Group Meetings)

Year	Date	Title	Place
2000	May 9	Explanation of Working Group Meeting	Manado
	May 31	Socio-economic Working Group Meeting	Manado
	Jun. 10	Natural Environment Working Group Meeting (Analysis on coastal environmental problems)	Manado
	Sep. 16	Database Working Group Meeting (Database situation in Japan/Result of Questionnaire survey)	Manado
	Oct. 3	Socio-economic Working Group Meeting (Result of Rapid Community Survey/Selection of Technical Support for Pilot Project)	Manado
2001	Jul. 9	Socio-economic Working Group and Natural Environment Working Group Meeting	Manado

Table 1.1 Major Interactions between the Study Team and Indonesia Side (5)
(Other Major Meetings)

Year	Date	Title	Place
2000	Apr. 24	Introduction of IC/R for BAPPEDA	Manado
	Jun. 16	Meeting with BAPPEDA-Minahasa for explanation of the Study	Tondano
	Jun. 20	Meeting with BAPPEDA-Bitung for explanation of the Study	Bitung
	Jun. 22	Meeting with BAPPEDA-Bolaan Mongondow for explanation of the Study	Kotamobagu
	Jun. 27	Meeting with BAPPEDA-Manado for explanation of the Study	Manado
	Sep. 15	Minahasa Kabupaten Task Force Meeting for Report of Study Progress	Tondano
	Oct. 28	Minahasa Kabupaten Task Force Meeting for Pilot Project	Tondano
	Nov. 2	Minahasa Kabupaten Task Force Meeting for Pilot Project	Tondano
	2001	Mar. 14	Explanation and Discussion of Progress Report I for Minahasa Regency
Mar. 16		Explanation and Discussion of Progress Report I for Manado Municipality and Bitung Municipality	Manado
Mar. 17		Explanation and Discussion of Progress Report I for Bolaang Mongondow Regency	Kotamobagu
Jun. 20		Meeting with NRM/EPIQ, USAID for Zonation in Bunaken National Park	Jakarta
Jul. 19		Meeting with NRM/EPIQ, USAID	Manado
Jul. 27		Ceremony for Establishment of Management Group for Pilot Project, Rap rap Village	Raprap
Aug.10		Technical Meeting with related agencies for Pilot Project	Manado
Aug. 18		Beach Cleaning Contest	Raprap
Aug. 20		Ceremony for Establishment of Management Group for Pilot Project, Basaan/Basaan Satu Village	Basaan/ Basaan Satu
Aug. 24,25		Zonation training with NRM/EPIQ, USAID	Manado Tua
Sep. 4		Meeting with Bunaken National Park Board	Manado
Oct.30		Explanation and Discussion of Progress Report II for Bolaang Mongondow Regency	Kotamobagu
Oct.31		Explanation and Discussion of Progress Report II for Manado Municipality and Bitung Municipality	Manado
Nov. 1		Explanation and Discussion of Progress Report II for Minahasa Regency	Tondano
2002		Jan.24	Explanation and Discussion of Draft Final Report for Bolaang Mongondow Regency
	Jan.25	Explanation and Discussion of Draft Final Report for Minahasa Regency	Tondano
	Jan.28	Explanation and Discussion of Draft Final Report for Manado Municipality and Bitung Municipality	Manado
	Jan.30	Presentation to Governor of North Sulawesi Province and parliament members	Manado
	Jan.31	Technology Transfer Seminar	Manado
	Jan.31, Feb.1	GIS database demonstration and operation skill transfer meeting	Manado

(3) Submission of the Study Reports

The Study Team has submitted various reports to JICA and Indonesia side, to evaluate the progress and results of each study period. Major reports are shown in Table 1.2.

Table 1.2 List of Major Reports

Year	Month	Title of Report	Content
2000	April	Inception Report	Objectives, scope of work and methodology of the study.
	December	Working Paper	Existing conditions and study progress
2001	March	Progress Report I	Preliminary identification of existing conditions as the result of Phase I.
	June	Interim Report	Result of analysis of existing conditions. Explanation of the planning framework for the management plan and development framework.
	October	Progress Report II	Planning framework, guidelines for coastal resource use Draft structure of master plan.
2002	January	Draft Final Report	Summary, Master Plan, Coastal Environmental Conditions and Coastal Management System, Community Based Coastal Management, Study Activities
	March	Final Report	Summary, Master Plan, Coastal Environmental Conditions and Coastal Management System, Community Based Coastal Management, Study Activities

Source: JICA Study Team

(4) Development of coastal GIS

The Study Team developed a Coastal Geographic Information System (GIS) database based on aerial photographs, field surveys, and secondary data collection. The database has been engaged in preparation of thematic maps, spatial analysis and coastal management zoning. The Study Team transferred the technical knowledge on the entire system to the Indonesian counterparts. The Study Team held a technology transfer seminar in January 2002 in Manado. It is expected that local governments and institutions in North Sulawesi Province continue to maintain for sustainable management planning and utilize this coastal GIS as the first component of the coastal environmental management information system even after the mission of the JICA Study is completed.

(5) Community Based Artificial Reef Development

It can be said that the coastal area is not managed very well, so that coastal resources have been damaged by all sorts of inappropriate manner as gleaned from the above analysis. A bottom up approach to community-based management is very important for coastal management. However, it is not intended that fishermen try to achieve sustainable resources when there is no incentive brought by open access to coastal waters. But it is

essential for coastal management that every fisherman is made aware of resource management and what the potential opportunities could be because of it. It is expected that establishment of artificial reefs shall provide opportunity for introduction of own resources and collective management at the community level to fishermen and that artificial reefs shall be intended for improvement of fishing grounds rather than for increase of amount of fish catch in this Study.

In the Pilot Project, two artificial reef units was designed and planned by the Study Team, but made and set up by the community people. It was intended to be community-based trial, therefore, the material, size, set up method, and cost needed to be affordable, simple and easy enough for communities. The site was decided from the aspect of environmental conditions especially *geographic, sea bottom, slope, current and biological conditions* based on aerial photos and direct observations. After a month of setting up an artificial reef in a Pilot Project village, the artificial reef was already covered by fouling organisms, and hundreds of juvenile fishes, lobsters, and shrimps have started living comfortably at their new habitat. According to the monitoring survey that was conducted, 15 species of fishes and shrimps are identified inside and surrounding the artificial reef (see Final Report Vol. V, Project Activities).

(6) Preparation of Enlightenment Materials

The Study created educational materials combined with presentation of study process. A 23-minute video program to explain CBCM was made by showing pilot project activities in the field. The video was made in Indonesian language, and aimed to raise awareness of not only community people but also every stakeholder related with coastal area management. The video program shall be duplicated into VHS tapes and VCD disks, and will be distributed to all related government agencies from provincial to regency level.

A participatory planning methodology called Project Cycle Management (PCM) was introduced into the workshop, and the manual for Participatory Planning was prepared in Indonesian language, and distributed to related stakeholders.

(7) Public Relations Activities

The Study Team has also been carrying out PR activities energetically through the Study period. Major activities are as follows:

- Publication of Newsletter (4 issues)
 - No.1 of Volume 1 in April 2000
 - No.2 of Volume 1 in October 2000

No.3 of Volume 1 in January 2001

No.1 of Volume 2 in August 2001

- Contest of the Study symbol
- Development of an Internet Study Homepage, <http://www.intecoreef.com>
- Advertisements and articles in newspapers
- Interviews by TV news programs
- Participation in international conferences and seminars as guest speaker
 - 9th International Coral Reef Symposium in Bali, Oct., 2000
 - International Workshop on Technology for Coastal Conservation and Rehabilitation in Jakarta, Aug., 2001
- Participation in the exposition "North Sulawesi Province Development Fair" as exhibitor in September 2001

1.9 Composition of the Study Team

List of the members who had joined and gave unstinted cooperation to the Study mentioned above are shown as follows.

Indonesian Government Side

National Steering Committee

(Chairperson)

Dr. Herman Haeruman

Deputy, Regional and Development Natural Resources,
BAPPENAS

(Vice chairpaerson)

Dr. Rokhmin Dahuri

Minister of Marine Affairs and Fisheries
Ex. General Director, Coastal Beaches and Small Islands
Affairs, Ministry of Marine Affairs and Fisheries (DKP)

Dr. M. Kasim Moosa

Center of Oceanology Research and Development, LIPI

Prof.Dr.Ir.Lucky.W.Sondakh,MEc

Chairperson, Planning, Research and Development
Agency(BAPELITBANG), North Sulawesi

Drs. Achmad Abdullah

Director, Directorate of Conservation and Marine
National Park, Directorate General of Coastal and Small
Islands, DKP

Mr. R.V. Kawangian

Directorate for Bureau of Planning and Foreign
Cooperation, DKP

Ir. Edi Djuharsa

Directorate General Forest Protection and natural
Conservation, Ministry of Forestry

Mr. Nyoman Yuliarsana

Land Rehabilitation and Soil Conservation, Ministry of
Forestry

Mr. Iwan Gunawan

Director of Natural Resources, Analysis and Applied
Technology Board (BPPT)

Mr. Isac Tarigan Directorate of Regional Resources, Directorate General of Regional Development, Ministry of Home Affairs

Provincial Steering Committee

(Chairperson)

Prof.Dr.Ir.Lucky.W.Sondakh,MEd Chairperson, Regional Planning, Research and Development Agency(BAPELITBANG), North Sulawesi

(Ex. Chairperson)

Mr. Joppy Saruan Ex. Chairperson, BAPELITBANG North Sulawesi

Ir.J.J.S.Lolong Chief of Infrastructure of Local and Regional Planning Division, BAPELITBANG North Sulawesi

LAKSMA TNI Kenny Welong Commandant, Navy in Bitung ("LANTAMAL VI BITUNG")

Prof. S. Berhimpon Dean, Faculty of Fisheries and Marine Science, Sam Ratulangi University

Prof.Ir.B.Sompie,MSc Head of Provincial Local Environmental Impact Management Agency

Ir. F.Kaunang Head of Provincial Fisheries and Marine Affairs Office

Drs. N. Pesik Head of Provincial Tourism Office

Ir. Marthinus Ranteallo Head of Provincial Forestry Office

Mr. J.R. Korengkeng, SH Head of Law and Human Rights Bureau, Governors Office

Ir. M. Tompodung Chairperson, BAPPEDA, Minahasa Regency

Ir. R. Mokodongan Chairperson, BAPEDA, Bolaang Mongondow Regency

Ir. J. Tambajong Chairperson, BAPEKO, Manado Municipality

Drs. H.R.Makagansa Chairperson, BAPEDA, Bitung Municipality

Ir. F.B. Najoran Head of Provincial Water Resources Management Office

Mr. M. Arief Tocngkagie Head of Bunaken National Park Authority

Ir. Komar, Msi Head of Land Rehabilitation and Soil Conservation Office, Ministry of Forestry

Ir. Dedy Heryadi., MS Director, Fisheries Academy Bitung

Mr. Benyamin Mengga, SH Head of Provincial Office of National Land Use Board

Drs.Joppy Hehosua Head of Provincial Transportation Office

Sub-Steering Committee

A. Coastal Spatial Use Management Sub-Committee

Mr. Benyamin Mengga, SH Head of Provincial Office of National Land Use Board

Mr. Ferdinand G. Pua, SH Head of Regional Development Sub Division, BAPELITBANG North Sulawesi

Ir. J.R. Lumban Batu, MM Head of Soil and Land Spatial Division, Provincial Office of National Land Use Board

Ir. N. Tamara Head of Infrastructure Culture Sub Section, Provincial Fisheries and Marine Affairs Office

Mr. I. Sofianto Hadi	Head of Planning Division Sub Section, Provincial Transportation Office
Ir. Veronika Kumurur, MSc	Faculty of Engineering of Sam Ratulangi University
Ir. Rugaya Biki	Head of Soil and Spatial Plan Sub division, BAPEKO, Manado Municipality
Ir. J.P.A. Rompas	Head of Development Planning Division II, BAPPEDA, Bitung Municipality
Mr. Felix Maringka	BAPPEDA Minahasa Regency
Ir. Dwi Dharma	Head of Soil and Spatial Plan Division, BAPEDA, Bolaang Mongondow Regency
Mr. J. E. Mala	Forestry Office, Minahasa Regency

B. Coastal Resources Management Sub-Committee

Ir. F. Kaunang	Head of Provincial Fisheries and Marine Affairs Office
Ir. N. Pesik	Head of Provincial Tourism Office
Ir. Ria Dunggio	Head of Regional Development Sub Division, BAPELITBANG North Sulawesi
Ir. H. Malingkas	Provincial Fisheries and Marine Affairs Office
Mr. B. Mononutu, SH	Head of Law Division, Law and Human Rights Bureau, Governors Office
Ir. L.T.X. Lalamentik	Lecturer / Dean Assistant, Faculty of Fisheries and Marine Science, Sam Ratulangi University
Ir. Samuel Hamel	Fisheries Academy Bitung
Ir. Agustinus Sudibyo	Head of Marine and Fisheries Resources Sub Office, Marine Office, Manado Municipality
Ir. Emmy Sjafi'i	Head of Coastal, Beach & Small Island Community Empowerment and Fisherman/Farmer Sub Office, Marine Office, Manado Municipality
Mr. Johdi Madea, SE	Head of Coastal, Beach & Small Islands Management Section, Fisheries and Marine Affairs Office, Bitung Municipality
Ir. Mario Panelewen	Head of Fisheries Resources Identification Section, Fisheries and Marine Affairs Office, Minahasa Regency
Ir. Johnny Arbie	Head of Fisheries Development Sub Office, Fisheries and Marine Affairs Office, Bolaang Mongondow Regency
Mr. Johan Garang	Staff of Extension Section, Tourism Office, Manado Municipality
Mr. Ronny A. Pangkola	Head of Recreation and Public Entertainment Section, Tourism Office, Bitung Municipality
Dra. Selma H.S. Rumat	Head of Information Services and Promotion Section, Tourism Office, Minahasa Regency
Mr. Donald Kolintama, BSc	Head of General Division, Tourism Office, Bolaang Mongondow Regency
Ir. Christie Saruan, MSi	BAPEKO, Manado Municipality

Mr. Nimbrot O. Polontoh, SPI	Head of Coastal and Marine Management Sub Division, BAPPEDA, Bitung Municipality
Mr. Suyanto Ramelan, BSc	BAPEDA, Bolaang Mongondow Regency
C. Urban Environmental Management Sub-Committee	
Prof.Ir.B.Sompie,MSc	Head of Provincial Local Environmental Impact Management Agency
Ir. L. Mentang	Head of Sub Office, Provincial Infrastructure and Settlement Office
Ir. N. Pusung	Head of Urban and Rural Infrastructure Sub Division, BAPELITBANG North Sulawesi
Ir. Febe Moniaga	Head of Section, Provincial Infrastructure and Settlement Office
Mr. Nico Kaseang	Head of Environmental Supervision Section, Provincial Industry and Trading Office
Drs. D.J. Salendu, MSi	Head of Recovery of Environmental Artificial and Social Sub Division, Provincial Local Environmental Impact Management Agency
Ir. Yorry Rapar	Head of Soil Use Plan Section, Provincial National Land Use Board
Ir. Y.N. Koloay	Head of Urban Settlement Sub Office, City Arrangement Office, Manado Municipality
Dr. Joy A. Sumakul	Head of Planning, Research, Development and Extension Division, Cleaning Management Board, Manado Municipality
Ir. Ivonne E. Sumayku	Public Work and Regional Settlement and Infrastructure, Bitung Municipality
Ir. H. V. Lolowang	Head of Public Work and Regional Settlement and Infrastructure Minahasa Regency
Ir. N. Tomboelu, MSi	Head of Urban and Rural Infrastructure Sub Division, BAPEKO, Manado Municipality
Drs. Ralph Laloan, MSi	Head Research Division, BAPEDA Bitung Municipality
Ir. Jaya Mokoginta	BAPEDA, Bolaang Mongondow Regency
Ir. Amos Kenda, MSi	Head of Division, Local Environmental Impact Management Office, Manado Municipality
Ir. Pingkan Sondakh	Head of Preservation and Recovery Environmental Quality Sub Division, Local Environmental Impact Management Agency, Bitung Municipality
D. Watershed Management Sub-Committee	
Ir. H.F. Sampouw, Dipl.HE	Vice Head of Provincial Water Resources Management Office
Ir. Komar, MSi	Head of Land Rehabilitation and Soil Conservation Agency
Mr. D. Muhaimin, ST	Provincial Water Resources Management Office

Ir. Eko H. Kuntjoro, MT	Head of Section, Land Rehabilitation and Soil Conservation Agency
Mr. O.M. Pontoh, BA	Head of Recovery of Coastal and Beach Environmental Sub Division, Provincial Local Environmental Impact Management Agency
Mr. F.R. Sumakul	Community and Government Empowerment Board, North Sulawesi Province
Mr. A. N. Watung	Community and Government Empowerment Board, North Sulawesi Province
Ir. Matus Tangyong	Head of Ground Water Section, Water Resources Management Sub Office, Public Infrastructure Office, Manado Municipality
Mr. Selong Papatungan	Water Resources Management Office, Bolaang Mongondow Regency
Ir. Hilda Towoliu	Head of Planning Division, Agribusiness Office, Manado Municipality
Ir. R. Kombaitan	Head of Estate Crop Sub Office, Agribusiness and Forestry Office Bitung Municipality
Ir. Jan Poluan	Head of Division, Agriculture and Horticulture Office, Minahasa Regency
Mr. Agus Gunibala	Forestry and Estate Crop Office, Bolaang Mongondow Regency
Mr. Meldy Lumintang	BAPEDA, Minahasa Regency

E. Coastal Ecosystem and Marine Wildlife Conservation Sub-Committee

Ir. Marthinus Ranteallo	Head of Provincial Forestry Office
Mr. M. Arief Toengkagie	Head of Bunaken National Park Authority
Ir. Helly Tampi	Head of Section, Provincial Forestry Office
Ir. Syihabbudin	Head of Conservation Section, Bunaken National Park Authority
Ir. Nining Rumningsih	Head of Section, Agribusiness and Forestry Office, Bitung Municipality
Mr. Benny Kaparang	Head of Seed and Seed Farm Section, Forestry Office Minahasa Regency
Ir. Emmie M. Wagiu	Head of Natural and Environmental Sub Division, BAPEKO Manado Municipality
Mr. Johny Wenur, SE	Head of Transportation and Tourism Sub Division, BAPPEDA Bitung Municipality
Ir. Taufik Mokoginta	Head of Sub Division, BAPEDA Bolaang Mongondow Regency

Technical Working Group

A. Natural Environment Group

Mr. A. G. Kawatu, SE, MSi	Executive Secretary, BAPELITBANG North Sulawesi
---------------------------	-------------------------------------------------

Mr. K. Batotanete, SH	Chief of Reporting & Controlling Division, BAPELITBANG North Sulawesi
Ir. Jenny Karouw, MSi	Head of Infrastructure Division, BAPEKO, Manado Municipality
Mr. Lettu (Laut) F. Suoth	Navy (LANTAMAL VI Bitung)
Mr. B. Mononutu, SH	Head of Law Division, Law and Human Rights Bureau of Governors Office
Drs. Bobby Roring, MSi	Head of Division, Provincial Local Environmental Impact Management Agency
Ir. Erni Tumundoh	Provincial Fisheries and Marine Affairs Office
Ir. Helly Tampi	Head of Section, Provincial Forestry Office
Mr. D. Muhaimin, ST	Provincial Water Resources Management Office
B. Socioeconomic Development Group	
Drs. L. J. Liwoso, MSoc.Sc	Chief of Regional Economic Planning Division, BAPELITBANG North Sulawesi
Mr. Abdi Buchari, SE, MSi	Chief of Social and Government Research and Development Division, BAPELITBANG North Sulawesi
Drs. D. Poluan	Head of Basic Requirements Research and Development Sub Division, BAPELITBANG North Sulawesi
Ir. Nurlian Tomboelu, MSi	Head of Urban and Rural Infrastructure Sub Division, BAPEKO, Manado Municipality
Ms. B. Puspita Devi, SPi	BAPELITBANG North Sulawesi
Ir. L.T.X. Lalamentik	Lecturer/Dean Assistant, Faculty of Fisheries and Marine Science, Sam Ratulangi University
Ir. J. J. Mongkaren	Head of Division, Provincial Local Environmental Impact Management Agency
C. Database Group	
Drs. B.S. Tujuwale, MS	Chief of Human Resources Planning Division, BAPELITBANG North Sulawesi
Mr. Ferdinand G. Pua, SH	Head of Regional Development Sub Division, BAPELITBANG North Sulawesi
Ir. J.R.Lumban Batu, MM	Head of Soil and Land Spatial Division, Provincial Office of National Land Use Board
Ir. Jhonly Emor. MS	Faculty of Fisheries and Marine Science, Sam Ratulangi University
Ir. Samuel Hamel	Fisheries Academy Bitung
Ir. Eko H. Kuntjoro, MT	Head of Section, Land Rehabilitation and Soil Conservation Agency
Ir. Syihabbudin	Head of Conservation Section, Bunaken National Park Authority

Central Government Counterparts

(Ministry of Marine Affairs and Fisheries : DKP)

Dr. Alex S.W. Retraubun	Director for Small Islands Affairs, Directorate General of Coastal and Small Islands, DKP
Mr. Ferrianto Hadisetiawan Djais	Spatial Planning Director for Directorate General of Coastal and Small Islands, DKP
Ir. Agus Dermawan	Head of Sub Directorate of Marine Preservation and Conservation Area, DKP
Ir. Sapta Putra, MSc	Head of Sub Directorate of Integrated Coastal Zone Management, Directorate General of Coastal and Small Islands, DKP
Dr. Ir. Subandono Diposaptono, M.Eng	Directorate of Controlling of Marine Pollution, DKP

North Sulawesi Province Counterparts

Drs. S. A. Kindangen, MS	Vice Chairperson, BAPELITBANG North Sulawesi
Mr. A.G. Kawatu, SE, MSi	Executive Secretary, BAPELITBANG North Sulawesi
Mr. F. Wenur	Head of General Sub Division, BAPELITBANG North Sulawesi
Mr. Ferdinand G. Pua, SH	Head of Regional Development Sub Division, BAPELITBANG North Sulawesi
Ms. B. Puspita Devi, SPI	BAPELITBANG North Sulawesi
Ms. Elvira Katuuk	BAPELITBANG North Sulawesi
Mr. Nico Beradus	BAPELITBANG North Sulawesi

(Advisor of Pilot Project)

Ir. Jouke Sigar	Water Resources Management Office, Minahasa Regency
Mr. Decky Kaligis	Provincial Land Rehabilitation and Soil Conservation Office
Ir. Ellen Cumentas, Sp	Provincial Water Resources Management Office
Ir. Yoedy H.M. Toha, Sp	Provincial Water Resources Management Office
Ir. Febe Moniaga	Provincial Infrastructure and Settlement Office
Mr. Johny Janis	Provincial Land Rehabilitation and Soil Conservation Agency
Ir. Matius Tangyong	Head of Ground Water Section, Water Resources Management Sub Office, Public Infrastructure Office, Manado Municipality
Mr. Tarmizi, BSc	Provincial Health Office

Japanese Government Side

JICA Advisory Committee

Mr. Masahiro Ohta	Chairperson, Senior Advisor of JICA
Ms. Naoko Nakajima (Observer)	Ministry of Environment
Mr. Kei Osada	Ministry of Environment
Mr. Tastuo Seino	Ministry of Environment
Mr. Kenichi Suzuki	Ministry of Foreign Affairs

JICA (Headquarters)

Mr. Takanori Jibiki	Director General, Social Development Study Department
Mr. Senichi Kimura	Director, Social Development Study Department
Mr. Tomonori Kikuchi	Deputy Director, Social Development Study Department
Mr. Hiroaki Endo	Social Development Study Department
Mr. Kazunobu Suzuki	Forestry and Natural Environment Department

JICA (Indonesia Office)

Mr. Michio Kanda	Resident Representative
Mr. Hiroyoshi Ihara	Ex. Resident Representative
Mr. Makoto Inaba	Deputy Resident Representative
Mr. Hiroo TANAKA	Assistant Resident Representative
Mr. Naoaki Omiya	Ex. Assistant Resident Representative
Mr. Untung Stefannus	Program Officer
Mr. Hari Ramadhan	Ex. Program Officer

The Study Team

Dr. Akinori Sato	Team Leader / Environmental Management
Ms. Akiko Okitsu	Community Development
Mr. Hiroshi Matsuo	Regional Development/Eco Tourism
Mr. William R. Allison	Coral Reef
Mr. Yoichi Ide	Pisces/Fishery Resources Management
Mr. Osamu Narasaki	Fishery
Mr. Masahiro Ichikawa	Vegetation
Mr. Atsushi Okuizumi	Aerial Photography
Mr. Kentaro Usuda	Aerial Photography
Mr. Hirokazu Hosoi	GIS
Dr. Mamoru Osada	Socio-Economy/Financial Analysis

Mr. Akira Hirai	Enlightenment
Mr. Keita Yonezawa	Institution/Human Resources Development
Mr. Hiromi Seto	Regional Institution / Law
Ms. Naomi Okada	Participatory Planning
Mr. Kenji Asakawa	Administrative Coordinator
Mr. Shingo Sato	Administrative Coordinator

Supporting Staff

Mr. Syuichi Fujiwara	Aerial Photograph Interpretation
Prof. Janny D. Kusen	Faculty of Fisheries and Marine Science, Sam Ratulangi University
Prof. Daniel Limbong	Faculty of Fisheries and Marine Science, Sam Ratulangi University
Prof. Hard N. Pollo	Faculty of Agriculture, Sam Ratulangi University
Ir. Elsje Pauline Manginsela, MSc	Faculty of Agriculture, Sam Ratulangi University
Mr. Dennie Mamonto, S.Pi	Indonesian Scientific Divers Association (ASPSIA)

Chapter 2

Existing Coastal Conditions of the Study Area

Chapter 2

Existing Coastal Conditions of the Study Area

2.1 Geography and Topography of the Study Area

The Study Area occupies a part of North Sulawesi Province, and consists of Manado municipality, Bitung municipality, Minahasa regency, and a part of Bolaang Mongondow regency. It extends about 200 km long from north-south and about 60 km wide from east-west. The coastline of the area is about 1,056 km long, and the Study Area is 7,800 km². Table 2.1 is estimated by coastal GIS developed by the Study Team.

Table 2.1 Shoreline and Coastal Water Area of the Study Area

Parameters	Areas	Manado	Bitung	Minahasa	Bolaang Mongondow	Total Study Area
Length of Coastline (km)	Main land	29.7	46.3	411.3	226.9	714.2
	Islands	36.4	96.9	184.4	23.8	341.5
	Total	66.1	143.2	595.7	250.7	1,055.7
Coastal Water Area (km ²)	4 miles from shoreline	317.5	439.8	2,419.3	1,044.3	4,220.9
	12 miles from shoreline	820.2	1,314.7	5,842.2	3,263.2	11,240.3

Source: JICA Study Team

Note: Data of Bolaang Mongondow covers only the Study Area

The inland of the Study Area is generally mountainous or hilly because it was formed geomorphologically by the occurrence of volcanic eruption. Plains in limited scale are distributed among the mountains as basins or along the coastline facing the Celebes Sea. Because of the mountainous topography and strip shape of Sulawesi Island, rivers generally are rather short and the current is rapid. The Study Area is a very irregular coastline and a narrow littoral shelf.

2.2 Coastal Environment and Resources

2.2.1 Coastal Environment

(1) Shoreline Forms

The shoreline forms of the Study Area are composed of coral reef, rocky shore, sandy beach, mud and artificial structure, which are shown in Figure 2.1. Meanwhile, the shoreline length by form is shown in Table 2.2. The major shoreline form is sandy beach, accounting for 43% (456km) of the total shoreline. Sandy beach consists of light color (white) beach and dark color (black) beach.

Table 2.2 Composition of Shoreline Form in the Study Area

Category	Length (km)	Proportion (%)
Sandy beach	456	43
Light sandy beach	(283)	(27)
Dark sandy beach	(173)	(16)
Mud	31	3
Rocky shore	216	20
Mangrove	316	30
Artificial structure	37	4
Total	1,056	100

Source : JICA Study Team

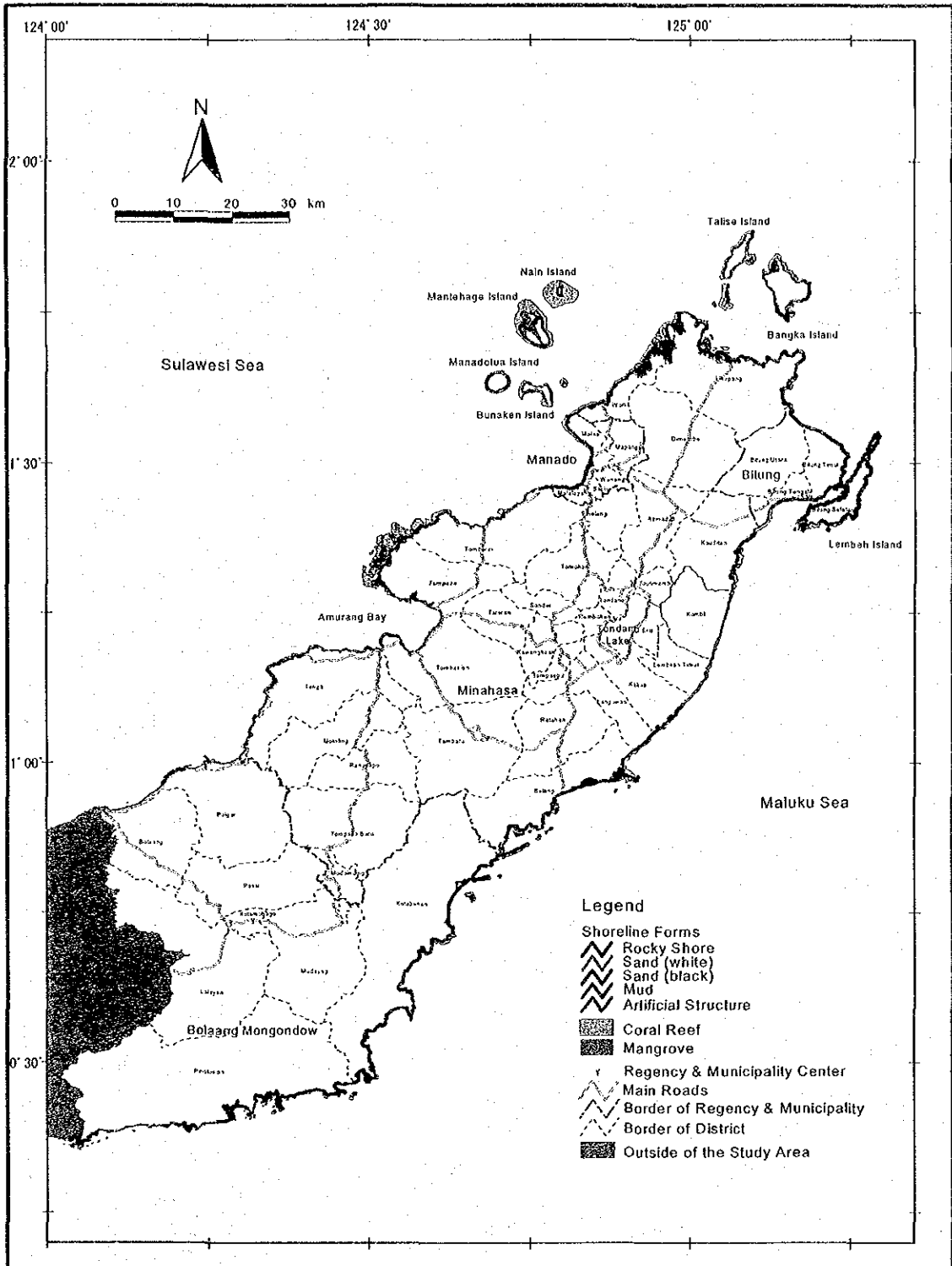
The main structure of shoreline forms has several patterns. The main base shore of the Study Area is composed of coral reef, sandy beach and mangrove forest. These three main base shore lines accompany other shore line types. The major patterns are as shown in Table 2.3. The shore pattern of "Sandy beach – Coral reef" can be seen on the west coast of the Study Area. The shoreline of Lembeh Island and around the coast of North Sulawesi peninsula, and spotted areas of southern west coast are "Rocky shore – Coral reef." In "Mangrove forest – Mud– Coral," coral reefs are developed widely.

The shorelines of Manado and Bitung municipalities are dominated by artificial structures. In Manado, there is considerable landfill activity going on, on top of what used to be coral reef. Much of the artificial structure along the coast of Manado is related to coastal defense whereas Bitung is dominated by port facilities.

Table 2.3 Major Shoreline Patterns of the Study Area

Base Shore Type	Shoreline to offshore
Coral reef	sandy beach – coral reef rocky shore – coral reef rocky shore – sandy beach – coral reef mangrove forest – mud – coral reef
Sandy beach	sandy beach
Mangrove forest	mangrove forest - mud

Source : JICA Study Team



Source: JICA Study Team

Figure 2.1 Distribution of Shoreline Forms

The narrow submarine shelf bears many small islands, especially on the south side of the main island. Island clusters located off Manado and Likupang and the solitary large islands of Lembeh and Bentenan are particularly salient. Clusters of smaller islands are found along the south side at Bentenan, Rataotok area, and there are scattered islands along the coast farther west. The Manado Tua inland with its very narrow shelf is an extinct volcano that last erupted in the Eocene. Lembeh is a large high island separated from the Bitung area of peninsular North Sulawesi by the narrow Lembeh Strait. Much of the coast of Lembeh is cliffed, with the north end mostly cliff, turning to cliffs and bluffs alternating with sandy beaches farther south. Some of the cliffs appear to be raised reef, others are volcanic and at least two in the vicinity of Kungkungan (Cape Baturirir and Pulau Sarena Besar) are raised deposits of foraminiferan chalk. All of the islands sit on the marginal shelf of the main peninsula.

(2) Coral Reef Conditions

In the Study Area, most of the reefs are fringing reefs close to shore. There are comparatively wide coral reefs in the northern west coast, and the coast between Tanawangko Bay and Amurang Bay, and islands in the northern part of the Study Area – Nain, Mantehage, Manado Tua, and Bunaken. On the other hand, coral reefs on the east coast have not developed well. The slope of coral reefs is steep, especially along the north coast. The slope on the south side is generally more gradual. In areas of substantial freshwater drainage, coral reefs are either poorly developed or absent (e.g. Inobunto on the north and Nuanga to Rataotok on the south).

The status of coral reefs in the Study Area was assessed using live coral cover as a proxy for coral community well being. Coral cover estimates were assigned to a four-category system based on live coral ratio usually used in Indonesia and also in other countries. Although this is a gross simplification of a complex situation, these ratios provide a standard for comparison of reefs in the Study Area with those in other parts of Indonesia. A coral reef distribution map based on aerial photo is shown in Figure 2.2, and cover ratio of classified coral conditions is shown in Table 2.4.

Total coral reef area of the Study Area is 222.7 km². A large portion (89% of total coral reef or 198.2 km²) of coral reef is classified as "Poor," including areas covered with seagrass/algae and sand. "Excellent" condition is seen in only 0.2% of total coral reef in the Study Area or 0.4 km². Excellent conditions are spotted on the northern part of Manado Bay, in the southern part of Lembeh Island and the south side of Putusputus islands.

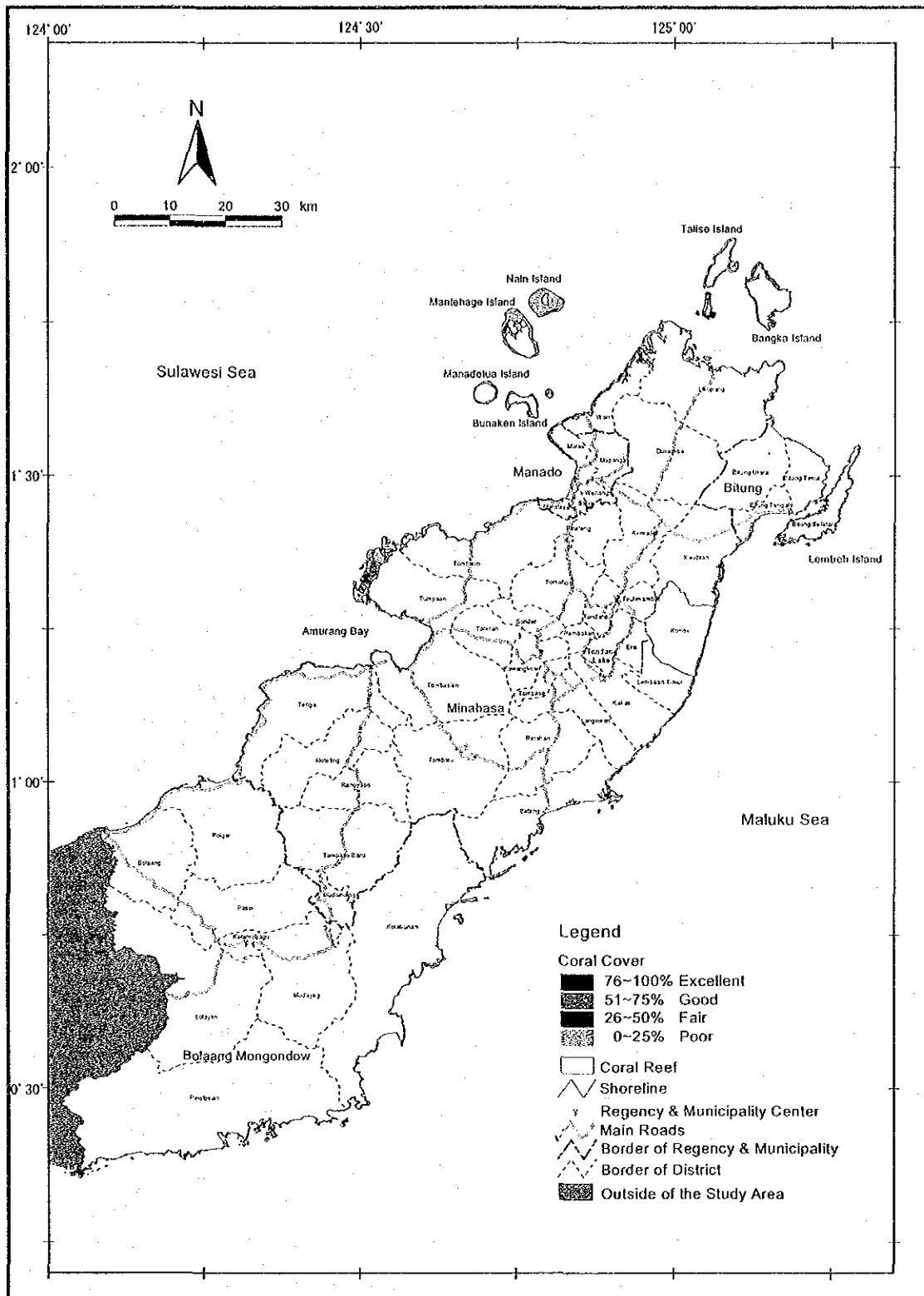


Figure 2.2 Coral Reef Distributions

Most of "Good" condition coral reef is also spotted with 1.7% of total coral reef area, or 4.0 km², in islands in the northern part of the Study Area such as Banga, Talise, Nain, Mantehage and Bunaken.

Table 2.4 Cover Ratio of Live Coral in the Study Area

Classification Live coral ratio (%)	Poor* 0 – 25 %	Fair 26 – 50 %	Good 51 – 75 %	Excellent 76 – 100 %	Coral Reef Area
Cover Area (km ²)	198.2	20.2	3.9	0.4	222.7
Cover ratio (%)	89.0	9.1	1.7	0.2	100

Source : JICA Study Team

*: including seagrass/algae areas and sand bottom.

(3) Seagrass and Algae

Much of the coastal area has well developed seagrass beds on coral reef area. Total area of seagrass, algae and mixed area is 94.5 km², 4.9 km² and 9.3 km² respectively, as shown in Table 2.5. Seagrass and algae area accounts for approximately 50% of total coral reef area in the Study Area, or 108.7 km², as shown in Table 2.5. Seagrass beds can be seen on most of shore in the Study Area. Large size of seagrass beds is distributed in islands in the northern part of the Study Area including Nain Island, Mantehage Island, and the coast between Tanawangko Bay and Amurang Bay, and around the border between Dimembe district and Likupang district, because these areas are located on wide coral reefs.

Table 2.5 Cover ratio of Seagrass and Algae

	Seagrass and Algae				Sand	Coral Reef Area
	Seagrass	Algae	Mixed	Total		
Cover Area (km ²)	94.5	4.9	9.3	108.7	9.4	222.7
Cover ratio (%)	42.4	2.2	4.2	48.8	4.2	-

Source : JICA Study Team

The densest beds of seagrass are *Enhalus acoroides* and *Thalassia hemprichii*. *Enhalus acoroides* can have very long leaf blades and is abundant close to shore and mangroves. *Enhalus acoroides* is distributed close to shore and mangrove forest, indicative of quiet, warm, turbid water with high organic load (Whitten et. al., 1987). *Thalassia hemprichii*, the most abundant seagrass in the Study Area, replaced *Enhalus acoroides* at 10 to 20 m from shore.

(4) Mangrove Forest

Mangrove forest is one of the important components of coastal ecosystem. Because mangrove forest acts as the basis of its ecosystem, as spawning ground for various marine biota and protection of shorelines from erosion.

Mangrove can be found along most of the shore of the Study Area, although their area is generally small and in strips. A large area of mangrove exists in a few places, such as the northern part of the Study Area including Likupang, Arakan, and Mantehage Island. The distributions of mangroves are shown in Figure 2.3.

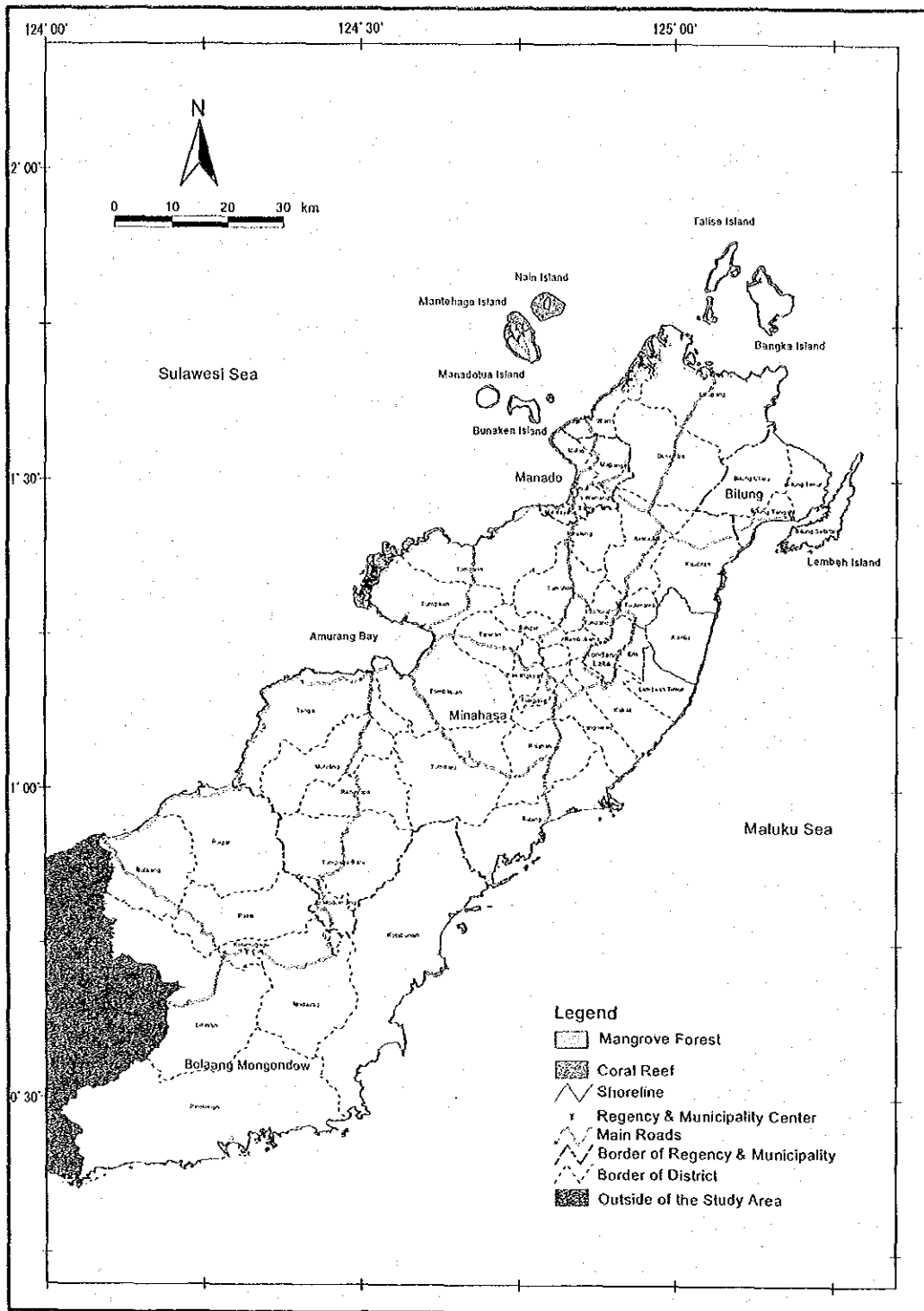
Totally, in Indonesia, there are 91 species of mangrove plants, and 37 of them are tree species (Kartawinata *et al*, 1979. *Status Pengetahuan Hutan Bakau di Indonesia. Prosiding Seminar Ekosistem Hutan Mangrove*, 1978: 21-39.). In Sulawesi Island, 35 tree species can be found in the mangrove forests. Main genera of mangrove tree species, which live in the Study Area, are *Avicennia* sp, *Rhizophora* sp, *Sonneratia* sp and *Bruguiera* sp (Whitten, *et al*, 1987. *The Ecology of Sulawesi*). Depending on the tide, salinity and mud thickness, the mangrove consists ideally of three main zones as follows:

- The outer zone : dominated by *Avicennia* and *Sonneratia*, and the mangroves are around 1 meter tall
- The middle zone : dominated by *Rhizophora*, and around 3-4 meters tall
- The inner zone : dominated by *Bruguiera*, and around 5-10 meters tall

(5) Reef Fishes

There are over 7,000 species of tropical fishes that live on or near coral reefs. In Bunaken National Park, there are at least 2,000 species of reef fishes (Bunaken National Park Natural History Book, NRM/EPIQ, 1999).

The Study Team conducted a visual census of reef fishes in the Study Area in 2000. *Chaetodontidae* can be used for indicator species because *Chaetodontidae* is grouped as coral polyp eater, so that there is a relationship between distribution of *Chaetodontidae* and coral reef distribution. In other words, composition and number of *Chaetodontidae* indicate healthy conditions of coral reefs. Reef fishes belonging to the *Chaetodontidae* family were identified in the survey areas in Table 2.6.



Source: JICA Study Team

Figure 2.3 Mangroves Distribution

Table 2.6 Location of *Chaetodontidae* Family Identified in the Study Area

Family of fishes	Manado Tua	Bunaken	Lembeh	Tanjung Tawan	Likupang	Wori	Manado	Rap rapRap rap	Siladen	Mantehage	Nain	Bangka	Total
<i>Chaetodon</i>	12	14	9	3	7	11	3	11	11	8	8	9	106
<i>Chelmon</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Coradion</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Forcipiger</i>	1	0	1	0	0	0	0	2	1	1	0	0	6
<i>Hemitaurichthys</i>	1	1	1	0	0	1	0	1	1	1	1	1	10
<i>Heniochus</i>	1	2	2	2	1	3	2	3	1	3	2	2	24
Total	15	17	13	5	8	15	5	17	14	13	11	12	146

Source: JICA Study Team

A comparatively higher number of species of coral fishes are identified in coral reef areas in Bunaken, Rap rap, Manado Tua, Wori, and Siladen, especially Bunaken National Park and other protected areas than in other areas. On the other hand, a smaller number of coral reef fish species are identified in Tanjung Tiwang and Manado. There are narrow and poor reefs in these areas.

(6) Marine Endangered Species

In the Study Area, several endangered species have been found such as sea turtles, *Dugong dugon* and coelacanth as follows:

a) Sea turtles

Sandy beaches are used as spawning sites of sea turtles. Although the following four sea turtles can be found in North Sulawesi, it seems that there are not many spawning beaches for sea turtle in the Study Area because the sandy beach is not wide:

- green turtle (*Chelonia mydas*);
- hawksbill turtle (*Eretochelys imbricata*);
- loggerhead turtle (*Caretta caretta*); and
- leatherback turtle (*Dermochelys coriacea*).

b) Dugong dugon

Dugong dugon were formerly found throughout Indonesia and neighboring seas. They are severely reduced in west and central Indonesia and locally extinct in some areas. The only significant population remaining in North Sulawesi resides in the southern main peninsular portion of Bunaken National Marine Park where they are

under considerable pressure from humans. There is no data available on the status of their population at present.

c) Coelacanth

Coelacanth is an ancient group of large and lobe-finned fish. It was believed that Coelacanths were extinct since 70 million years ago. A Coelacanth was caught in South Africa in 1938. This was followed by another catch in Manado in 1997, the first time that a Coelacanth was found outside South Africa. Then another Coelacanth was caught in Manado in 1998. Coelacanth was listed as protected fish by the Convention of International Trade in Endangered Species (CITES).

2.2.2 Coastal Resources

There are different types of natural resources existing in coral reefs and their surrounding environment, namely, fishery resource, mineral resource, and forest resource. As spatial resource, the coral reef environment can be utilized as tourism resources. However tourism activities occupy or use spatial area so that it is not classified as resource use.

(1) Fishery Resources

Available data on fishery production is limited. Only Fishery Landing Office (*Pangkalan Pendaratan Ikan: PPI*) and Fishing Auction Market (*Tempat Pelelangan Ikan: TPI*) data are available. It seems that total fishery production is more than three to five times the recorded data of PPI and TPI. According to PPI, the production of fishery catch is dominated by Bitung (more than 50,000 tons every year), followed by Minahasa (16,000 tons/year) and Manado and Bolaang Mongondow (6,000 to 8,000 tons/year). Mainly those fishes can be grouped as offshore fishes, named Skipjack tuna (*Cakalang*), Tunas (*Tuna*), Scads (*Layang*), Eastern litteli tunas (*Tongkol*), Travallies (*Selar*), with a collective share of 90% of total fishery production in the Study Area.

Following the landing of marine catch by fishermen, there are several routes of fish trading they can choose from, a process that is depicted in Figure 2.4. From fishermen to consumers, some related persons such as wholesale buyers or retailers are involved.

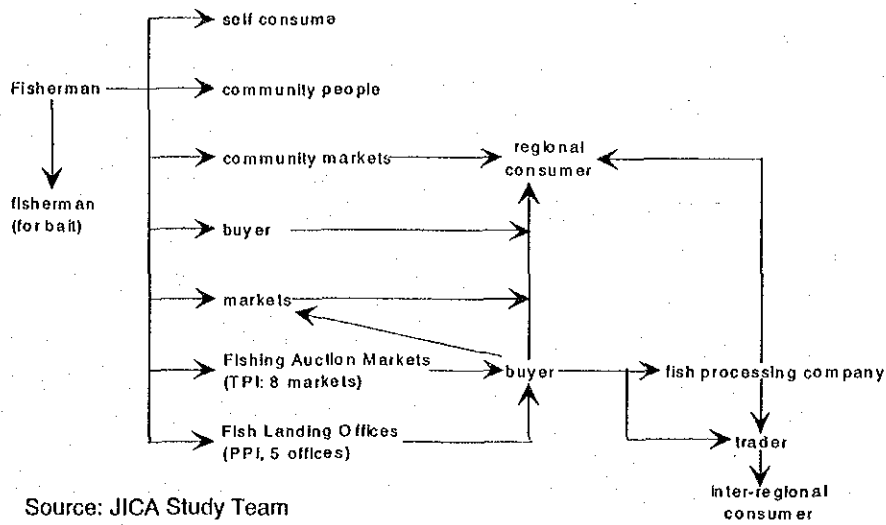


Figure 2.4 Overall Flow of Marine Fish Catch in North Sulawesi

Focusing on the fishes in the coastal water, coastal sea zone is classified by fishing ground as shown in Table 2.7.

Table 2.7 Major Species by Type

Reef fish-1	Reef fish-2	Non-reef fish
- Red snappers	- Travallies/yellow travallies	- Flying fish
- Groupers	- Jack Travallies	- Fringescale sardinella
- Yellow tail	- Sharks	- Indian mackerels
- Cuttle fishes	- Anchovies	- Scads
- Goat fishes	- Needle fishes	- Narrow barred king mackerel
	- Common squids	

Source : JICA Study Team

Note:

Reef fish-1: The major grounds are on the reef flat.

Reef fish-2: The major grounds are close to reef edge.

Non-reef fish: The major grounds are close to reef but outside coral reefs.

Generally, the fishery production is higher in the outer area than in the inner area, i.e., the non-reef fish is higher than that of reef fish-2 and reef fish-1 is lowest in terms of production and value. Figures 2.5 and 2.6 show the production and value of coastal fishes. The shares of production and value by these types of fish in the Study Area in 1998 were as follows:

Table 2.8 Fish Production and Value by Fishing Ground in Coastal Water, 1998

Type of fish	Production	Value
Reef fish-1	6%	18%
Reef fish-2	18%	23%
Non-reef fish:	76%	59%

Source : Fishery Statistics 1999, Fishery Office North Sulawesi Province

Note : Figures compiled by JICA Study Team

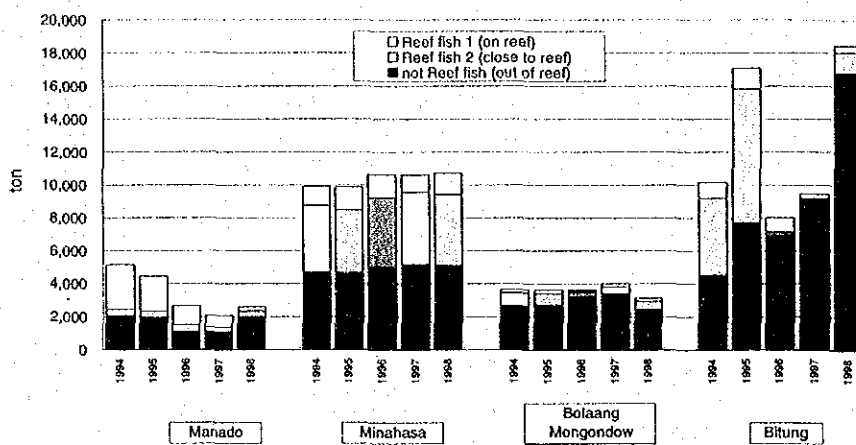


Figure 2.5 Production of Coastal Fishes

Source : Fishery Statistics, Fishery Office North Sulawesi Province

Note : Figures compiled by JICA Study Team

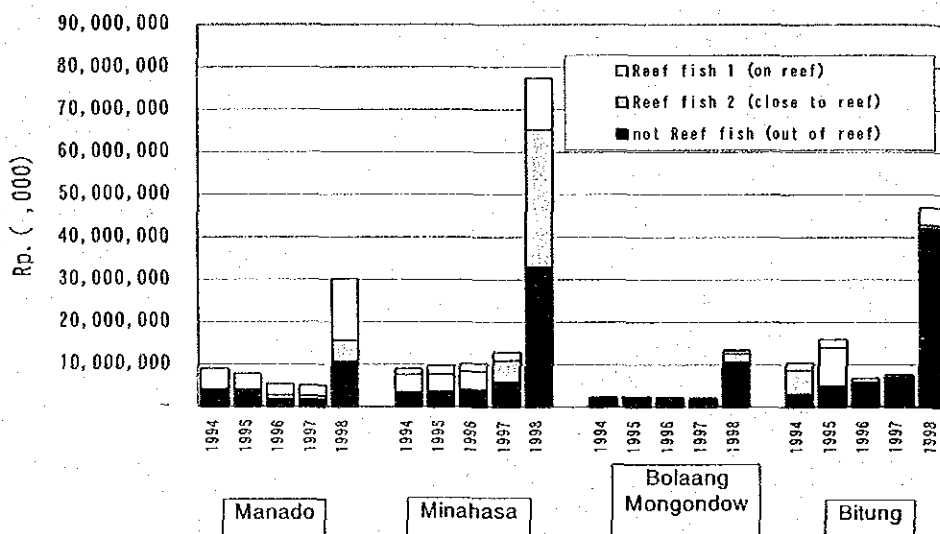


Figure 2.6 Value of Coastal Fishes

Source : Fishery Statistics, Fishery Office North Sulawesi Province

Note : Figures compiled by JICA Study Team

The share of the reef fish-1 and reef fish-2 in total fishing in the coastal water has decreased, i.e. 50 % in 1994 to 24% in 1998 in production, and 61% in 1994 to 42% in 1998, in terms of value.

The production of the reef fish-2 also decreased in production, but the value of the reef fish-2 increased in value in Manado municipality, and a similar trend can be seen in Minahasa regency.

(2) Mangrove Forest Resources

Mangroves can be found in many places along the shoreline especially at the headlands and islands in the Sulawesi Sea side. Detailed description and specification are shown in section 2.2.1 (4) of this report.

Presidential Decree No. 32/1990, regarding Protected Area Management prescribes the designation of conservation areas for mangrove forest. According to the above Decree, mangrove cutting and other activities affecting mangrove areas can be used, provided there is no impact on environment, biodiversity and natural disaster prevention. There are several ways of using mangrove trees in the Study Area, mainly Mantchage Island, Likupang and Arakan.

The uses of mangroves are as follows:

- firewood (for daily cooking and city market);
- post for building construction and fence; and
- bark used for dyeing and sap for strengthening trawl nets.

Mangroves have been traditionally used as firewood for daily cooking by the neighboring coastal communities. Other than the daily cooking of the communities, people sell mangrove firewood to the city market. In the urban areas, such as Manado and Bitung, there are several shops selling them.

The tall and thick mangroves are cut to use as post for scaffold of building construction in the urban areas. Especially if the sites are in wet condition, mangrove woods are utilized rather than bamboo. According to an interview made with the shop owners, they sell roughly 36,000 posts per year. These numbers correspond to around 36 ha/year of the affected areas of mangrove forest.

Bark of mangroves is harvested where a large mangrove area exists. The bark is used to dye and strengthen trawl nets. Trawl nets are broadly used by fishermen in the whole region, especially Bitung where lots of fishing nets are used by fishermen. According to several interviews made with users of bark, it is estimated that 30,000 trees/year are

affected by this trade, and the affected mangrove area is calculated at approximately 160 ha/year.

The activities in mangrove forests mentioned above excluding the fishpond making are practiced by local people. According to information from the Forestry Department (*Dinas*), no local people had obtained permission to engage in the above-mentioned activities. Based on the data gathered from the traders and local people, it is estimated that the area of mangroves affected by the local people's activities, such as collecting of fire wood, cutting of trees as post, and the bark harvesting, is at least 200 ha/year.

(3) Mineral resources

There are two types of mineral resources from coral reefs as follows:

- coral rock; and
- coral sand.

Coral rocks are often used as construction materials and building materials including:

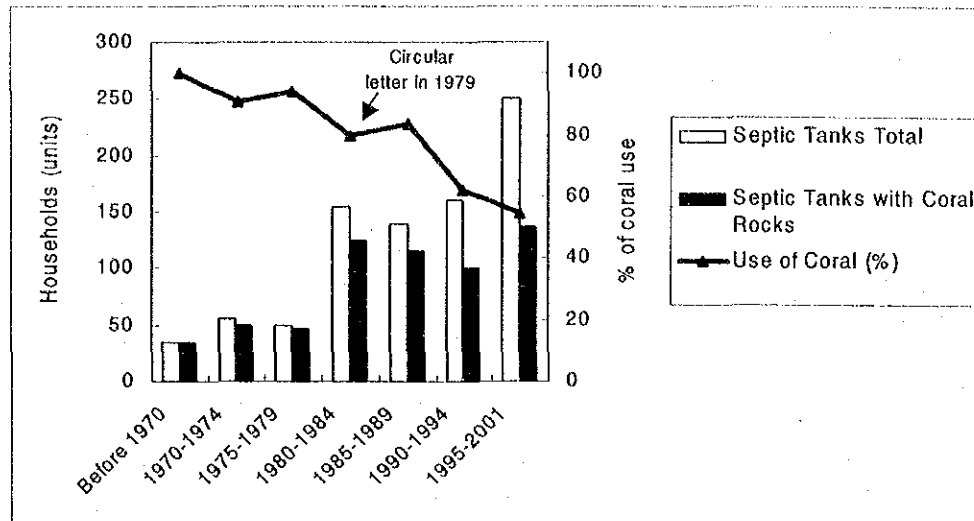
- road construction;
- jetty, breakwater structure and other coastal structures;
- public facilities;
- coastal community houses (for decoration and for fencing); and
- Septic tanks for toilets.

Coral sand is used as raw material for civil works and building constructions. From information gathered, it was known that coral sand as well as coral rocks were used as foundation material for the construction of Trans Sulawesi Highway. Another use of coral sand is cement making.

Coral mining is more visible than other problems, so that it gives an impression of a serious problem. Observation was made of piles of corals in every village visited. Coral rocks are commercially valuable for construction of septic tanks of toilets; especially coral rocks are sold in cities where there is more demand for toilets. According to the survey by the Study Team, the price of corals is Rp. 30,000 per 1 cubic meter.

The Study Team also conducted another questionnaire survey on coral rocks used for the septic tank of household toilets in Manado City to estimate the total amount of corals mined. This survey was designed to cover toilets that are built in different periods of time, built by different levels of family income, and located in various levels of population density. Figure 2.7 show the historical trend of the use of septic tanks and those with corals in Manado municipality. It is noted that:

Until 1979, corals were frequently used (more than 90% of septic tanks). There was sharp increase after 1980 in both number of septic tanks and those with corals and reached a peak during 1985 – 1989. After 1990, the frequency of use of corals decreased (62.5% in 1995 - 1999). The rates of coral use for septic tanks became lower than before, however, more than 50% of the people still continue to use coral for their toilets.



Source: Questionnaire survey by the JICA Study Team

Figure 2.7 Number of Septic Tanks with Corals in Individual Toilets

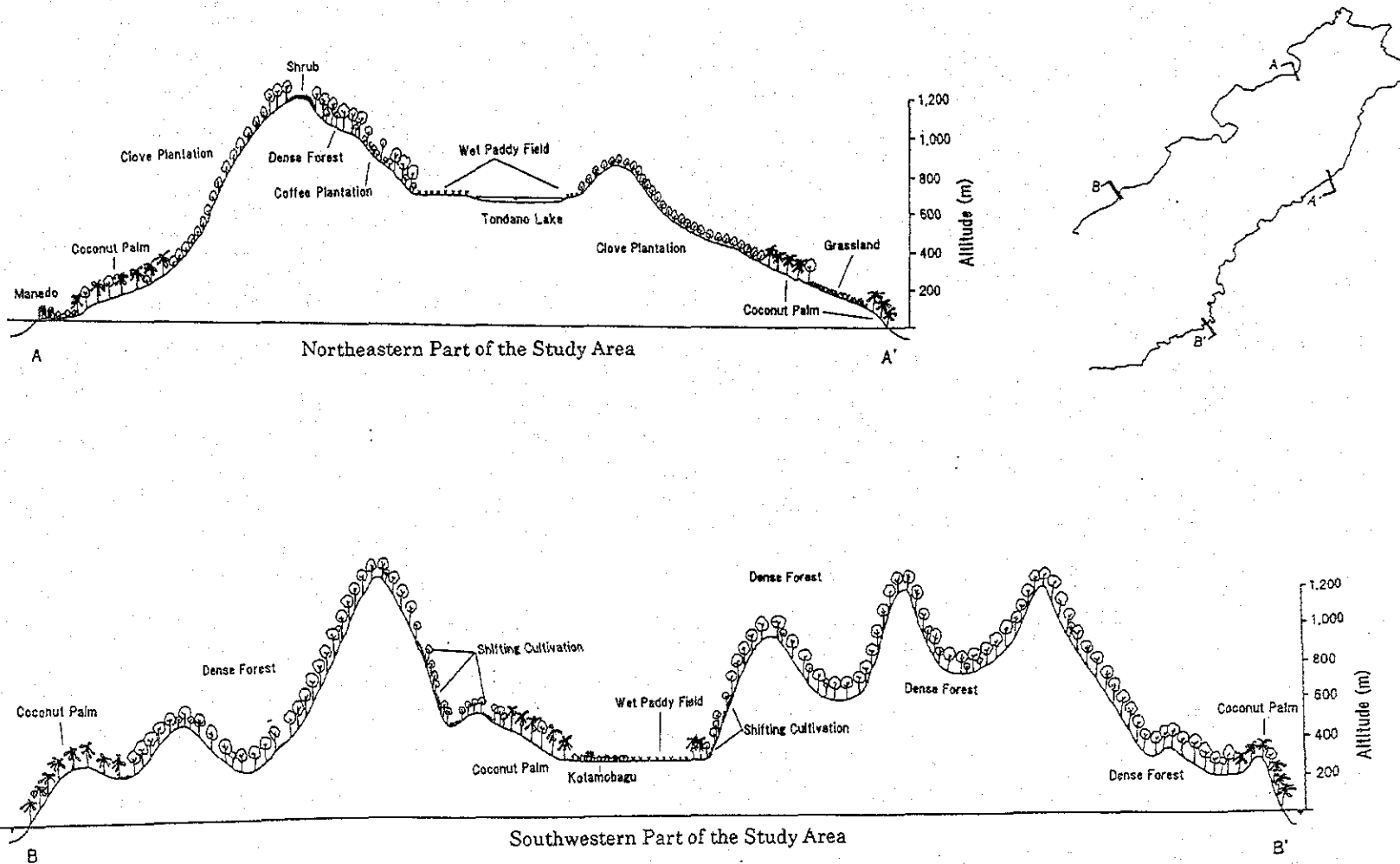
Out of the 722 households interviewed, valid responses were processed from 699 households. According to the above interview survey, 496 households have toilets with coral rocks, which represent 71% of valid responses (699 households). One household has 1.2 unit of toilets on average, as one unit of toilet requires 1.5 m³ of coral rocks. Therefore, it is estimated that 139,500 m³ of coral rocks was mined, or 46 hectares of coral reef (30 cm in deep), for construction of septic tanks in Manado municipality which had a total of 109,498 households in 1999.

2.3 Terrestrial Environment

It is important for the management of coastal environment and coastal resources to understand terrestrial environmental conditions, because land-based human activities affect the coastal water. Especially, the impact of sedimentation of eroded soil on the coral reef would be very critical. In this section, the terrestrial environmental condition related to coastal management is explained.

(1) Landscape

The Study Area can be divided into two parts from the viewpoint of landscape characteristics, namely, the plantation dominant area and the forest dominant area. The border between these two parts is Tenga - Belang line. In the northeastern part from the border, the plantation of coconut and clove is main component of landscape, while in the southwestern part, forest is dominantly distributed (See Figure 2.8.).



Source: JICA Study Team

Figure 2.8 Distribution of Landscape in the Study Area

0 5km

(2) Land Use

The vegetation and land uses found in the Study Area are classified into 17 types as shown in Table 2.9. As a result of the study on vegetation and land use, in the Study Area, dominant vegetation and land use found are "dense forest" and land use with coconut palm, which fall under No. 4 and No. 5. The dense forests are distributed in the southwestern part of the Study Area, while a large area of coconut palm (No. 4 and No. 5) is found in the northeastern part.

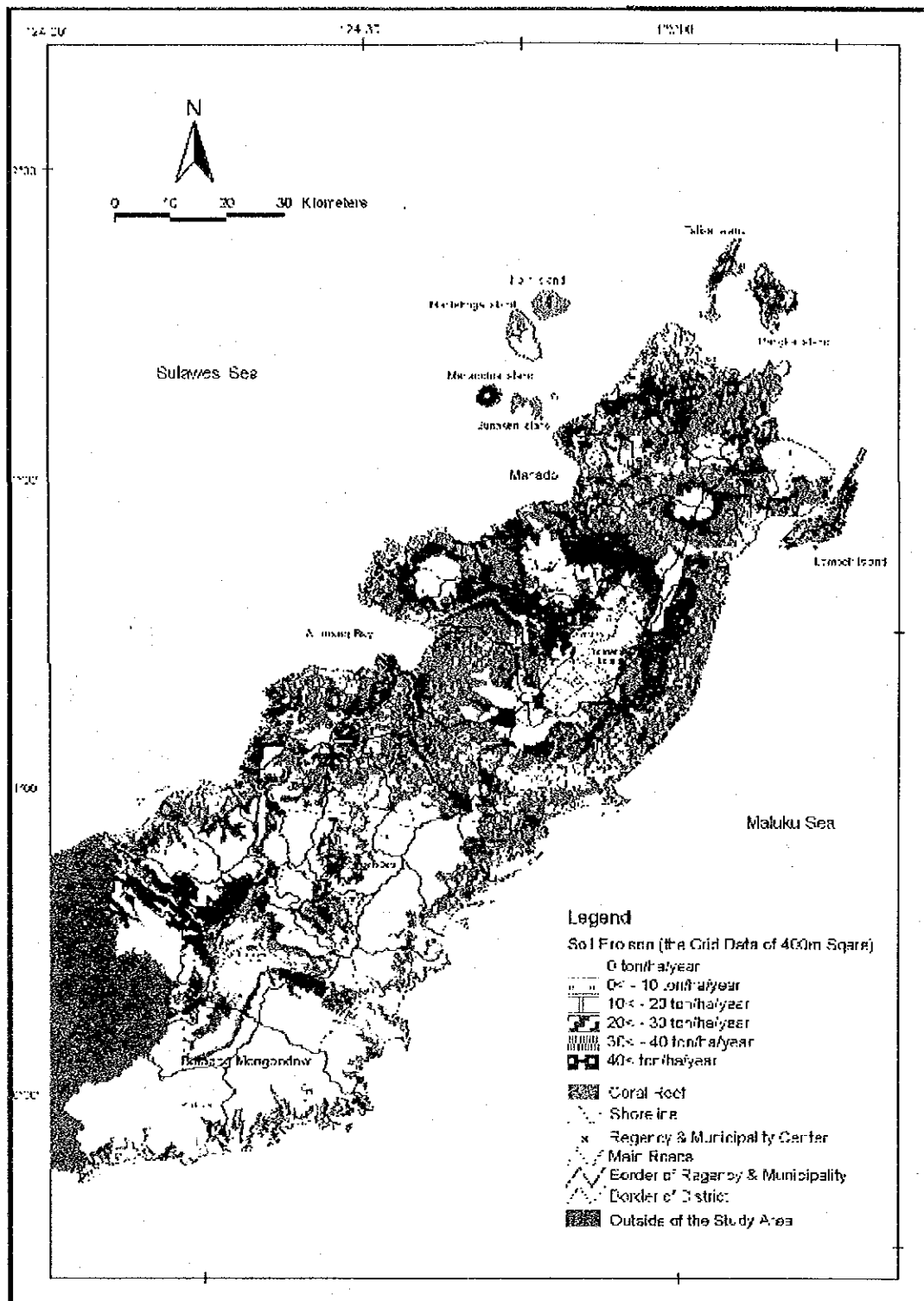
Table 2.9 Classification of Land Use and Vegetation in the Study Area

No.	Legend	Area (km ²)	Ratio(%)
1	Dense Forest	2,399	30.6
2	Open Forest or Shrub Land	44	0.6
3	Mangrove	77	1.0
4	Coconut Palm, or Mixed Coconut Palm and Tree Crops	2,073	26.4
5	Mixed Coconut Palm Plantation and Extensive Agricultural Farm	1,234	15.7
6	Clove Plantation	590	7.5
7	Tree Crops Excluding Coconut Palm and Clove	33	0.4
8	Intensive Dry Agricultural Farm	140	1.8
9	Extensive Agricultural Farm (Forest or Bush Fallow)	335	4.3
10	Extensive Agricultural Farm (Grass Fallow)	212	2.7
11	Open Wet Paddy Field	318	4.1
12	Mixed Wet Paddy Field and Coconut Palm Tree	88	1.1
13	Fish or Shrimp Pond	3	0.0
14	Swamp	3	0.0
15	Bare Land	13	0.2
16	Water Body	58	0.7
17	Settlement and Others	229	2.9

Source : JICA Study Team

(3) Possibility of Soil Erosion

The sedimentation of eroded soils critically affects the coral reef and its ecosystem. Figure 2.9 shows the estimated amount of soil erosion in each watershed. Considering the coral reef management from the viewpoint of terrestrial environment, soil erosion is an important factor. In the Study Area, evidences of soil erosion from the non-point source, such as heavy landslides and the riverbank erosion in big scale, could not be found. However, the Study Area is characteristically mountainous, and the distance from some inland areas up to shores is generally short. If soil erosion occurs, topographically the eroded soil runs down rapidly and flows into seas directly. Over the whole Study Area, the land vegetation cover is generally moderate or high, although some areas with low cover are found. In those areas, high potential of soil erosion is clarified.



Source: JICA Study Team

Figure 2.9 Estimated Amount of Soil Erosion in Each Watershed

There are especially two critical areas. One is the area where the extensive agricultural farm (forest and bush fallow) is practiced along the middle and lower part of Lomagin River. The other is the extensive agricultural farm (grass fallow) distributed between Kema and Bentenan and between Tanawanko and Inovonto. These areas are critical because of not only the high potential of soil erosion, but also their location, which is very close to coasts. The eroded soil may run off on the slope and directly flow into the sea in a short time. In such areas, some considerations on the land use management are necessary.

2.4 Socio-Economic Conditions

2.4.1 Population

(1) Population and Population Density

The population of the Study Area in 1999 is shown in Table 2.10. The latest population in the Study Area is 1.52 million (1999 estimate), which is 56% of the whole population of the province. Manado municipality is the most densely populated area in the Study Area with the rate of 2,202 persons/km².

Table 2.10 Land Area and Population of the Study Area in 1999

Regency/Municipality	Area (km ²)	Share (%)	Population	Share (%)	Pop. Density (persons/km ²)
Minahasa	4,270.8	67.0	770,442	50.6	180
Manado	176.2	2.8	388,008	25.5	2,202
Bitung	302.9	4.8	120,051	7.9	396
Bolaang Mongondow *	1,625.7	25.5	245,290	16.1	151
(Bolaang Mongondow Total)	(4,622.9)		(428,332)		(93)
Study Area	6,375.7	100.0	1,523,791	100.0	239
North Sulawesi *1)	19,023.9	1.0	2,736,600	1.4	146
Indonesia *1)	1,904,443.0	100.0	204,783,900	100.0	107

Sources: Draft Potensi Desa Sensus Penduduk 2000 di Kabupaten Minahasa, Kota Manado, Kabupaten Bolaang Mongondow, Kota Bitung.

*1) Statistik Lingkungan Hidup Indonesia, 1999

Notes: *Data refers to the 8 districts in Bolaang Mongondow regency. The sub-total area in the table (6,375.7 km²) is based on the administrative boundary.

(2) Population Growth

The average population growth rate in the Study Area from 1980 to 1999 of 1.56% is slightly lower than the national average of 1.73% in the same period. However, those of Manado (2.35%) and Bitung (2.08%) are much higher than the national average. This increase is mainly due to inter-migration from Minahasa regency and other regencies

nearby. The population growth rates of all sub-areas between 1990-1999 are lower than that between 1980-1990 except Minahasa regency's as shown in Table 2.11.

Table 2.11 Population Growth by Sub-Area in the Study Area 1980 – 1999

Regency/Municipality	Population			Increase ratio *1)		
	1980	1990	1999	1980 – 1990	1990 – 1999	1980 - 1999
Minahasa	634,281	679,299	770,442	0.69	1.03	1.01
Manado	249,659	320,630	388,008	2.53	2.14	2.35
Bitung	81,252	105,638	120,051	2.66	1.43	2.08
Bolaang Mongondow *1)	171,368	214,733	245,290	2.28	1.49	1.91
Study Area Total	1,136,560	1,338,300	1,523,791	1.65	1.45	1.56
Other areas *2)	978,262	1,108,889	1,212,809	1.26	1.00	1.14
North Sulawesi Province Indonesia ('000)	2,114,822	2,447,189	2,736,600	1.47	1.25	1.37
Share of the province in Indonesia (%)	1.43	1.36	1.34	-	-	-

Sources: North Sulawesi in Figures, 1996 and 1998, and Sensus Penduduk Tahun 1990

Note: *1) Only eight (8) districts in the Study Area, and *2) Areas outside the Study Area in North Sulawesi province

(3) Population by Sub-zone

Villages in the Study Area can be divided into 3 types by their geographical locations.

- Urban villages: locate in Manado and Bitung municipalities
- Inland villages: locate in the inland zone
- Coastal villages: with sea as a direct boundary.

The population shares by village in sub-areas in 1999 were as follows: Urban Village, 33.3%, Inland villages, 50.8%, and Coastal villages, 15.9%. However, the increase ratios pointed to a slow down in the Urban area and Coastal village between 1990-1999 than 1980-1990. Decreasing immigration from outside of the province might account for this slower increase of ratio between 1990-1999.

2.4.2 GRDP

The economic growth of North Sulawesi is supported mainly by the agricultural sector, service and construction industries. The table below shows the GRDP of North Sulawesi Province from 1995-1999 at both current prices. According to Table 2.12, agriculture contributed about 24% to the GRDP in 1999, followed by service, 19%, and construction sector, 15%. The real increase rate of GRDP between 1995 to 1999 was 30% in total, and very rapid increase in mining sector was seen due to the gold mining boom.

Table 2.12 GRDP of North Sulawesi Province from 1996 – 1999 at Current Prices

	1995	1996	1997	1998	1999	Share (%)
Agriculture	1,035.4	1,245.2	1,466.4	2,324.2	2,600.7	24.1
Mining	130.1	211.4	250.0	391.2	632.3	5.9
Industry	331.7	415.7	480.4	845.8	932.3	8.6
Electricity	25.4	31.5	37.8	74.5	85.4	0.8
Construction	422.9	528.7	615.5	1,476.8	1,578.3	14.6
Trade	459.5	616.3	739.4	1,207.7	1,354.7	12.6
Transport	504.6	594.2	693.6	1,114.3	1,224.0	11.4
Financial	199.4	239.6	272.2	215.9	310.3	2.9
Service	683.5	908.2	1,059.0	1,653.7	2,063.2	19.1
Total	3,792.5	4,790.7	5,614.1	9,304.2	10,781.2	100.0

Source: PDRB Sulawesi Utara 1999

Unit: Billion Rupiah

2.4.3 Fishing and Coastal Community

(1) Productivity of North Sulawesi and the Study Area

Latest data on marine/coastal and inland fishery productions is given in Table 2.13. According to the table, the total production of fishery sector of the province was 196,878 tons in 1999. While the share of the Study Area was almost 80% of the total production of the province that same year. More than 90% of fishery production of the province was the catch of marine/coastal fishery. It should be noted that the catch of marine/coastal fishery in Bitung was 115,632.2 tons, which was 63.6% of the total for the province.

Table 2.13 Production of Fishery Sub-sector and Regency/Municipality in 1999

Regency/ Municipality	Total	Marine fishery		Catch (open waters*3)	Inland fishery			
		Catch	Cultured		Brackish pond	Freshwater		
						Pond	Rice field	Net Pond
Minahasa	27,122.0 (13.8%)	16,142.2 (8.9%)	4,416.3	2,010.2	83.8	1,862.6	1,595.4	1,011.5
Manado	7,151.5 (3.6%)	6,671.1 (3.7%)	0	0	0	16.5	0	463.9
Bitung	116,136.6 (59.0%)	115,632.2 (63.6%)	478.2	0	0	23.1	3.1	0
Bolaang Mongondow	8,832.7 (4.5%)	7,544.3 (4.1%)	0	108.5	26.6	767.9	316.1	69.3
Sub-total *1)	159,242.8 (80.9%)	145,989.8 (80.3%)	4,894.5	2,118.7	110.4	2,670.1	1,914.6	1,544.7
Other areas *2)	37,635.2 (19.1%)	35,900.7 (19.7%)	756.6	752.2	60.5	44.8	16.0	104.4
North Sulawesi Total	196,878.0 (100%)	181,890.5 (100%)	5,651.1	2,870.9	170.9	2,714.9	1,930.6	1,649.1

Unit: tons

Source: Dinas Perikanan (Fishery office), North Sulawesi Province

Notes: *1) Value of Bolaang Mongondow is total of whole Bolaang Mongondow. (= not equivalent to the production from JICA Study area in Bolaang Mongondow)

*2) Total of Sangihe Talaud, Gorontalo regency and Gorontalo municipality

*3) Open waters include lakes, dams and rivers.

In the Study Area, economic activities in coastal communities are mainly fishing, farming, trading, and construction of fishing boats. People who live near coastline mainly depend on fishing activities; however, for fishers who have land, their wives farm for their daily subsistence and when the weather is not suitable for fishing, those fishers work on their farm as well. In the case of fishers without land, when the weather is not suited for fishing, they look for work in other towns such as Manado, Bitung, Likpang, and Belang.

(2) Earnings

In coastal resource management, fishing and other coastal economic activities are important elements to consider. Therefore, the Study Team looked to fishing and other coastal economic activities in the coastal communities in the Study Area. The results of analysis follow:

Sample data of income level taken from the survey of 24 coastal communities by the Study is shown in Table 2.14. According to the data, there are basically 3 patterns of income level among coastal communities. The first pattern is that those communities engaged in small-scale fishing around the coastal area have bigger concentrations in the lowest category of income level. The second pattern is that those communities engaged in offshore fishing or a combination of fishing and culturing or even fish juvenile anchovies have larger populations in the lowest and highest categories of income level, while the concentration in the middle income is low. The third pattern is seen only in Nain Island where economic activity concentrates on seaweed culture. The concentration becomes higher as the income level goes up.

The survey indicates that by adding other economic activities, such as seaweed culturing and other types of fishing such as anchovies fishing by *Bagan*, and/or offshore fishing, coastal communities would be able to realize economic development. In the case of Nain Island, the community focuses only on seaweed culturing and so far it has been very successful. However, this kind of monopolized economic activity can be easily influenced by any outside conditions such as world economic markets or domestic markets. It might be useful for Nain Island to look at varying their economic activities for the safety and sustainability of their economic development.

Table 2.14 Income Level by Community

Village name	0~200,000		200,001~300,000		300,001~400,000		400,001~500,000		>500,000		Total	Main Activities
	No.	%	No.	%	No.	%	No.	%	No.	%		
Ambang II	14	66.7	7	33.3	0	0.0	0	0.0	0	0.0	21	F
Basaan I	18	66.7	8	29.6	0	0.0	1	3.7	0	0.0	27	F, (B)
Bantenan	5	23.8	10	47.6	0	0.0	1	4.8	5	23.8	21	F, SW
Blongko	12	80.0	2	13.3	1	6.7	0	0.0	0	0.0	15	F
Borgo	7	33.3	4	19.0	2	9.5	4	19.0	4	19.0	21	OSF
Buyat	3	21.4	9	64.3	0	0.0	2	14.3	0	0.0	14	F
Kapitu	12	57.1	6	28.6	0	0.0	3	14.3	0	0.0	21	F
Kemja III	7	33.3	6	28.6	1	4.9	3	14.3	4	19.0	21	OSF
Kulu	8	38.1	7	33.3	1	4.8	0	0.0	5	23.8	21	F, SW
Libas	5	23.8	9	42.9	2	9.5	3	14.3	2	9.5	21	F
Manado Tua II	10	62.5	4	25.0	2	12.5	0	0.0	0	0.0	16	F
Molompar	12	75.0	3	18.8	0	0.0	1	6.3	0	0.0	16	OSF
Motto	15	68.2	7	31.8	0	0.0	0	0.0	0	0.0	22	F
Nain	3	10.3	8	27.6	4	13.8	7	24.1	7	24.1	29	F, SW
Papusungan	5	23.8	8	38.1	5	23.8	2	9.5	1	4.8	21	F
Popareng	9	56.3	1	6.3	1	6.3	3	18.8	2	12.5	16	F
Ranoyapo	17	81.0	0	0.0	0	0.0	2	9.5	2	9.5	21	F
Rap rap	19	65.5	8	27.6	1	3.4	1	3.4	0	0.0	29	F, SW
Ratatotok/Imr	13	50.0	6	23.1	1	3.8	4	15.4	2	7.7	26	F, B, SW
Serey	11	73.3	4	16.7	0	0.0	0	0.0	0	0.0	15	F
Talise/Tambun	7	35.0	9	45.0	2	10.0	0	0.0	2	10.0	20	F*
Tateli waru	8	53.3	2	13.3	2	13.3	3	20.0	0	0.0	15	F
Tiberias	14	70.0	5	25.0	1	5.0	0	0.0	0	0.0	20	F
Tumbak	10	47.6	8	38.1	0	0.0	1	4.8	2	9.5	21	F, SW

Source: Coastal Community Survey in August 2000, JICA InteCoReef Study

Legend: F: Small-scale fishing in coastal area, OSF: Offshore fishing, B: Bagan, SW: Seaweed culturing

Note: Tambun is the Proyek Pesisir project site and has been provided some boats to activate fishing activities in the village; it might have some effects on income level. Seasonal work obtained outside of village might have some effects on income level as well.

 Pattern 1
  Pattern 2
  Pattern 3

2.4.4 Poverty

According to the Central Bureau of Statistics (BPS), the poverty rate in the country, which declined to 11% in 1997, increased dramatically to 39.5% in 1998. Notwithstanding the accuracy of this figure, public opinion estimates the poverty level to be critical. The number of people living in poverty increased to an unbelievable number of about 79.5 million nationwide.

According to data on "Family below Poverty Line" by the Ministry of Family Planning, the rate is declining in the Study area; however, the rate is increasing only in Manado municipality. The poor villages are concentrated in the northern part of North Sulawesi, Manado area, the southeast side of Minahasa, and the east side of Bolaang Mongondow. In general, there must be some truth to an earlier statement that villages located at coastal areas and dependent only on fishing such as the northern part of Minahasa regency seem

underdeveloped economically. Manado municipality looks like it has more population living in poverty related to urbanization recently.

Individuals and households in rural communities obtain income from several occupational resources and engage in a variety of productive activities. Many fishers are also part-time farmers and vice versa, so clear-cut distinctions between fishers and farmers, as occupational categories, can be meaningless. However, according to the coastal community survey done by the Study Team in August 2000, it could be true that those fishers who depend only on fishing in the coastal area using simple fishing techniques such as hook and line are the poorest of the poor.

2.5 Existing Coastal Management

2.5.1 Coastal Management Policy and Approach

The importance of coastal management has been spreading throughout the nation, although it was only in the mid-1990's that coastal management was taken up as a government policy. Previous to that time period, coastal management had been discussed only on a sectoral basis, such as coastal environmental conservation, fishery development, industrial development and others. The concept of integrated or comprehensive coastal management was also introduced into the country in the 1990's, just as it was taking shape in other parts of the world. Actually, however, implementation of integrated coastal management was started only in recent years. Meanwhile, there exist different agencies with differing management policy and regulations, because there was no coordination agency and responsible agencies for coastal management as a whole. The past few years saw this situation improving with the adoption of the concept of co-management by stakeholders such as different government agencies, NGOs and community people.

It can be said that coastal resource management was first formally incorporated into the national development policy in 1993. For example, in the former State Policy Guideline, (*Garis-garis Besar Haluan Negara: GBHN*) drawn up in 1993, the section of the marine sector was separated from the agricultural sector for the first time. Afterward, several important coastal management projects and programs have been started such as Marine Resources Evaluation and Planning Project (MREP), Coral Reef Rehabilitation and Management Program (COREMAP) and Coastal Resources Management Project (*Proyek Pesisir*). These projects and programs are introducing the concept of integrated coastal management and community based coastal management to the people. Furthermore, the Ministry of Marine Exploration and Fishery (DELP), later the Ministry of Marine Affairs and Fishes (DKP), was established in 1999 and is responsible for marine and coastal

resource management in Indonesia. The DKP manages a broad range of activities not only fishery resources development, promotion of industrial development but also coastal community development and marine protected area management. That is to say a cross-sectoral organization for coastal management was established. This is an indication of the country's serious efforts to manage its natural resources for national economic development and the high expectations to achieve this.

The Indonesian Government has recently adopted a decentralization policy following demands for political freedom after its strong authoritarian governance. Of more significance was that the decentralization policy sought to efficiently address problems arising from the diversity of Indonesia because of its geographical features and the different ethnicity, religion, and cultural backgrounds of its people. The top-down approach by the former regime could not appropriately manage this situation. Furthermore, rich provinces such as Aceh and Irian Jaya demanded administrative freedom. The Indonesian Government therefore needed an appeasement policy.

Decentralization is meant to accommodate the services based on regional features in different areas, and hold together a potentially divided country by providing appeasement. Thus, the jurisdiction of central government agencies has been transferred to local governments, especially implementation. Without exception, coastal management also has been affected by this decentralization wave. Local governments especially municipalities/regencies (*kotakabupaten*) have become increasingly important in coastal management.

In coastal management history, community participation was emphasized from the 1990's. Decentralization gives opportunity for community participation in coastal management. Community people are the user of coastal resources and are always faced with coastal problems so that they have enough motives to play an important role for coastal management. In North Sulawesi, *Proyek Pesisir* (CRMP) has been implemented from 1997 and aims to develop community-based coastal resources management. Community based coastal management has been recognized as an important approach in coastal management in North Sulawesi as well.

2.5.2 Roles of Related Agencies in Coastal Management

(1) Transition of the Roles and Functions to Decentralization

The Indonesian Government has adopted a policy of regional autonomy. As a consequence, "Regional Governance, Law No. 22, 1999" and "The Fiscal Balance Between the Central Government and the Regional Government, Law No. 25, 1999" were

established. Administrative functions and roles are being transferred from central government agencies to local governments under Indonesia's decentralization policy. "Government Authority and Provincial Authority as Regional Autonomy, Government Regulation No. 25, 2000" was established in 2000. Although this regulation outlines the roles of central government agencies and provincial governments, those for municipalities and regencies are not prescribed. The responsibilities of central and local governments regarding coastal management are shown in Table 2.15. The responsibilities of different levels of local governments have not been clearly decided especially for regency/municipality and district level governments in the government regulation No. 25, 2000.

Table 2.15 Current Administrative Roles of Governments in Coastal Management

Fields	Central Government	Provincial Government
Marine	<ul style="list-style-type: none"> Decision on policy and establishment of regulation on investigation, reservation, and management for use of marine natural resources beyond 12 miles. Decision on policy and establishment of regulation covering administrative boundaries in the sea and international law for marine Decision on guidelines for beaches and island management 	<ul style="list-style-type: none"> Regulation and management of Provincial Marine Water Investigation, exploitation, preservation and management in marine water under provincial government Preservation and management of regional endemic species, and fisheries preservation in marine water under provincial government Issues of license for agriculture and fishery in water area under provincial government Supervision for effective use of fishery resources in water area under provincial government
Transportation	<ul style="list-style-type: none"> Decision on management of breakwater at provincial and international ports Decision on standard for working environment of water areas and port areas in provincial and international ports 	<ul style="list-style-type: none"> Decision and maintenance/management of transportation monitoring facilities and traffic signs in marine water from 4 miles Decision and maintenance/management of transportation monitoring facilities and traffic signs in marine water from 4 miles to 12 miles Design of provincial ports and decision of permission policy Agreement on environmental management for marine resource use in marine water from 4 miles to 12 miles Agreement on preservation and protection of marine resources in area under plural municipality and regencies
Living Environment	<ul style="list-style-type: none"> Agreement on environmental management for marine resource use beyond 12 miles Environmental impact assessment on activities beyond 12 miles Decision on guidelines for natural resources preservation 	none
Others	<ul style="list-style-type: none"> Decision on guidelines for natural resources management and protection Implementation of natural resources management and protection beyond 12 miles 	<ul style="list-style-type: none"> Management of non oil/gas energy resources excluding radioactive substances in marine water area from 4 miles to 12 miles Action Plan regarding river erosion, sedimentation, productivity in river basin cover plural municipalities and regencies

Source: Law No. 25, 2000 "Government Authority and Provincial Government Authority as Regional Autonomy", compiled by JICA Study Team

Important players of coastal management are not only local governments but also communities, because community people are coastal resource users. Possibility of sustainable use of coastal resources and conservation of natural environment depend on

community people. It is expected that NGOs provide community-oriented technical support and financial support to communities, because of lack of capacity of local governments.

(2) Roles of other related organizations/groups in coastal management

a) Communities

Coastal Communities have an important role in the development of coastal and marine resources use and conservation. In the Study Area, Kulu villagers have been replanting mangrove trees in the last 10 years. In Ratatotok village, each community decides the special use in their coastal area according to the benefits to the villagers. While some coastal communities have been making efforts to manage their area by a participatory approach like Kulu and Ratatotok villages, still most of communities do not have any ideas of coastal management and its implementation. Under the new government regime, decentralization of planning and management, the role of communities is becoming more important and their participation for development planning and implementation will be vital. In order for communities to play such an important role, the village governance is being changed in a democratic manner to make it possible to reflect the people's voice in decision making.

b) Governance

In Minahasa Regency, "Several Local Regulation in Minahasa Regency about Village Government: *Beberapa Peraturan Daerah Kabupaten Minahasa tentang Pemerintahan Desa*" was approved and issued in August 2000. In this local regulation, a village (*Desa*) has to have a Village Representative Body (*Badan Perwakilan Desa: BPD*), which will be elected by community members representing social, political, religious, professional, and traditional organizations and other community leaders. The function of BPD is to strengthen village governance and to apply democracy at the village level. BPD replaces LMD and has a say on replacing the village head. In other regencies and municipalities in the Study Area, this regulation is still in process.

According to the survey of 24 coastal communities done by the Study Team in August 2000, cooperation among fishers does not exist in most of the 24 communities except in a few communities. But fishers' cooperation in these few communities is not really functioning well at all due to various reasons. If no cooperation exists among fishers, it will be difficult to reflect their voices to the village governance.

c) Academic institutions

Coastal management requires various experts on natural environment, ecosystem, sociology, tourism, fishery, economy and forestry. Under a decentralization policy, the responsibility of coastal management is being transferred from central government agencies to local governments. Academic institutes have a function of providing human resources for coastal management. In North Sulawesi, there are educational institutions such as Sam Ratulangi State University, Fishery Academy (belonging to DKP) and Institute of Technology Minahasa (Private University). Fishery Faculty of Sam Ratulangi State University provides approximately 100 persons a year of human resources. It is expected that academic institutes will provide human resources with knowledge of coastal management.

d) NGOs

Non-profit, voluntary organizations and non-governmental organizations are called *Lembaga Swadaya Masyarakat (LSM)*. They represent an increasingly important role in community development, problem solving, monitoring the effects of local industry and development projects, sensitizing public officials and business groups to environmental issues, and promoting campaigns to enhance public awareness and support for environmental protection and participatory involvement.

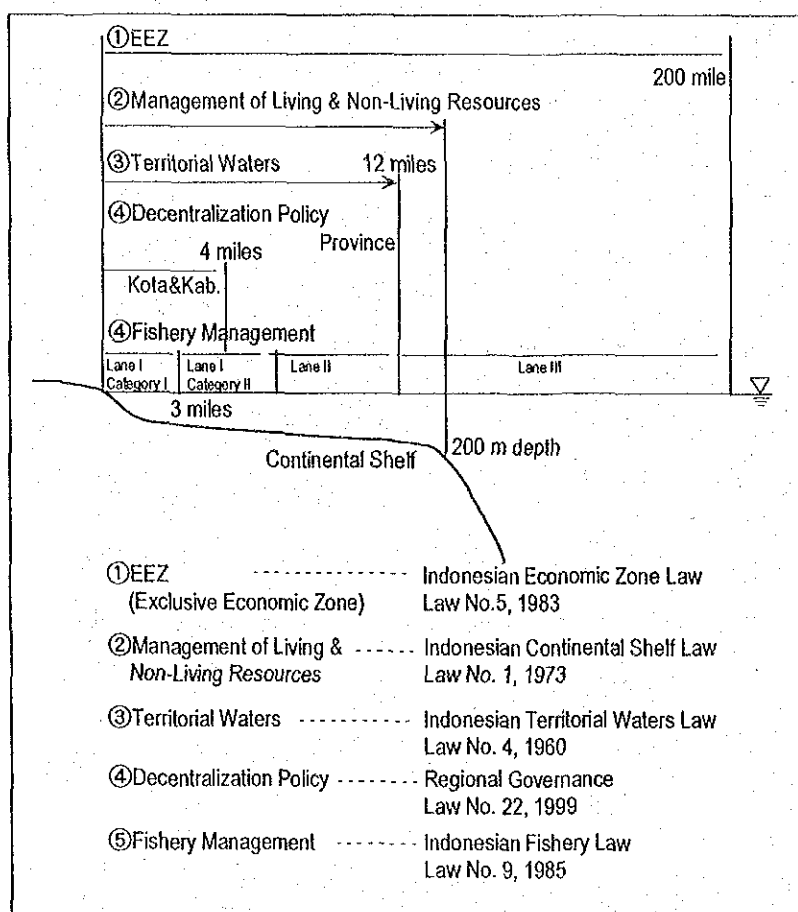
Based on interviews of some members of NGOs, the Study identified the following problem areas for NGOs (detailed discussion in "Volume III Coastal Environmental Conditions and Coastal Management System"):

- lack of self-confidence of community people;
- difficulty of representing the voice of community;
- budget constraints;
- coordination; and
- preference of dealing with a smaller, exclusive group in a community.

2.5.3 Coastal Management Area

Major water areas determined are shown in Figure 2.10. According to Government Regulation No. 22 (1999), the governments of municipalities (*Kota*) and regencies (*Kabupaten*) should manage coastal waters starting from their shorelines up to 4 miles. Provincial governments should manage coastal waters 4 to 12 miles from shoreline. However, Government Regulation No. 22 (1999) does not prescribe where the shoreline starts – the lowest tide level or the highest level or the mean sea level.

In addition to the above management area, there is some zoning system based on use of fishing in the coastal area. Within water area from shoreline to 200 miles from shoreline is categorized by Ministerial Decree No. 392/kpts/lk 120/99 as shown in Table 2.10. Mariculture farmers, for instance of pearl and seaweed, and fishermen, such as *bagan*, *sero*, and *tambak*, are required to obtain locational and operational permits from government. In case of domestic investment within 4 miles seaward, a permit was previously issued by the provincial government; however, after decentralization this responsibility now belongs to municipal/regency governments.



Source: JICA Study Team

Figure 2.10 Indonesia's Marine and Coastal Water Classification

2.5.4 Community Based Coastal Management

Although it should be kept in mind that Community Based Management (CBM) is not a panacea for resource management, efforts should still be made to encourage village level control on coastal resources in North Sulawesi, and also to institutionalize CBM for coastal areas in the form of a decentralized government administration. CBM for coastal area must not be understood as all elements of coastal resources management should be allocated to the local communities, but a more dynamic partnership must evolve between local communities and local government. Moreover, this should be complemented by the ability of the local government to provide enabling legislation and other assistance.

The Study Team conducted a survey of 24 coastal communities. By comparing the two villages of Kulu and Rap rap, it is found that they both have very rich and various coastal resources in their coastal area. Kulu village has decided to conserve the mangrove forest in the area and is utilizing the coastal space effectively, while Rap rap village destroys their resources and feels that the conservation of their resources is a hopeless situation. There are some points of discussions identified by analyzing these two different types of communities.

- a) The aspects of perception and knowledge of coastal resources and affinity to the coastal resources

People's perception and knowledge of coastal resources is important but the knowledge of management and sense of initiatives might be more important factors for CBM. In Kulu village, people have very high perception and knowledge of coastal resources and sense of closeness to their coastal resources, so do Rap rap village. People in coastal area know their resources, locations, functions, and conditions very well; however, they lack the capacity to manage their resources and do not believe that they are able to do it. The big difference between Kulu village and Rap rap village is that Kulu people believe in their ability to conserve their resources and are willing to take action because of their sense of ownership to the coastal resources.

- b) The aspect of knowledge of management and sense of initiatives

The Study Team could not find any traditional knowledge on coastal resource management practiced in the area, even in Kulu village. It would be important to introduce modern management ideas and skills to communities where coastal management is absent, according to their need. What is essential is how this information would be disseminated and how communities could be organized in order to establish CBM for coastal area.

c) Sense of ownership based on territorial boundaries

One of the biggest differences between Kulu village and Rap rap village is whether or not the community has a sense of ownership of their coastal areas. Kulu villagers have a very strong sense of ownership of their coastal area and believe that any resources inside the area belong to them. It is not known exactly where this sense of ownership came from, but the important observation is that this ownership seems to be associated with the boundaries in the sea which they believe divide their area and others. This sense of ownership may lead to the sense of village level management to conserve their coastal area and resources in Kulu village.

In order to establish CBM for coastal area, it would be a very important element to consider giving a sense of ownership of coastal area based on territorial boundaries. Then, there would probably be a need to consider giving coastal communities some form of user rights of coastal area in order to protect their resources from outsiders, and conserve them by sustainable use.