

Data Collection Survey on Outer-ring
Fishing Ports Development
in the Republic of Indonesia

FINAL REPORT

October 2010

Japan International Cooperation Agency
(JICA)

INTEM Consulting, Inc.

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10-035

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Preface

(挿入)

Map of Indonesia (Target Area)



Currency and the exchange rate

IDR 1 = Yen 0.01044 (May 2010, JICA Foreign currency exchange rate)

Contents

Preface

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Currency and the exchange rate

List of abbreviations/acronyms

List of tables & figures

Executive summary

Chapter 1 Outline of the study

1.1 Background	.....	1
1.1.1 General information of Indonesia	.....	1
1.1.2 Background of the study	.....	2
1.2 Purpose of the study	.....	3
1.3 Target areas of the study	.....	3

Chapter 2 Current status and issues of marine capture fisheries

2.1 Current status of the fisheries sector	.....	4
2.1.1 Overview of the sector	.....	4
2.1.2 Status and trends of the fishery production	.....	4
2.1.3 Fishery policy framework	.....	7
2.1.4 Investment from the private sector	.....	12
2.2 Current status of marine capture fisheries	.....	13
2.2.1 Status and trends of marine capture fishery production	.....	13
2.2.2 Distribution and consumption of marine fishery production	...	16
2.2.3 Status of fisheries resources	.....	18
2.2.4 Fishery resource management measures	...	20
2.3 Issues on marine capture fisheries and countermeasures taken	.....	23
2.4 Other donors' assistance	.....	24

Chapter 3	Current status of fishing port development		
	3.1 Administrative arrangement	.....	25
	3.2 Outer-ring fishing port (ORFP) development	.....	30
	3.2.1 ORFP development master plan	.....	30
	3.2.2 Road map of ORFP development	.....	38
	3.3 Issues to be addressed in implementing the ORFP development plan	.....	47
Chapter 4	Results of site surveys at the target fishing ports		
	4.1 Selection of the target fishing ports	.....	52
	4.2 Current situation of the target fishing ports	.....	53
	4.2.1 General information of the survey areas	.....	53
	4.2.2 Characteristics of the target fishing ports	.....	56
	4.3 A summary of the survey results	.....	119
	4.3.1 Site specific fishing port development plans and their issues	....	119
	4.3.2 Necessary considerations in appraising the support for the ORFP development	....	123
	4.3.3 Conclusions of the site surveys	....	138
Chapter 5	Synthesis of the study results		
	5.1 Preliminary appraisal of ORFP development plan	.....	141
	5.2 Feasibility of ORFP development plan	.....	148
	5.3 Suggestions/recommendations on the ORFP development plan	....	150
	5.4 Other remarks	...	152

Attachment:

Appendix A Results of the site surveys conducted by local consultant

Appendix B List of materials referred

List of abbreviations/acronyms

ADB	Asian Development Bank
APBD	Anggaran Pendapatan dan Belanja Daerah/ Local annual expenditure and revenue budget
APBN	Anggaran Pendapatan dan Belanja Negara/ National annual expenditure and revenue budget
BAPPENAS	Bidang Ekonomi, Keuangan, dan Industri dan Kantor Menteri Negara Perencanaan Pembangunan Nasional / National Development Planning Board
CTI	Coral Triangle Initiative on coral reefs, fisheries and food security
DAK	Dana Alokasi Khusus/ Special grant
DAU	Dana Allocasi Umum/ General revenue sharing
DG	Directorate General
DGCF	Directorate General of Capture Fisheries
DKP	Departemen Kelautan dan Perikanan/ Directorate General of Capture Fisheries
EEZ	Exclusive economic zone
EIA	Environmental Impact Assessment
FAD	Fish Aggregating Devices
FKPPS	Forum Koordinasi Pengelolaan dan Pemanfaatan Sumberdaya Ikan/ National Committee for Fish Stock Assessment
FMA	Fisheries Management Area
GMP	Good Manufacturing Practices
IDB	Inter-American Development Bank
IPTEK	Sentra Informasi Ilmu Pengetahuan dan Teknologi/ Technical Information Centre
IUU	Illegal, Unreported, Unregulated Fishing
KEPMENTAN	Keputusan Menteri Pertanian/ Agricultural Ministerial Ordinance
KKMB	Konsultan Keuangan Mitra Bank/ Mitra Bank Financing Service
KKPE	Kredit Ketahanan Pangan dan Energi/ Financing for Energy and Food Securing
KUB	Kelompok Usaha Bersama/ Community Business Group
KUD	Koperasi Unit Desa/ Village Cooperation Society
KUR	Kredit Usaha Rakyat/ Community Business Financing
LIPI	Lembaga Ilmu Pengetahuan Indonesia/ The Indonesian Institute of Sciences
LPPMHP	Laboratorium Pengujian dan Pengawasan Mutu Hasil Perikanan/ Fishery Quality Control Inspection Laboratory

MMAF	Ministry of Marine Affairs and Fisheries
MSY	Maximum Sustainable Yield
NMTDP	National Medium Term. Development Planning
NTB	Nusa Tenggara Barat/ West Nusa Tenggara
NTT	Nusa Tenggara Timur/ East Nusa Tenggara
ORFP-DP	Outer Ring Fishing Port Development Project
PELINDO	Pelabuhan Indonesia/ Indonesian Port
PMA	Penanaman Modal Asing / Foreign Direct Investment
PMDN	Penanaman Modal Dalam Negeri/ Domestic Investment
PPI (Type D)	Pangkalan Pendaratan Ikan/ Fish Landing Place (Type D)
PPN (Type B)	Pelabuhan Perikanan Nusantara/ Archipelago Fishing Port (Type B)
PPP (Type C)	Pelabuhan Perikanan Pantai/ Coastal Fishing Port (Type C)
PPS (Type A)	Pelabuhan Perikanan Samudera/ Oceanic Fishing Port (Type A)
PRPT	Pusat Riset Perikanan Tangkap/ Fishery Research Centre
RERUM	Perusahaan Umum/ Fishery Public Corporation
RKP	Rencana kerja Pemerintah/ Government Execution Plan
RPJM	Rencana Pembangunan Jangka Menengah/ Mid-term Development Plan
RPJMN	Rencana Pembangunan Jangka Menengah Nasional/ National Mid-term Development Plan
RPJP	Rencana Pembangunan Jangka Panjang/ Long-term Development Plan
SPA	Sumbangan Perhitungan Anggaran/ Special Economic District
TAC	Total Allowable Catch
TP	Task Assistance
TPS	Teknologi Pengelolaan Sumberdaya Perairan/ Fishery Resource Processing Technology
UNCLOS	United Nations Convention on the Law of the Sea
UPT	Pertemuan Unit Pelaksana Teknis/ Fishing Port Management Organization
VMS	Vessel Monitoring System
WPP	Wilayah Pengelolaan Perikanan/ Fishery Management Area

List of tables and figures

Chapter	Nos.	Titles	Page	
Chapter 1	Table 1.1-1	Basic data of Indonesia	1	
Chapter 2	Table 2.1-1	Capture fishery production (2003 – 2008)	4	
	2.1-2	Number of fishers (marine and inland open water capture fishery) (2003 – 2008)	5	
	2.1-3	Number of fishing vessels and boats (Marine capture fisheries) (2003 – 2008)	5	
	2.1-4	Number of fish processors and fish distributors	6	
	2.1-5	Main indicators for measuring attainment of objectives in Mid-term Development Plan (2010-2014) of MMAF	8	
	2.1-6	Regional Fishery Organizations (RFOs), in which Indonesia participates	11	
	2.1-7	Situation of private investment in fisheries sector 2004-2008	12	
	2.2-1	Marine capture fishery production by major species (2003 – 2008)	13	
	2.2-2	Number of marine capture fishers (2003 – 2008)	14	
	2.2-3	Number of fish processing business units and fish processors	15	
	2.2-4	Number of certificate issued for fish processors	16	
	2.2-5	Volume of marine capture fishery production by fishing management area (2003-2008)	19	
	2.2-6	Trend of MSY in marine capture fisheries	19	
	2.2-7	MSY and TAC in each FMA	21	
	2.2-8	Comparison of catch and MSY, TAC in FMAs in Eastern and Western Indonesia	22	
		Fig. 2.2-1	Per-capita consumption of fishery products by province	17
		2.2-2	Fishing Management Areas in Indonesia	18
	Chapter 3	Table 3.1-1	MMAF Civil Servants, 2005-2009	25
		3.1-2	Classifications of fishing port	26
		3.1-3	Budget allocation of MMAF	27
		3.1-4	Non Tax Revenue (PNBP) of MMAF in 2005-2009	29
		3.2-1	Summary of outer-ring fishing port (ORFP) development master plan in each site	36
3.2-2		Cost estimation for ORFP development	39	
3.2-3		Planning/development process of ORFP development	43	
3.2-4		Progress of ORFP development in target survey areas	45	
		Fig. 3.1-1	Administrative structure of fishing ports	28
		3.1-2	Facilities damaged in small PPIs	30
	3.2-1	Location of selected survey sites	41	
Chapter 4	Table 4.1-1	List of survey sites	52	

Table 4.2-1	Outline of the target survey areas	53
4.2-2	Fishing port facilities of the private sector (PT. Maritim Timur Jaya)	54
4.2-3	Volume of total fishery production in the West Nusa Tenggara Province in 2004-2008	57
4.2-4	Volume of capture fishery production in the West Nusa Tenggara Province 2004-2009	57
4.2-5	Estimation of fishery resource potentials in the West Nusa Tenggara	58
4.2-6	Number of fishing boats by size in the West Nusa Tenggara Province and Central Lombok District, 2009	58
4.2-7	Number of fishers in the Central Lombok District 2004-2009	59
4.2-8	Planned facilities and infrastructure in PPN Teluk Awang, 2009	62
4.2-9	Teluk Awang fishing port development cost	64
4.2-10	Marine capture fishery production in volume and value 2004 – 2008	66
4.2-11	Fish processing units based on cold storage ownership in Makassar 2009	67
4.2-12	Cost of the Untia fishing port development project	71
4.2-13	Volume of fishery production in NTT (2004-2008)	72
4.2-14	Capture fishery production in the Kupang City and NTT Province	73
4.2-15	Estimation of fisheries resource potentials in NTT waters	74
4.2-16	Volume of fish landed in PPP Kupang, 2007	74
4.2-17	Number of fishing boats using PPP Kupang in 2007	75
4.2-18	Number of fishing boats by size in Kupang 2004-2009	75
4.2-19	Main facilities of PPP Kupang	79
4.2-20	Revenues in PPP Kupang, 2007	80
4.2-21	Fish production in volume in East Kalimantan, 2004-2008	84
4.2-22	Number of fishing boats by category in Nunukan 2007-2009	85
4.2-23	Number of fishers/fisheries establishments in Nunukan by business scale, 2006-2008	85
4.2-24	Implemented budget for the development of PPN Nunukan	88
4.2-25	Fish production in North Sulawesi, 2006-2009	90
4.2-26	Fishing boats condition by size in North Sulawesi and Bitung 2008	92
4.2-27	Capture fishery production by major species in Bitung 2009	92
4.2-28	Volume and value of fish landed at PPS Bitung 2008-2009	93
4.2-29	Main facilities of PPS Bitung	95
4.2-30	Revenues in PPS Bitung, 2008-2009	98

Table	4.2-31	Number of fishing boats using Bitung fishing port (5/19-5/20 ; by Survey team)	99
	4.2-32	Frequency of vessel visits in PPS Bitung, 2008-2009	99
	4.2-33	Required berth length of Bitung fishing port	100
	4.2-34	Volume of fishery production by species in Ternate 2002 - 2007	103
	4.2-35	List of facilities of PPN Ternate	106
	4.2-36	Number of fishing boats using the PPN Ternate facilities 2008-2009	107
	4.2-37	Volume and value of ice sold in PPN Ternate, 2008 - 2009	107
	4.2-38	Ice blocks supplied by private ice making factories, 2008 - 2009	107
	4.2-39	Revenues in PPN Ternate, 2008-2009	108
	4.2-40	Required length of berth in Ternate fishing port	110
	4.2-41	Cost estimation of PPN Ternate development	111
	4.2-42	Volume of fishery production in Maluku Province, 2006-2008	112
	4.2-43	Number of fishing boats in the Southeast Maluku District, including Tual City	113
	4.2-44	Number of fishers in the Southeast Maluku District, including Tual City	114
	4.2-45	Main facilities of PPN Tual	116
	4.3-1	Survey results on the seven ORFP development sites	120
	4.3-2	Summary of current situation for the seven ORFP development sites	124
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Fig.	4.2-1	PT. Maritim Timur Jaya	54
	4.2-2	Fish processors in Bitung	55
	4.2-3	Administrative map of West Nusa Tenggara (NTB) Province	56
	4.2-4	Local and inter-regional marketing & distribution of fishery products from Teluk Awang	60
	4.2-5	Fisheries activities around Teluk Awang	61
	4.2-6	PPN Teluk Awang development plan	63
	4.2-7	Location of PPN Untia	65
	4.2-8	Fisheries activities in Makassar	68
	4.2-9	PPN Untia development plan	70
	4.2-10	Current view of the construction site of PPN Untia	70
	4.2-11	Nusa Tenggara Timur (NTT) Province	72
	4.2-12	Fish marketing channels for inter-regional and export destinations	76
	4.2-13	Summary of fishing activities in Kupang and in the region	78
	4.2-14	Current conditions and development plan of PPN Kupang	82
	4.2-15	Administrative map of East Kalimantan Province	83
	4.2-16	Fresh fish marketing channels in Nunukan	86

Fig.	4.2-17	Summary of fishing activities in Nunukan area	87	
	4.2-18	PPN Nunukan development plan	89	
	4.2-19	Collapsed structure and current site view	89	
	4.2-20	Administrative map of North Sulawesi Province	90	
	4.2-21	Summary of fisheries activities in the region of PPS Bitung	94	
	4.2-22	Facilities of PPS Bitung	96	
	4.2-23	Current facilities of PPS Bitung	97	
	4.2-24	PPS Bitung in the morning	99	
	4.2-25	Development plan of Bitung fishing port	101	
	4.2-26	Location of PPN Ternate	102	
	4.2-27	Summary of fishing activities of PPN Ternate and the region	105	
	4.2-28	Current status of PPN Ternate	109	
	4.2-29	Development plan of PPN Ternate	111	
	4.2-30	Location of PPN Tual fishing port	112	
	4.2-31	Summary of fishing activities around PPN Tual	115	
	4.2-32	Panoramic view of PPN Tual	117	
	4.2-33	Current facilities of PPN Tual	117	
	4.2-34	Development Plan of PPN Tual	118	
<hr/>				
Chapter 5	Table	5.1-1	Time schedule of ORFP development plan	144
		5.1-2	Requirements of outer ring fishing port facilities in Indonesia	147
		5.2-1	Number of fishing port development for past ten years	149
		5.4-1	Regulations related to development of harbor	154
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Executive summary

1. Outline of the study

1.1 Background of the study

The Republic of Indonesia (hereinafter referred to as “Indonesia”) has an abundant variety of marine and fishery resources. Indonesia is one of the main fishing nations in the world with 2.74 million fishers (2.24 million marine capture fishers and 0.5 million inland open water capture fishers) with about 5.2 million tons of capture fishery production (4.7 million of marine capture fisheries and 0.5 million tons of inland open water capture fisheries) in 2008. In addition, the development of aquaculture has been remarkable. In 2008, the number of fish farmers was about 2.76 million and production reached 3.85 million tons. Per capita consumption of fishery products in Indonesia has been increasing from 23.95 kg in 2005 to 28.00 kg in 2008. Thus, fishery products are an important source of good quality protein for Indonesian nationals. In marine capture fisheries, fishery resources tend to decrease due to over fishing in western waters. On the other hand, fishery resources are kept in relatively good condition in eastern water. However, in eastern Indonesia, the income of fishers is still low because of a delay in basic infrastructure development, such as fishing ports, and improvement of the fish distribution system, etc. To promote sustainable utilization of fishery resources in Indonesia, in addition to improvement of the system and rules on fisheries management, it is important to promote implementation of infrastructure development that is balanced regionally throughout this very large territory. When the relevant parties examine support for the development of basic facilities of fishing ports and functional facilities, such as storing and processing facilities for fishery products, it is necessary to clarify the effectiveness and evaluation in implementing of the fishing port development, and the priorities regarding assistance for the fishery sector from the aspect of supporting the sound development of the fishery sector of Indonesia.

1.2 Purpose of the study

This study aims to collect the latest information on the current situation and issues affecting the fishery sector as well as on fishing ports, and to examine the information to consider Japan’s aid framework in the field of fishing port rehabilitation and renovation.

- Policy and programs of Indonesian government and trends of other donors’ assistance
- Support for sustainable development of the fishery sector in Indonesia
- Clarification of priorities in support of the fishery sector
- Confirmation of meaning and positioning of support for fishing port rehabilitation and/or renovation

1.3 Target areas of the study

The target area of the study is the whole country of Indonesia from the aspect of information analysis. In the site survey, the team studied 7 outer-ring fishing port sites: Teluk Awang port (West

Nusa Tenggara province), Makassar port (South Sulawesi province), Kupang port (East Nusa Tenggara province), Nunukan port (East Kalimantan province), Bitung port (North Sulawesi province), Ternate port (North Maluku province), and Tual port (Maluku province), all of which the Indonesian government expects to develop.

2. Current status and issues of marine capture fisheries

2.1 Current status of the fishery sector

Fishery production in Indonesia has increased slightly. It reached 9.05 million tons in 2008, 1.53 times that of the 5.91 million tons produced in 2003; it is the third largest in the world following China and Peru. A brief breakdown is 5.20 million tons of capture fisheries (57%) and 3.85 million tons of aquaculture (43%). The production of marine capture fisheries has been slightly increasing (7%) from 4.38 million tons in 2003 to 4.70 million tons in 2008, and inland open water capture fisheries increased (62.5%) from 309 thousand tons in 2003 to 494 thousand tons in 2008. On the other hand, marine aquaculture production increased 7.9 times from 249 thousand tons in 2003 to 1,966 thousand tons in 2008, and brackish water aquaculture production increased 1.9 times and freshwater aquaculture production increased 2.0 times in the same period, respectively. The increase in aquaculture production is very obvious compared to capture fisheries production. Among the total production of marine aquaculture, production of seaweed culture grew about 9.3 times from 230 thousand tons in 2003 to 2.14 million tons in 2008. The number of fishers involved in production in the fishery industry (marine capture fisheries and inland open water fishery) is about 2.73 million in total. The number of inland open water capture fishers is approximately 500 thousand. The number of fish processors increased 10.5% from 329,332 persons in 2005 to 363,980 persons in 2009. The import of fishery products increased from 857,783 tons in 2003 to 911,674 tons in 2008. The value also increased from US\$1,643.542 million to US\$2,699.683 million in the same period. The import of fishery products in terms of quantity increased from 107,768 tons in 2003 to 280,179 tons in 2008 and in terms of value increased from US\$90.808 million to US\$267.659 million during the same period. This is 2.6 times the increase in quantity and 2.9 times the increase in value of imports¹. Chilled and frozen fish was imported the most with 83,984 tons in 2008. The share is 30% of the total. In a comparison of exports and imports, exports exceed imports. However, the degree of increase for imports is bigger than that of exports.

2.2 Current status of marine capture fisheries

Of the total of 9.05 million tons of annual fishery production for Indonesia in 2008, about 4.70 million tons (52%) were produced by marine capture fisheries. 330 thousand tons of scad was caught, the most for a single species in the 4.22 million tons of production in 2008. About 300 thousand tons of

¹ Import Statistics of Fishery Products 2008

scad was caught in 2003, and this species recorded the highest production for the 6 years from 2003 to 2008, followed by about 300 thousand tons of skipjack, 250 thousand tons of Kunbun (a similar group to horse mackerel), and 200 thousand tons of anchovy. Yellow-fin tuna, a major exporting product, totaled about 100 thousand tons in 2008, which is 50 thousand tons less than that of 2003². Production of shrimp is relatively stable with approximately 250 thousand tons. Large pelagic fish species increased 1.4 times from 2003 to 2008. As of 2008, the number of marine capture fishers was about 2.24 million in the whole of Indonesia. 49.6% of them are full-time fishers.

Fish processing factories located in inland areas utilize catches that foreign fishing vessels caught outside of the EEZ of Indonesia. There are three patterns seen in fish processing factories, namely, Indonesian enterprises, joint ventures with foreign enterprises and foreign enterprises. MMAF promotes the idea that Indonesian fishing vessels and boats catch the fish and then supply the catch to fish processing factories associated with foreign enterprises³. Classification of processed fish products described in the statistics for Indonesia consists of salted and dried fish, boiled fish, fermented fish (berachan, peda, fish sauce), smoked fish, frozen fish, canned fish, and fish meal. In 2008, frozen fish was produced the most with about 460 thousand tons, followed by salted and dried fish with about 450 thousand tons. These 2 items occupy around 75% of the total production of processed fish products⁴.

MSY (Maximum Sustainable Yield) is evaluated biologically by the work team composed of LIPI (The Indonesian Institute of Sciences), the Marine fishery research bureau in MMAF, universities and NGOs once every five years. 80% of MSY is set as TAC (Total Allowable Catch) in all Indonesian waters. With regards to MSY, overexploitation exceeding MSY can be observed in WPP-RI571 (Malacca Strait/Andaman Sea) and WPP-RI714 (Toro Bay/Banda Sea), and the catch has been excessive for the fishery resources to recover. Excessive fishing over TAC can be seen in WPP-RI572+573 (West Sumatera, Indian Ocean+ South Java/South Nusa Tenggara/West Timor, Indian Ocean) and WPP-RI712 (Java Sea) in addition to the above 2 fishing management areas.



Fishing Management Areas in Indonesia

(Source: Ministerial Decree of MMAF No. Per. 01/MEN2009 about Fishing Management Area of 2010)

² Capture Fishery statistics of Indonesia 2008

³ Hearing from Directorate General of the fisheries processing circulation in MMAF

⁴ Capture Fishery Statistics of Indonesia 2008

In Indonesia, a new system for fishery resources management has been introduced along with progress in decentralization since 2000. The authority to manage fishery resources and capture fisheries is shared among 3 different levels, namely, central government, province, and district/city. District/city manages the area within 4 nautical miles from the coast, and province manages marine areas from 4 nautical miles up to 12 nautical miles. Central government is responsible for the management of fishing operations in EEZ over 12 nautical miles and international waters.

As one of the fishery management measures, foreign fishing vessels and Indonesian fishing vessels exceeding 100GT are obliged to be equipped with a Vessel Monitoring System (VMS). Fishing vessels over 60GT and up to 100GT are to be provided with a transmitter, and fishing vessels smaller than 60GT are to be provided with off-line VMS by MMAF⁵. According to MMAF, 3,500 fishing vessels were equipped with VMS from 2003 until 2010; this number is about 80% of the total number of fishing vessels over 100GT. As for fishing licenses, central government deals with fishing vessels over 30GT, province with 10-30GT fishing vessels, and district/city with fishing vessels/boats smaller than 10GT, respectively⁶. Other necessary operations are the surveillance and capture of IUU fishing vessels/boats. The Navy, Marine Police, and DGMFRSC (DG of Marine & Fisheries Resources Surveillance and Controlling) of MMAF have the power to do these operations. The Marine Police has jurisdiction only in Indonesian waters, while DGMFRSC of MMAF controls not only Indonesian waters but also the EEZ. These 3 parties collaborate with each other.

2.3 Issues on marine capture fisheries and countermeasures taken

Illegal, Unreported, Unregulated (IUU) fishing conducted by foreign fishing vessels, etc, has been rampant outside of the 12-nautical-mile areas. Therefore, it is an urgent issue to strengthen the MCS (monitoring, control and surveillance) system and utilize fishery resources effectively. As a countermeasure to IUU fishing, MMAF is strengthening the surveillance of IUU fishing vessels using VMS. The Minapolitan Development Plan in the National Mid-term Development Plan (2010-2014) mentions some countermeasures in this field, which are at present ongoing. These countermeasures are i) the improvement of the infrastructure for fish distribution and processing, ii) promotion of exports of fishery products by supporting small-medium enterprises, iii) promotion of investment, iv) support for formulation of small-medium business units in communities, v) development of financial institutions for fishers' organizations, vi) development of infrastructure in 100 small and archipelagic areas, and vii) strengthening the capabilities of organizations and enterprises engaged in fish processing and distribution. For exporting companies, MMAF obliges them to acquire international standards of quality control such as HACCP and GMP and supports them financially from the national budget. The method for collecting catch data, the foundation of fishery resources management, varies between

⁵ Indonesian Fisheries Book 2010

⁶ MMAF Directorate General of the Secretariat, Statistics information center

districts. Therefore, an unification of data collection standard is required. At present, each district sends monthly the catch data to MMAF through the Internet. In each district, 3 members of the staff are assigned to deal with fishery statistics on aquaculture, capture fisheries, and fish processing. They are authorized to collect data from daily meetings with KUD (Village Cooperatives) under the Ministry of Cooperatives and Small-Medium Enterprises, but in areas where KUD do not exist they conduct sampling directly at fish markets and fish landing beaches. Moreover, their sampling frequency and methods are not standardized. Therefore, the reliability of their information is doubtful. MMAF asks experts on fishing management to check the data sent from provinces and districts twice a year.

3. Current status of fishing port development

Indonesian fishing ports are classified into 4 types by Ministry Decree No. PER16/MEN/2006 and No. KEP.10/MEN/2004, as follows:

Classification of fishing port⁷

Class of Fishing Port	Amount and Jurisdiction	Technical Criteria	Fishing Operation
A: Oceanic Fishing Port PPS: Pelabuhan Perikanan Samudera/	6 ports, MMAF	<ul style="list-style-type: none"> - Have mooring/docking facilities for 60GT fishing vessels at minimum. And have port pond for 100 fishing vessels with minimum depth of 3m. - Minimum length of pier is 300m, etc. 	<ul style="list-style-type: none"> - operational/fishery activities in territorial waters, EEZ and offshore - 18,000 to 120,000 tons of fishing catch
B :Archipelago Fishing Port PPN: Pelabuhan Perikanan Nusantara	13 ports, MMAF	<ul style="list-style-type: none"> - Have mooring/docking facilities for 30GT fishing vessels at minimum. - Have port pond for 75 fishing vessels with minimum depth of 3m. - Minimum length of pier is 150m, etc. 	<ul style="list-style-type: none"> - operational/fishery activities in Territorial water and EEZ - 7,200 to 18,000 tons of fishing catch
C :Coastal Fishing Port PPP: Pelabuhan Perikanan Pantai /	2 ports, MMAF	<ul style="list-style-type: none"> - Have mooring/docking facilities for 10GT fishing vessels at minimum. 	<ul style="list-style-type: none"> - operational/fishery activities in inland water and archipelago.
	44 ports, province	<ul style="list-style-type: none"> - Have port pond for 30 fishing vessels with minimum depth of 2m. - Minimum length of pier is 100m, etc. 	<ul style="list-style-type: none"> - operational/fishery activities in inland water, archipelago and territorial water - 3,000 to 7,200 tons of fishing catch
D: Fishing Landing Place PPI: Pangkalan Pendaratan Ikan	895 places, province and region/city	<ul style="list-style-type: none"> - Have mooring/docking facilities for 3GT fishing vessels at minimum. - Have port pond for 20 fishing vessels with minimum depth of 2m. - Minimum length of pier is 50m, etc. 	<ul style="list-style-type: none"> - operational/fishery activities in inland water and archipelago

書式変更：中央揃え、行頭文字または番号を削除、グリッドへ配置

書式変更：箇条書きと段落番号

⁷ Indonesian Fishing Ports 2009, DGCF, MMAF, JICA

(Source: DG of Capture Fisheries, MMAF, 2009)

3.1 ORFP development master plan

The utilization rate of marine fishery resources in Indonesia is not the same between territories. Some areas are over exploited and others are not utilized optimally. This disparity is related to the development level of the fishing port facilities. In Indonesia, among 813 ports (as of 2004), most of the fishing ports are small-scale PPI, and are located in Java, the east coast of Sumatra and the archipelago coast, which makes up about 70% of the total. And only about 20% of the fishing ports are located in the eastern part and outer ring area⁸. In connection with this deviation in fishing port distribution, fisheries resources are considered that it is not optimally utilized in the outer ring area such as the Indian Ocean (West Coast of Sumatra Is.), South China Sea, Arafura Sea, Sulawesi Sea and so on. It is believed that there are underutilized resources in this area. However, this sparse fishing port location in the outer ring area makes it difficult to monitor fishery resources and to control IUU fishing in the EEZ, etc. Furthermore, the outer ring territory not only has a minimal amount of fishing port facilities, but also the territory lags behind in economic and industrial growth. Thus, it is important to exploit the underutilized resources of the outer ring areas not only by the fishery sector but also by other society-, economy- and environment-related sectors, operating under the sustainable management principles. Therefore, it becomes necessary to conduct a study to assess the future development of fishing ports in the outer ring areas by examining location, development plans and phased construction. The study on outer ring fishing port development for the master plan (*Pe kerjaan Penyusunan Masterplan Pengembangan Pelabuhan Perikanan di Lingkar Luar Wilayah Indonesia, Developmental Master Plan Composition, Outer Ring Fishing Port of Indonesian Territory (CODE: SU-01), Dec.2004, Final Report ; PT. Perentjana Djaja*) was carried out in 2004. In the Outer Ring Fishing Port Development Master Plan, 25 locations/sites in 20 provinces were selected to be developed from 813 fishing ports, which were built by 2004.

3.2 Road map of ORFP development

In 2010, MMAF formulated the “ROAD MAP, OUTER RING FISHING PORTS DEVELOPMENT, Pengembangan Pelabuhan Perikanan di Lingkar Luar Wilayah Indonesia, 2010, DIRECTORATE GENERAL OF CAPTURE FISHERIES” which provides an overview of the ORFP development plan, its current activities and step-by-step execution of the plan. The number of fishing ports increased from 813 ports to 968 ports in 2010.

The outer ring fishing port development is planned to be implemented through the following three stages.

Phase I: To locate the highest priority to eastern Indonesia and the border area. The development

⁸ Marine and Fishery statistics of Indonesia (DKP, 2007)

study was carried out for 8 locations (Bitung, Merauke, Pengambengan, Nunukan, Ternate, Teluk Awang, Kupang, Makassar) and drawing a detailed design for 6 locations and implementation of development/improvement of the fishing ports for 4 locations were carried out at a total estimated cost of 1.08 trillion IDR over 5 years.

Phase II: To complete the high priority locations and remaining locations in eastern Indonesia and to start work in western Indonesia. The development study for 9 locations and the compiling of the detailed design for 10 locations and implementation of development/improvement of the fishing ports for 9 locations were carried out at a total estimated cost of 1.08 trillion IDR over 5.5 years.

Phase III: Phase III is the final stage of the ORFP Development that expands to fishing ports in western Indonesia, with a total estimated cost of 3.05 trillion IDR over 5.5 years.

The proposal for the development of 8 fishing port that were selected in Phase-I was sent to BAPPENAS in 2006, and it was regarded as a priority project in the Blue Book 2006-2009. The actions, which have been carried out since 2004, are seen in the following table. In 2005, Untia fishing port (Makassar) was added as ORFP, and the total number of ORFP became 26 locations.

Planning/ development process of ORFP development

		2004	2005	2006	2007	2008	2009	2010
Outer Ring Fishing Port	Province	Preparation, FS ; ① Review ②; Rehab./ Improv. of Jakarta Fishing Port ; ④ Operational & Rehab./ Improv. of Fishing Port Facilities; ⑤	Detail Design ; ③ Construction; ⑥ Operational & Rehab./ Improv. of Fishing Port Facilities; ⑤	Proposals of Outer Ring Fishing Port to the Blue Book Proposal 2006-2009 Detail Design ; ① Master Plan & Detail Design ; ② Signing Aide Memoire ; ③	Construction (TP) ; ① Construction (DAK) ; ② Construction (Deco Funds); ③	Construction (TP) ; ① Construction (Deco Funds); ② Loan Agreement (IDB) ; ④ Operational & Rehab./ Improv. of Fishing Port Facilities; ⑤	Construction (TP); ② Construction (DAK); ③ Implementation of Development / IDB; ④ Operational & Rehab./ Improv. of Fishing Port Facilities; ⑤	Construction (TP Province); ① Construction (TP District); ② Operational & Rehab./ Improv. of Fishing Port Facilities; ④ Institutional Reform and detail design (IDB); ⑤
Sabang Labuhan Haji	NAD	⑤	⑤		② ③; Construction	③; Construction ③; Construction	③; Construction	
Belawan Sibloga	North Sumatra	② ⑤	⑤ ⑤	③ ③		④, ⑤ ④, ⑤	④, ⑤ ④, ⑤	④, ⑤ ④, ⑤
Bungus	West Sumatra	②, ⑤	⑤	Review Master Plan		⑤	⑤	④
Tarempa	Riau Island				①, ③; Construction	③; Construction		
Pulau Baai	Bengkulu	⑤	⑤	①	②, ③; Construction	③; Construction	②; Construction	②; Construction
Pemangkat	West Kalimantan	②, ⑤	⑤			⑤	⑤	④
Nunukan	East Kalimantan	①	②; Construction	Construction	①; Construction	①; Construction		
Jakarta	Jakarta	④ ; JBIC Loan Phase-V, ⑤		D/D & Rehab./JICA		Rehab. & Improv./JICA	Rehab. & Improv./JICA	Rehab. & Improv./JICA
Pelabuhanra tu	West Java	⑤	⑤	②		⑤	⑤	④

Cilacap	Central Java	e	e	Development / Improv.		e	e	d
Sadeng	DI Yogyakarta	e						
Prigi Pondokdada P	East Java	e	e		b, c; Construction	e; c; Construction	e; b, c; Construction	d; b; Construction
Pengambengan	Bali					e	e	d
Teluk Awang	West Nusa Tenggara	a	b; Construction, e	Construction by Deco Funds for NTB	c; Construction	a; Construction	b; Construction	c; Construction
Kupang	East Nusa Tenggara			a				
Bitung	North Sulawesi		b; Construction	Review Design				
Kwandang	Gorontalo				c; Construction	c; Construction	b; Construction	b; Construction
Tual	Maluku	e	e	Reclamation etc.		e	e	d
Ternate	North Maluku		e			Land Acquisition, e	e	d
Merauke Biak	Papua West Papua	a	b; Construction a	Construction by Deco Funds	b, c; Construction	a; Construction	b; Construction	c; Construction
Solong	West Papua				b			
Makassar	South Sulawesi		a				Construction	

Note: Colored cells show the seven surveyed sites.

3.3 Issues to be addressed in implementing the ORFP development plan

① To optimize fishery resources exploitation

According to the strategic plan of DKP⁹, the fishing catch is expected to increase at a rate of 0.55% per year from 2005 to 2009. From this aspect, the reduction of the fishing catch owing to attempts to stop over-fishing might be counterbalanced by IUU prevention measures and utilization of unexploited resources. Thus, the 0.55% increase rate would be considered as a realistic target. For the utilization of fishery resources under appropriate management, it is necessary to acquire the more accurate information regarding fishing catch and the current status of resources in outer ring fishing ports, and to improve the monitoring of ships. In this sense, it is important for the ORFP development to work alongside related policies and measures on resource and fisheries management.

② International standard facilities

In most of the fishing ports, the ice and fresh water supply does not fully satisfy the demand. And today, the fish processing industry requires international standard quality and hygiene for fish material and its treatment. Thus, the improvement in ice/water supply and hygiene systems in fishing ports is increasing in importance

③ Scale and contents of the facilities improvement plan

⁹ RENCANA STRATEGIS PEMBANGUNAN KELAUTAN DAN PERIKANAN TAHUN 2005 – 2009, DKP, 2005.

From the point of view of spreading fishing activity throughout the outer ring territory, the disposition of the planned sites would be geographically effective. However, as a delay caused by the lack of funding has already been seen in the project, it is considered that the scale of this project would be too ambitious for the government of Indonesia to complete with its own budget within the planning period.

In the ORFP Master Plan, the fishing port classification and the size of the facilities to be improved are based on the total allowable catch in the WPP fisheries management area, which each fishing port shares. And the actual demand and conditions of each site such as resources, catch, fishing boat, fishers, market, fish processing and distribution are not investigated in particular. Thus, it is needed to investigate these aspects for the following detailed design and planning works. Concrete development contents of individual fishing ports are entrusted to the detailed design and planning works carried out after the master plan, and a concrete image has not yet been produced by the master plan.

④ Distribution of fishery products to the outside regions

In terms of fishery product distribution toward the outside regions, it is important to have a reefer container service, to be able to accommodate large carrying vessels in fishing ports, and to be able to make use of an airline. Today, in Indonesia, a regular container service network has spread throughout the territory and connects major commercial ports in each region even in the outer ring areas. This has been developed through the improvement of container handling facilities in commercial ports by the Indonesian government. Therefore, fishery products are already shipped by reefer containers from the eastern outer ring territories. The regular container service network in the eastern area starts from Surabaya to Makassar, and then spreads to more eastern territories along some major routes.

4. Results of site surveys at the target fishing ports

4.1 Selection of the target fishing ports

As a result of this survey on the seven selected outer ring fishing ports, the development plan of each site is summarized in the following table. Here, in the site survey, SWOT analysis on the development plan is carried out to properly take into account the characteristics, current situation and problems of each site, based on discussions with those involved.

Survey results on the seven ORFP development sites

Site	Expected Users	Scale of Facility	Outcome	Problems & Tasks
PPN Teluk Awang	<p>145 sampan-type boats behind the fishing port and boats from two PPI on the eastern coast. It is not clear whether there will be a new entry of 30GT-class boat. In the province, there are 145 boats of 10~20GT class.</p> <p>It is believed that some private companies are considering moving to the fishing port.</p>	<p>The reclaimed land is big enough at present. Two jetties for small boats and 30GT-class boats are planned. The length of the main jetty of maximum size but in the first stage it could be kept to a minimum requirement.</p>	<p>Small-scale fishers expect to enlarge their fishing boats so as to operate off the gulf of Ekas.</p> <p>Get close to the fishing grounds in the Indian Ocean for fishing boats which use the current PPI.</p> <p>Base for patrol boats to operate in the Indian Ocean.</p>	<p>Access road is very poor. Development of access road is needed in parallel with fishing port construction.</p> <p>Electricity is limited and lacking.</p> <p>Need to investigate expected users of the fishing port, and related measures.</p> <p>Delay caused by budget shortfall.</p>
PPN Untia (Makassar)	<p>In the province, there are 149 boats of 20GT and larger classes. In the Makassar area, all fishing boats are less than 10GT. It is not clear whether there will be a new entry of 30GT-class boats.</p> <p>Currently, fishing boats use the two existing PPI, but they are not enough to satisfy demand. Demarcation for utilization of neighboring PPI is not clear.</p>	<p>Fishing port is planned to be located 600m offshore in order to keep its depth of 3m and to fulfill the requirements of PPN. This requires a large-scale breakwater and dredging.</p>	<p>To solve the shortage of mooring and handling facilities in current PPI.</p> <p>To improve hygiene condition and to be capable of meeting the requirements of fish processors.</p> <p>To make active use of the logistical advantage of the city.</p>	<p>Need to investigate expected users of the fishing port, and related measures.</p> <p>Delay caused by budget shortfall.</p> <p>Sedimentation in the port pond and around the fishing port.</p>
PPP Kupang	<p>Mainly used by medium to large class boats larger than 10GT. In 2009, there were 879 visits to PPP, and 100~140 monthly visits occurred in high season.</p> <p>Fishing port users are well demarcated with other PPI.</p> <p>It is not clear about the demand for land area.</p>	<p>In high season, the shortage of jetty space becomes serious. To breakup this congestion, a 2-to 3-fold extension of the jetty would be required. Thus, the development plan of the jetty is considered as correct.</p> <p>A port pond with enough depth is greatly needed, but not implemented in the development plan.</p>	<p>To solve the congestion of fishing boats in high season.</p> <p>To shorten the waiting time to unload, and to improve fish quality.</p> <p>To break up transshipment and to intensify the catching data collection and resources management.</p> <p>Base for patrol boats.</p>	<p>Shortage of jetty makes fishers continue transshipment. Development of jetty is greatly needed.</p> <p>Upgrading revetment around port basin and deepen it could improve port basin with enough depth.</p>
PPN Nunukan	<p>The outboard engine boat is dominant, along with inboard engine boats less than 5GT. It is not clear whether there will be a new entry of 30GT-class boat. Most of the fishers live in Sabatik Is. near to Nunukan, which is about one or two hours from the project site.</p>	<p>Minimum scale jetty is planned as PPN.</p>	<p>To be an inter-regional and export shipment base.</p> <p>To intensify fishing data collection system and resource management.</p> <p>To be a fishing base for border areas and support safe and stable fishing activities.</p> <p>Base for patrol boats.</p>	<p>Need to investigate expected users of the fishing port, and related measures.</p> <p>Effectiveness of administrative direction to Sebatik fishers to use new fishing port.</p> <p>Inadequate execution work would cause foundation problems</p>

Survey results on the seven ORFP development sites (Continued)

Site	Expected Users	Scale of Facility	Outcome	Problems & Tasks
PPS Bitung	PPS is used by both small-scale boats and large commercial fishing boats (21,000 visits per year). Not only large boats but also small-scale fishers provide fish to processors.	The development plan for the jetty is correct based on the calculation of the current number of boats and visits by small boats. And it would also be improved for large-scale boats, but some congestion caused by preparation work would occur.	To shorten the waiting time to unload, and to improve fish quality for both large-scale and small-scale fishing boats. To halt additional private jetty enhancement and to consolidate fishing catch to the fishing port. To provide hygienic conditions in the fishing port and to be capable of meeting processors' requirements.	It is difficult to expand further from current development plan, because land space is limited. Demarcation between neighboring Perikanan Nusantara. The sun shade roof is working well. And further development might be considered to improve hygienic condition.
PPN Ternate	Demarcation for utilization of neighboring PPI is not clear. At present, there is no critical shortage of facilities.	The scale of the existing jetty is correct, compared to the required jetty length (160m) based on the calculation of the current number of boats and visits.	There is sufficient room for jetties to accept cargo ships through shortage of commercial port facilities. Thus the jetties would be capable of meeting demand from fishing boats.	Need to investigate expected users of the fishing port, and development plan. Demarcation between neighboring PPI is to be investigated.
PPN Tual	Number of boat visits in 2009 was only 30 and no fish catch was landed at the fishing port. Currently, it is believed that large commercial fishing boats are using Ambon and Bitung fishing ports.	Before 2007, many large fishing boats, including foreign boats, entered PPN Tual. In these conditions, demand for fishing port facilities was high.	There is no special note.	The most important issue is to normalize current situation where there is little exploitation by fishing boats. Inter-regional demarcation involving Ambon and Bitung about large fishing boats

4.2 A summary of the survey results (at the target fishing ports)

In general, fishing port development planning should be based upon a proper spatial plan designed by the public sector and the scale of infrastructure should be balanced with expected sizes and numbers of fishing boats. Within the surveyed seven sites, Teluk Awang, Untia (Makassar) and Nunukan are newly constructed fishing ports and construction work has already been started by the Indonesian government's budget. MMAF is making every effort to get the necessary budget for the development of fishing ports. However, it takes time to obtain the budget and the short fall in the budget, which is not enough for construction, produces a delay in fishing port development. In addition, owing to the difficulties regarding supervision of construction work and technical difficulties, the progress of fishing port development is not meeting the government's expectation. Thus, the government of Indonesia anticipates assistance from Japan, because Japan has considerable experience in fishing port/port development with international high standards and precise technical management.

In fishing port development, unlimited coastal exploitation, which might impact coastal fisheries, such as reclaiming mangrove swamps, should be prevented in terms of sustainable fisheries development. Within the seven surveyed sites, PPN Nunukan is located near a mangrove swamp, there is a lobster spawning ground off Awang bay in Teluk Awang, and Kupan City is making a considerable effort to protect its coastal environment. These aspects should be taken into account in fishing port development.

At every site, in order to consider assistance to the plan, it is necessary to assess comprehensive benefits based on the analysis considering demand and supply, including detailed information and needs of expected beneficiaries, supposed ways of uses, suitable scale and detail of the facilities based on the above results. Particularly, the plans of newly constructed fishing ports should be carefully examined, since; 1) the conditions and needs of the expected beneficiaries have not been investigated; 2) the demarcation of neighboring PPI and the new fishing ports have not been clarified; and 3) the division of the port users between neighboring PPI and new fishing ports has not been considered. Here, it would be advisable in every ORFP site to investigate the expected benefits and to re-examine the detailed plans.

5. Synthesis of the study results

5.1 Preliminary appraisal of ORFP development plan

(1) Relevance

The ORFP plan has an important mission to fulfill the increasing domestic demand for fish and there is an issue that the contribution of the fishery sector to the national economy increases as international demand for fishery products increases. Although the Indonesian government is expected to meet these needs, Indonesian fishery production is almost reaching the upper limit from the point of view of the availability of marine fishery resources (MSY: 6.4 million tons and TAC: 5.12 million tons).

As such any increment in total fishery production from now on cannot be expected in the marine capture fisheries sector. However, the activities of the fishing fleet are not evenly conducted in the domestic water areas and it can be said that utilization of resources is still low in some areas, so there should be remaining rooms for further development. These areas are rather remote areas along the outer ring of Indonesian territory, and most of them are underdeveloped. Therefore, it is thought that the needs of fishing port development, which promote balanced utilization of fishery resources, are very high. The ORFP-DP is a plan to contribute to the promotion of effective utilization of resources in the underdeveloped areas within the EEZ, ensuring the safety of fishery industry operation in the marginal areas of Indonesia and proper utilization of fishery resources, in addition to the eradication of the IUU fishing through the provision of operation bases for national patrol vessels for monitoring, control and surveillance of the EEZ areas. For that reason, the development needs of ORFP-DP to provide new fishing ports meeting international standards in the Indonesian outer ring area are very high.

(2) Efficiency

Regarding the efficiency of this project, it is considered from the viewpoint of (1) output (2) time frame and (3) project costs as shown below. Although they have anticipated financial assistance from external sources (donors) with the implementation of the ORFP development plan of MMAF from the beginning, they have developed the master plan of ORFP in 2004, and initiated their own efforts by making the best use of whatever available budget (central, regional and extraordinary budget, etc.). The project started by taking phased approach (one to three) regarding the 26 outer ring fishing ports with a total project cost of 6,500 billion IDR (approx. 65 billion yen) in the implementation period of 8.5 years. This is because they viewed that overseas assistance would take considerable time. Such effort is an indication of the Indonesian government's firm commitment on the ORFP-DP. However, it was observed during the construction work in phase one that a steel pipe pile of the pier in Nunukan collapsed because of heavy weather, and construction work slowed in Teluk Awang and Makassar because of the delay in executing the project's budget. Similar problems may occur and this may further delay the time of completion. Therefore, at present, completion is nowhere in sight, and it has to be judged that effectiveness level of this plan is low.

These problems can be considered technical matters; but may also be attributed to the fact that they cannot receive the support of overseas donors in a timely manner.

(3) Prospects for effectiveness

In order to produce a positive effect from fishing port development, good management of facilities working in tandem with other relevant plans such as those for resources, production, processing, circulation, retail and consumption (disposal) are vital.

As for effectiveness, judging from the construction progress situation, it is almost impossible to

hope for completion of construction of all the sites in phase 1 (nine places) with the original budget. In case funding from overseas cannot be provided, phase 2 (9 sites in total comprising Sorong, Biak and Kwandang in the east, which were not in phase 1, and six places in the west), and phase 3 (8 sites in the west) started some construction work in 2007 and 2005, respectively, which influences the whole of the ORFP development plan.

However, the development needs of the outer ring fishing ports are considerable, and this is the project plan with emergency-like points such as the eradication of IUU fisheries, so ensuring promotion of the plan is a priority.

5.2 Feasibility of ORFP development plan

(1) Technical ability

The Indonesian government has about 960 fishing ports throughout the country and makes considerable effort in the development of fishing port infrastructure facilities especially in the rural areas for the continuous utilization of fishery resources. The results show that about 370 fishing ports have undergone development in the last ten years. The outer ring fishing ports will fall into the existing PPS or PPN (classes A or B) according to the plan, and there are 6 places in class A and 13 places in class B at present. Considering these points, it is judged that the technical ability regarding fishing port development is sufficient. It is planned that the scale and specifications of ORFP-DP match international standards, and it is necessary to implement the plan steadily taking into account the experience gained in Jakarta fishing port (as a hub port of ORFP in the western area) where the bank of a quay is presently being raised.

(2) Maintenance and management ability

Fishing port facilities in Indonesia are managed by two organizations at present namely UPT and PERUM. However, the Directorate General of Capture Fisheries of MMAF (the fishing port bureau is in charge) has responsibility for the completion of construction, and the central government has overall implementation responsibility, although local governments (province, prefecture and city, etc.) sometimes have responsibility due to the change of the source of project budget by site and by year. The ORFP-DP is divided into three phases, and it is for the large-scale project to develop 26 fishing ports throughout the country, which are required to comply with the international standards. The project has already started with a total project cost of 6,500 billion IDR (about 65 billion yen) and an implementation period of 8.5 years. In view of the overall scale of this large project, it cannot be simply said that relevant authorities are capable of managing the project based on the fact that they have successfully managed the past (rather smaller scale) fishing port development projects. For this reason, technical guidance especially focused on administration of the project is important as part of the technical assistance.

(3) Funding ability

As mentioned above, outer ring fishing port development has a goal of sustainable utilization of fishery resources; in addition, this project has been approved as an operation of high urgency among the fishery sector development plans in Indonesia. Although the Indonesian government has anticipated assistance from overseas development partners (donors) for the implementation of this program, it settled on the master plan in 2004 because of the urgency of the situation, and through making the most use of its own budget (central, regional and extraordinary budget, etc.). This is because overseas assistance takes time, and shows that the Indonesian government would like to conduct the project autonomously with their own budget.

However, during the construction work, problems have been revealed such as the collapse of a steel pipe pile of a pier during heavy weather, slowing down of construction work because of the delay in allocating the project budget, and postponement of the completion date. In Teluk Awang, Nunukan and Merauke, which are newly constructed fishing ports under phase 1, the budget has been allotted annually since construction started in 2005; but the fact is that there is not enough money to be able to finish within the period as originally scheduled. The situation is not clear whether or not the necessary budget can be procured. Although the Indonesian government has started construction work with its own budget through its own organization because of the necessity and urgency of this project, in terms of the construction progress and management situation of phase 1, considerable delays have already occurred.

(4) Necessity for close cooperation with related projects

For the outer ring fishing port development, it is important to carry out related plans such as fishing boats building and distribution, and preparation of support facilities such as roads and bridges for fish distribution in a timely manner. Close cooperation with other ministries and private enterprises is essential to achieve the aims of the ORFP development plan, and there is a need to push related projects of public infrastructure such as roads, and to attract private enterprises, for example, fishery processing-related companies etc.

5.3 Suggestions/ recommendations on the ORFP development plan

There are a number of salient issues identified in the course of the study, which may require the MMAF's additional actions. The followings are suggestions/ recommendations drawn from the synthesis of the study results

(1) Principles of facility development

The main point in the facility development project comes down to a simple question; "are they actually used and how effectively are they utilized?" The facilities become obsolete over time, and

there is the possibility the useful life of the facilities is reduced even by half when maintenance is not good. Hence, in ORFP-DP the most important point is to maintain the necessary quality (Q), and to complete construction steadily within the given cost brackets (C) and for a fixed period (D).

(2) Re-evaluation of demand prediction/development strategies at each site

The size of fishing ports in the master plan has been determined simply based on estimated available quantity of fishery resources in the area. The fishing port developed in such a way may likely be over-sized as compared to the actual demand from the fishing industry in the area.

(3) Clarification of the responsibilities among relevant government agencies in the implementation of the ORFP development plan

In the fishing ports under construction, there are several fishing ports where improvement work is slow due to the lack of budget and delay in budget execution. In addition, it often occurs that implementing agencies change several times, for example, province to regency, or regency to province, in the course of construction. This may cause lack of management and confusion. It is necessary to clarify the responsibility system for the project implementation before assistance is considered.

(4) Timely and coordinated implementation of supporting facility development

It was observed that some of the roads and bridges are remained non-functional in some of the outer-ring fishing ports of Phase 1. It is important to improve the basic social infrastructure to keep pace with outer-ring fishing port development in order to reinforce the distribution system for fishery products.

(5) Clear demarcation of technical responsibilities when taking over development work

In every site, understanding comprehensive benefits, the project beneficiaries, and usage patterns of the facilities is important. Investigation/analysis about assumed advantages must be done before the support is considered. In the case where construction work on the facilities is under way, it is necessary to analyze the prospective outcomes/benefits and to review the plan based on analysis of each site raised in the ORFP development plan in order to clarify the demarcation of technical responsibilities and to promote the project having a common understanding among stakeholders.

(6) Importance of the supervision of work

The supervision of work is important as there are problems such as loss of expected revenue because of delay in the construction work, reduced profit owing to an increase in management and security cost and so on.

(7) Necessity of the operation/management plan of the fishing port

Cooperation between the public and private sectors is important in such a way that public sector investment is kept to a minimum and private sectors carry out the development as much as possible in cooperation with public sectors. In this case, it is necessary to formulate an adequate management and administration plan of the port.

5.4 Other remarks

(1) Environmental impact assessment (EIA)

For the construction of fishing ports, examination and evaluation of environmental influences are carried out in accordance with the environmental law of Indonesia. Implementation responsibility of the EIA lies with the MMAF.

(2) Private sector's needs and projection of the demand for fish and fish products

The authorities need to pay due considerations on needs of private sectors such as importers, consumers and so on taking principles of effective use of fishery resources into account.

Since this study is conducted mainly through the collection and analysis of existing information and site surveys of 7 ports, it has only examined the outline of ORFP-DP, not the details of each fishing port. Therefore, for the thorough examination of the ORFP development plan, it is necessary to collect more detailed information through further investigation, to make clear the level of responsibility for construction work already completed within the framework of the project, and to discuss continuously the concrete implementation methods to ensure quality of each project.

Chapter 1 Outline of the study

1.1 Background

1.1.1 General information of Indonesia

The Republic of Indonesia (hereinafter referred to as “Indonesia”) is located in the border between the Pacific Ocean and the Indian Ocean. The country is situated between lat. 6 ° 8' N. and lat. 11 ° , and long. 94 ° 45'E and long. 141 ° , which consists of more than 17,000 islands forming the largest archipelago in the world. The land area is about 1,910 thousand km² (5.1 times larger than that of Japan), and the total area of Exclusive Economic Zone (EEZ) is about 5.8 million km² (the 3rd largest in the world) with 81 thousand km of the total coastal line (the 2nd longest in the world). Indonesia is blessed with rich marine and fishery resources thanks to very diversified geographical conditions. The basic data of Indonesia is shown in the table 1-1. The total population is 231 million in the country and 9.22 million in Jakarta as of 2009 according to the government estimation. The rate of population growth is 1.2% and it tends to be stable, however, the number of people living in poverty is 3.5 million and it occupies 15.1% of the total population. In recent years, though Indonesia has been suffered from a series of natural disasters, growth rate of GDP maintains at 6-7%, and this means less influence of growth against macro economy of the country. It is necessary to encourage further investments from both international and domestic entities in several industries in order to maintain the sustainable growth and to address major issues in the national development plan such as lowering poverty rate etc. for the future.

Table 1.1-1 Basic data of Indonesia

Items	Contents
Geography/Climate	Land area: 1.91 million km ² Tropical climate(Average 27°C, Dry season: April-September, Rainy season: October - March)
Population	231 million people(2009, government estimation), Rate of population increase:1.2%(average in 1990-2008), Population of Jakarta:9.22 million people(2009, government estimation) Population of poor: 3.75million people (Poverty rate:15.1%, 2008)
Ethnicity/Religion/Language	300 or more tribes, out of which mainly consist of Malay, 6 million or about 3% Chinese in the total population, Moslem(about 90%), Christian, Hinduism, Buddhist Indonesian language(Official language), other 250 or more local languages
GDP•Industry	US\$510.7 billion(2008), GDP per capita: US\$2,239, Gross growth rate: 6.1%(2008) Agriculture, forestry and fisheries:14%, Mining etc:11%, Manufacturing :27%, Wholesale, retail, and service: 20%

Work force/Unemployment rate	Agriculture, forestry and fisheries:44%, Mining etc:1%, Manufacturing :12%, Wholesale, retail, and service: 11% Unemployment rate:8.46%(February, 2008)(high standard)
Export	US\$136.7 billion(2008), Export to Japan: US\$ 27.7 billion(2008)
Import	US\$105.1 billion(2008), Import from Japan: US\$ 15.1 billion(2008)

(Source: JETRO (J-FILE) Indonesia)

1.1.2 Background of the study

Indonesia is abundant to variety of marine and fishery resources. Indonesia is one of the major fishing nations in the world with 2.74 million fishers (2.24 million of marine capture fishers and 0.5 million of inland open water capture fishers) and with about 5.2 million tons of capture fisheries production (4.7 million of marine capture fisheries and 0.5 million tons of inland open water capture fisheries) in 2008. In addition, development of aquaculture is remarkable. In 2008, the number of fish farmers is about 2.76 million and the production reached 3.85 million tons. Per capita consumption of fishery products in Indonesia has been increasing from 23.95 kg in 2005 to 28.00 kg in 2008. Thus fishery products are an important source of high quality protein supply to Indonesian nationals. Indonesia exported about 0.91 million tons of fishery products in 2008 and earned USD 2.7 billion. Fishery products constitute an important share of exporting products in the primary sector of Indonesia.

Marine waters of the country were initially divided into nine Fisheries Management Areas (FMA), which was increased to ten in the end of 2006 by sub-dividing the Indian Ocean FMA into two at Sunda Sea Strait located offshore area of Sumatera, Java, Bali, and Nusa Tenggara. Furthermore, the Sulawesi and Pacific Ocean FMA was sub-divided into two areas at near Morotai Island located in the north of Halmahera Island in 2009, which made the total number of FMAs eleven(Government Decree No.PER.01/MEN/2009) . Such changes are meant for more manageable and effect management of fishery resources. Relevant laws and regulations were also revised accordingly in order to strengthen management of fishing activities in the new FMAs and undertake proper and sustainable utilization of fishery resources. In marine capture fisheries, fishery resources show an apparent tend of decrease due mainly to over fishing in the Western water areas. On the other hand, fishery resources in the Eastern water areas are considered to be relatively in good condition. However, in the Eastern Indonesia, income levels of fishers are still low because of delayed development of basic infrastructure such as fishing ports and fish distribution systems etc. To improve income of fishers, it is necessary to utilize more varieties of fishery resources and to improve the quality of fishery products, which may suggest the needs for more efficient fish loading at fishing ports, introduction of fair fish dealing systems, improvement of storage and processing facilities, and establishment of fish distribution networks connected to consumption areas.

In addition, it is also important to ensure the quality of fishery products by improving hygienic standard of fish handling in view of effective utilization of fishery resources. To attain the sustainable utilization of fishery resources in Indonesia, the promotion of balanced infrastructure development is considered important in regions in Indonesia's vast landmass, adding to the improvement of systems and regulations on fisheries management.

When the relevant parties examine supports for the development of basic facilities of fishing ports and functional facilities such as those for storing and processing of fishery products, it is necessary to clarify the effectiveness and evaluation in implementing the fishing port development, and the priorities in the assistance of the fisheries sector from the aspect of supporting sound development of the fisheries sector of Indonesia.

Based on the above understandings, the study examines issues through the review of the current situation of the fisheries sector and the relevant policies. Also, the study clarifies the socio-economic situation and needs of stakeholders in marine capture fisheries and private enterprises relevant to capture fisheries and fish processing in order to predict the future of these parties and future trends regarding fishery resources. In addition, the study collects and analyzes information on fishing port facilities.

1.2 Purpose of the study

This study aims to collect the latest information on current situation and issues affecting the fisheries sector as well as fishing ports, and to examine the information to consider Japan's aid framework in the field of fishing port development.

- Policies and programs of the Indonesian government and trends in other donors' assistance
- Support for sustainable development of fisheries sector in Indonesia
- Clarification of priorities in the support of the fisheries sector
- Confirmation of meaning and positioning of support for fishing port rehabilitation and/or renovation

1.3 Target areas of the study

The target areas of the study are the whole country of Indonesia from the aspect of information analysis. In the site surveys, the team studies 7 outer-ring fishing port sites, namely, Teluk Awang port (West Nusa Tenggara province), Makassar port (South Sulawesi province), Kupang port (East Nusa Tenggara province), Nunukan port (East Kalimantan province), Bitung port (North Sulawesi province), Ternate port (North Maluku province), and Tual port (Maluku province), which the Indonesian government expects to develop.

Chapter 2 Current status and issues of marine capture fisheries

2.1 Current status of the fisheries sector

2.1.1 Overview of the sector

Fishery production in Indonesia has been gradually increasing in recent years. It reached 9.05 million tons in 2008, 1.53 times the 5.91 million tons of 2003; it is the third largest in the world following China and Peru. The industry is divided between 5.20 million tons for capture fisheries (57%) and 3.85 million tons for aquaculture (43%). Aquaculture contributes greatly to the increase of recent fishery production, becoming 3.14 times in 2008 what it was 2003. Capture fishery seems to have remained at almost the same level, increasing 1.10 times between 2003 and 2008. This is because coastal communities including artisanal fishers have been shifting to seaweed aquaculture from capture fishery, since local governments recommended seaweed aquaculture. However, naturally harvested seaweed has been decreasing.

2.1.2 Status and trends of the fishery production

The following table shows that the production of marine capture fisheries has been increasing slightly (7%) from 4.38 million tons in 2003 to 4.70 million tons in 2008, and that inland open water capture fisheries increased (62.5%) from 309 thousand tons in 2003 to 494 thousand tons in 2008. On the other hand, marine aquaculture production was 7.9 times higher, increasing from 249 thousand tons in 2003 to 1,966 thousand tons in 2008, and brackish water aquaculture production increased 1.9 times and freshwater aquaculture production increased 2.0 times in the same period, respectively. The increase of aquaculture production is very clear compared to capture fisheries production. Among marine aquaculture production, seaweed culture contributes significantly. The production of cultured seaweed increased 6.4 times in the same period.

Table 2.1-1 Capture fishery production (2003—2008) (Unit : tons)

	2003	2004	2005	2006	2007	2008
<u>Capture Fisheries</u>	<u>4,691,796</u>	<u>4,651,121</u>	<u>4,705,869</u>	<u>4,806,112</u>	<u>5,044,737</u>	<u>5,196,328 (57%)</u>
Marine	4,383,103	4,320,241	4,408,499	4,512,191	4,73,280	4,701,933
(Seaweed)	(64,610)	(8,677)	(9,670)	(4,996)	(4,643)	(2,917)
Inland water	308,693	330,880	297,307	293,921	310,457	494,395
<u>Aquaculture</u>	<u>1,224,192</u>	<u>1,468,610</u>	<u>2,163,674</u>	<u>2,682,597</u>	<u>3,193,565</u>	<u>3,855,200 (43%)</u>
Marine	249,242	420,919	890,074	1,365,918	1,509,528	1,966,002
Brackish water	501,977	559,612	643,975	629,610	933,833	959,509
Fresh water	472,973	488,079	629,625	687,069	750,204	929,688
Total	5,915,988	6,119,731	6,869,543	7,488,709	8,238,302	9,051,528 (100%)

(Source: DG of Capture Fisheries & DG of Aquaculture, MMAF, 2009)

The number of fishers involved in marine capture fisheries and inland open water fishery production in the fishery industry is about 2.73 million in total. The number of inland open water capture fishers is approximately 500 thousand and the number is stable. The number of fishers whose principal occupation is capture fishery occupies around half of the total; however, the number in 2008 decreased 0.67 times from that in 2003. Fishers involved in other related business in 2008 decreased to around 3/4 of the total in 2003. In total, 3.85 million fishers in 2003 became 2.73 million in 2008, an approximate 30% decrease.

Table 2.1-2 Number of fishers (marine and inland open water capture fishery) (2003–2008) (Unit: person)

Fisher	2003	2004	2005	2006	2007	2008
Full-time fisher	1,935,955	1,400,750	1,346,581	1,468,268	1,289,128	1,295,921
Part-time fisher (Mainly fishing)	1,334,378	1,064,822	866,195	845,134	1,034,110	1,013,516
Part-time fisher (Supplemental fishing)	587,264	469,717	377,588	386,772	432,556	427,129
Total	3,857,597	2,935,289	2,590,364	2,700,174	2,755,794	2,736,566

(Source: DG of Capture Fisheries & DG of Aquaculture, MMAF, 2009)

The following table shows the number of fishing vessels and boats in marine capture fisheries and inland open water capture fishery. The role of fishing vessels and boats in fishery production is important and modernization is therefore focused. The total number of fishing vessels and boats in marine capture fisheries was about 520 thousand in 2003 and 590 thousand in 2008, a 12% increase. The number of non-powered boats in 2008 was about 210 thousand, 30% of the total, and in 2003, 250 thousand, 47% of the total. The number and share of the non-powered boats has been decreasing and motorization of fishing vessels and boats has been increasing. (160 thousand in 2003 became 230 thousand in 2008, a 1.45 times increase). In-board engine vessels have been increasing overall, but 7,366 fishing vessels of 30GT or more in 2003 was reduced to around half that total, 4,048 in 2008. 112,471 in-board engine vessels less than 30GT in 2003 increased to 150,798 vessels in 2008. This is believed to be because of age and the affect on profitability caused by large fishing vessels built in foreign countries. It became important to introduce small fishing vessels with greater economy and more appropriate vessel shape/design, and to improve fishing port facilities throughout Indonesia to secure safe navigation and security.

Table 2.1-3 Number of fishing vessels and boats (Marine capture fisheries) (2003–2008)

(Unit: Number of vessels and boats)

Classification of vessels and boats	2003	2004	2005	2006	2007	2008
Non-powered fishing boats	250,649	256,830	244,471	249,955	241,889	212,003
Out-board engine fishing boats	158,411	165,337	165,314	185,983	185,509	229,335

In-board fishing vessels and boats	<5GT	79,218	90,148	102,456	106,609	114,273	107,934
	5-10GT	24,358	22,917	26,841	29,899	30,617	29,936
	10-20GT	5,764	5,952	6,968	8,190	8,194	7,728
	20-30GT	3,131	3,598	4,553	5,037	5,345	5,200
	30-50GT	2,338	800	1,092	970	913	747
	50-100GT	2,698	1,740	2,160	1,926	1,832	1,665
	100-200GT	1,731	1,342	1,403	1,381	1,322	1,230
	>200GT	599	436	323	367	420	406
	Sub total	119,837	126,933	145,796	154,379	162,916	154,846
Total	528,717	549,100	555,581	590,317	590,314	596,184	

(Source: DG of Capture Fisheries & DG of Aquaculture, MMAF, 2009)

The following table shows the number of fish processors and fish distributors. The number of fish processors increased 10.5% from 329,332 people in 2005 to 363,980 people in 2009. The number of fish distributors increased 2.2 times in the same period. The regional distribution of the number of fish processors shows that Java has 49%, followed by 19% for Sulawesi and 14.7% for Sumatra.

Table 2.1-4 Number of fish processors and fish distributors (Unit: People)

	2005	2006	2007	2008	2009
Number of fish processors	329,332	345,799	371,734	399,614	363,980
Number of fish distributors	197,599	207,479	223,040	249,768	425,639

(Source: Marine and Fisheries in Figures 2009, MMAF)

The import of fishery products increased from 857,783 tons in 2003 to 911,674 tons in 2008. The amount also increased from US\$1,643.542 million to US\$2,699.683 million in the same period. It is the 11th highest import amount in the world. There was a 1.06 times increase in quantity and a 1.64 times increase in the amount of imports in the same period. In export volume for 2008, 424,401 tons of “other fish”, except skipjack and tuna, occupies 46.5% of the total, followed by shrimp (18.7%), others included seaweed (18.2%), and “skipjack and tuna” (14.3%). In 2008, US\$1,165.293 million worth of shrimp counted for 43% of total exports, followed by “other fish”, except for skipjack and tuna (27%), “skipjack and tuna” (13%) and others including seaweed (9%). Shrimp is still a highly valued international commodity. Among fishery products by commodity type, fresh fish including frozen fish counts for about 420 thousand tons, followed by fresh crustaceans and mollusca, including frozen ones and also dried and salted and smoked crustaceans and mollusca of 188 thousand tons, packaged fish including canned fish of about 59 thousand tons, packaged crustaceans and mollusca of about 55 thousand tons,

and dry and salted fish and smoked fish of about 28 thousand tons. The principal exporting destination is the USA in both quantity and value totaling 139,128 tons, US\$937.22 million, in 2008, followed by Japan with 117,182 tons, US\$616.73 million, and the EU with 79,652 tons, US\$324.45 million. Items by type regarding principal destination is as follows: shrimp, USA with about 77 thousand tons, followed by Japan with about 40 thousand tons; tuna, Japan with about 29 thousand tons, followed by the USA with 21 thousand tons; “other fish”, Japan with about 38 thousand tons, followed by the USA with about 32 thousand tons. These figures are based on data from 2008.

The import of fishery products increased from 107,768 tons in 2003 to 280,179 tons in 2008 in quantity and increased in value from US\$90.808 million to US\$267.659 million during the same period. This is a 2.6 times increase in quantity and a 2.9 times increase in value of imports. Chilled and frozen fish was imported the most with 83,984 tons in 2008. This is 30% of the total. The secondary product is fish meal with 24% and the third is other meals with 23%. In 2008, as for the import value, the principal is chilled and frozen fish at US\$683.79 billion (26%), followed by other meals (23%) and fish meal (17%).

Comparing exports and imports, exports were greater. However, the degree of the increase of imports is bigger than that of exports.

2.1.3 Fishery policy framework

(1) National mid-term development plan (2010-2014)

Six (6) objectives are laid out in the field of fishery in the current national mid-term development plan. Community development and empowerment through programs on ecologically and economically sustainable capture fishery and aquaculture for artisanal fishers and fish farmers in coastal and archipelagic areas:

- Adaptation to and alleviation of climate change in the marine and fisheries sector
- Improvement of quality of fishery products and income of artisanal fishers by marketing and promotion of small and medium scale enterprises
- Development of infrastructure for marine and fishery resources and improvement of facility maintenance and management
- Development of marine and capture fishery and monitoring of illegal fishing, and improvement of surveillance systems
- Promotion of harmonization of accumulated experiences contributing to development of marine and capture fishery and scientific technologies

(2) Mid-term development plan related to development of marine and fisheries (Strategic Plan 2010-2014)¹

The strategic plan (2010-2014) sets out the following 4 policy objectives of the Ministry of Marine Affairs and Fisheries for the coming 5 years after 2010 based on Government Ordinance No. 25 (National Development Plan System) and Presidential Decree No. 5 (National Mid-Long-Term Development Plan 2010-2014) and aims

¹ Strategic Plan of Ministry of Marine Affairs and Fisheries in 2010-2014

to be realized through 6 policy measures. The four policy objectives are as follows:

Pro Poor : Measures against poverty for persons related to the marine and fisheries sectors in the socio-economic field

Pro Job : Measures against unemployment utilizing unused aquaculture potential, enlargement of opportunity for industrialization through support for capital investment and guarantees

Pro Growth : Realization of development and growth in marine and fisheries sector, a pillar of the national economy, by shifting to contemporary entrepreneurs from small business units through support for the improvement of various infrastructure, industrialization and modernization

Pro Sustainability : Undertaking alleviation of and adaptation to global environmental issues as well as recovery and conservation of the environment in marine, coastal and archipelagic areas

Six (6) policy measures under the 4 policy objectives are as follows:

- ① Minapolitan Development
- ② Entrepreneurship (Spirit of entrepreneur)
- ③ Networking
- ④ Technology and innovation
- ⑤ Support (measures against poverty)
- ⑥ Strengthening systems for community grouping

The following table shows the indicators for the objectives of this plan. The catch volume targets a 0.55% annual increase, and aims to realize 5.5 million tons in 2014. The goal in 2014 is a 5.8% increase compared to 5.2 million tons in 2008. Aquaculture production targets a 33.19% increase annually and the goal in 2014 aims to realize 16.89 million tons.

Table2.1-5 Main indicators for measuring attainment of objectives in Mid-term Development Plan (2010-2014) of MMAF

Details	Goals					Average increase (%/yr)
	2010	2011	2012	2013	2014	
ECONOMIC FUNCTION						
Fisheries GDP Contribution to National GDP (Without oil and gas) (%)	3.0	3.5	4.5	5.5	6.5	0.21
Fishery production (million tons)	10.76	12.26	14.86	18.49	22.39	20.16
• Capture Fisheries	5.38	5.41	5.44	5.47	5.50	0.55
• Aquaculture	5.38	6.85	9.42	13.02	16.89	33.19
The Export Value of Fishery Products (USD Billion)	2.9	3.2	3.6	4.1	5.0	14.63
Fish Consumption (kg/capita/yr)	30.47	31.64	32.39	33.17	38.67	6.29

The Number of Fish Processing Units (Units)*	444	449	454	459	464	1.12
Fishermen/Fish Farmers Terms of Trade (FFT)	105	107	110	112	115	2.30
ENVIRONMENTAL FUNCTIONS						
Area of Marine Conservation Region and Waters (million ha)**	0.9	0.9	0.9	0.9	0.9	-
The Number of Small Islands Including the Outermost Small Islands that Are Managed (Island)***	20	55	60	50	20	-
Percentage of Water Areas that Are Free of <i>IUU Fishing</i> (%)	62	75	82	91	100	12.79

*) The number of fish processing units (UPI), which will become the target for the relevant year

***) Target area of marine conservation regions and waters for the relevant year

****) The Number of Small Islands Including the Outermost Small Islands which will become the target of management for the relevant year

The “Minapolitan” development plan in the above 6 policy measures aims for:

- i) Improvement of productivity of capture fishery and fishery business and quality of fishery products
- ii) Fair and impartial improvement of income of fishers, fish farmers and fish processors
- iii) To develop areas appointed by Minapolitan to be a core of economic development in the surrounding areas and to be a driving force for improvement of the economic environment of the residents

It is also stated to realize “Minapolitan” as a core for regional development giving priority to fishery business in the potential areas for fishery development. The approach to realize “Minapolitan” is to establish a system by improving the efficiency of resource utilization and to integrate production facilities and processes, processing and distribution, and environmental management. The following are the concrete measures for the field of fishery infrastructure.

- i) Improvement of fishery infrastructures shall proceed, giving highest priority to 25 outer-ring fishing ports.
- ii) 5,100-unit increase in fishing vessels and fishing equipment.
- iii) Development of 541 areas for aquaculture (238 areas for freshwater aquaculture, 158 areas for mariculture, and 145 areas for brackish water aquaculture)
- iv) Supply 69.7 billion seeds to meet demand
- v) Implementation of improvement of infrastructure related to fish processing and distribution, namely improvement of cold chain system, fish processing centers, and fishery clusters in the Minapolitan areas in the 33 provinces
- vi) Promotion of exports by supporting small/medium enterprises, investment promotion, support for formulating medium/small business units in communities, and development of financial institutions for fishers etc.
- vii) Development of infrastructure in 100 small island and archipelagic areas, and strengthening the capabilities of

business organizations and companies working in fish processing and distribution

The Minapolitan Development Plan aims to improve 86 prioritized fishery core cities for regional development throughout Indonesia. The improvement of outer-ring fishing ports will link with and meet the Minapolitan Development Plan.

(3) Fishery law

A new fishery law which has the following 8 objectives was enacted in 2004.

- Obtaining foreign currency and enlargement of contribution to national finance through export of fishery products
- Promotion of employment
- Increase of supply and consumption of fishery products as food stuffs
- Appropriateness of fishery resources management
- Improvement of productivity, quality and added value of fishery products and strengthening competitiveness
- Promotion of fish processing industry
- Optimization of fishery resources, areas for aquaculture, and environment for fishery resources
- Protection and management of zones for fishery resources, which are suitable for aquaculture

(4) Ministry Decree of MAFF related to capture fishery (No: PER.17/MEN/2006)

In 2006, (Marine Affairs and Fisheries Ministerial Decree, No: PER.17/MEN/2006, Concerning Capture Fisheries) was enacted. The main points are as follows:

- Abolition of past licensing system and agency for foreign vessels
- Fishing licenses are only issued to Indonesian citizens and enterprises established under Indonesian law .
- Foreign investors and foreign enterprises investing in capture fishery are obliged to simultaneously establish a fish processing company in Indonesia.
- Undertaking promotion of capture fishery business through revision of investment system for capture fishery

(5) Vision of Directorate General of Capture Fishery of MMAF

In order to optimally utilize marine and fishery resources, the Directorate General of Capture Fishery (DGCF) of MMAF has a vision for “Stable, independent and sustainable capture fishery in Indonesia in 2020”. The following are the objectives of the vision:

- Management of sustainable utilization of fishery resources
- Increase of fishers’ income and improvement of fishers’ social welfare
- Provision of fishing port facilities to improve both quantity and quality
- Empowerment of Indonesian fishing vessels and boats
- Promotion of effective and competitive fishing business

(6) Regional fishery organizations

The regional fishery organizations (RFOs) that Indonesia has joined are as shown in the next table.

Table2.1-6 Regional fishery organizations (RFOs), in which Indonesia participates

Name of organizations	Main activities
SEAFDEC (South East Asia Fisheries Development Center)	SEAFDEC is an international organization established to contribute to the promotion of fishery development in Southeast Asia; there are 11 member nations in total (10 ASEAN countries and Japan). It deals with problems in the international fishery field in Southeast Asia such as food security, fishing proof system, small-scale fisheries, climatic change, subsidies, the execution of UNCLOS (United Nations Convention on the Law of the Sea) and the global economic transition, etc.
ATSEF (Arafura and Timor Seas Experts Forum)	ATSEF is an experts' forum in which the scientific research is promoted by regional cooperation in the coastal nations of the Arafura Sea and the Timor sea. It aims for the sustainable development of marine resources in this area. The member countries are Australia, PNG, East Timor, and Indonesia.
NACA (Network on Aquaculture Center in Asia and Pacific)	NACA is a network organization concerned with aquaculture in Asia and the Pacific region, undertaking activities such as the interchange of personnel between member countries, training on food safety, fair/profitable trade in relation to the spread of selective breeding, problems related to hormones, antibiotics and heavy metals, etc. The DG of Aquaculture of MMAF represents Indonesia.
IOTC (Indian Ocean Tuna Commission)	IOTC is a regional fishery organization working to secure tunas resource conservation in the Indian Ocean and the optimal use of said resources; there 27 member nations and 1 organization (EU) member. Indonesia joined in June 2007. In the 13th meeting held in Bali in 2009, it was agree that the EU could postpone the prohibition of excessive catches of bigeye, yellowfin and Spanish mackerel.
CCSBT (Commission for the Conservation of Southern Bluefin Tuna)	CCSBT is a regional fishery organization that aims to secure the conservation and the optimal use of southern bluefin tuna resources; there are five member countries: Japan, Australia, New Zealand, South Korea, and Indonesia. Indonesia joined in April 2008.

(Source: Indonesian Fisheries Book 2010, and web sites, etc.)

2.1.4 Investment from the private sector

From 2004 to 2008, the fisheries sector was provided with IDR8.2 billion from Domestic Investment (PMDN: Penanaman Modal Dalam Negeri) for 6 projects and US\$71 million (IDR636 billion) from Foreign Direct Investment (PMA: Penanaman Modal Asing) for 22 projects. The largest investment recorded for PMDN was in 2005 and PMA in 2006. The total amount of investment for the fisheries sector is minimal (less than 1%) compared to the total investment amount in all sectors of Indonesia.

Table 2.1-7 Situation of private investment in fisheries sector 2004-2008

Type	2004		2005		2006		2007		2008	
	Nu mbe r	Amount	Nu mbe r	Amount	Nu mbe r	Amount	Nu mbe r	Amount	Numb er	Amount
Fisheries sector										
Local capital (billion IDR)	-	-	4	4.9	1	0.2	1	3.1	0	0.0
Foreign capital (million USD)	2	5.3	7	5.8	5	32.8	5	24.7	3	2.4
All sectors										
Local capital (billion IDR)	130	15,409.4	214	30,665.0	164	20,788.4	159	34,878.7	106.0	8,496.6
Foreign capital (million USD)	546	4,602.3	909	8,914.6	867	5,977.0	603	7,305.2	544	10,380.6
Ratio of investment amount for fisheries sector										
Local capital (%)	0.00	0.00	1.87	0.02	0.61	0.00	0.63	0.01	0.00	0.00
Foreign capital (%)	0.37	0.12	0.77	0.07	0.58	0.00	0.66	0.33	0.37	0.02

Source: Investment Coordinating Board (BKPM), 2008

Number: Number of Fixed business licenses issued

Investment amount: The realization of investment (PMDN in billion Rupiah, PMA in million US\$)

Large-scale fish processing industries have been developed in Makassar, Bitung, Ambon, and Tual in Eastern Indonesia as private business activities in the fisheries sector. Frozen fish and canned products are produced in Makassar and Tual, canned products in Katsuobushi and frozen fish in Bitung. Small-scale or home-industry fish processing are major business entities in addition to the above areas. A number of fish processors export to Taiwan and Australia and some export live fish.

2.2 Current status of marine capture fisheries

2.2.1 Status and trends of marine capture fishery production

(1) Production

Of the total of 9.05 million tons of annual fishery production in Indonesia in 2008, about 4.70 million tons (52%) were produced by marine capture fisheries. However, the share of marine capture fishery production in total fishery production has decreased from 75% in 1990. Meanwhile, mariculture and freshwater aquaculture has increased drastically. The share of marine capture fisheries in the total production amount was about 60% in 2007.

330 thousand tons of scad was caught, out of a production total of 4.22 million tons in 2008, as a mono species. About 300 thousand tons of scad was caught in 2003; this species recorded its highest production total in the 6 years from 2003 to 2008, followed by about 300 thousand tons of skipjack, 250 thousand tons of Kunbun (a group similar to horse mackerel), and 200 thousand tons of anchovy. About 100 thousand tons of Yellow-fin tuna, a major exporting product, was caught in 2008, 50 thousand tons less than in 2003. Production of shrimp is relatively stable at around 250 thousand tons. Large surface fish increased 1.4 times in 2008 compared to 2003.

Table 2.2-1 Marine capture fishery production by major species (2003—2008) (Unit: tons)

Major species	2003	2004	2005	2006	2007	2008
Tunas	151,926	176,996	183,144	159,404	191,558	194,173
Skipjack-tunas	208,626	233,319	252,232	277,388	301,531	296,769
Eastern little tuna	267,339	310,400	309,794	329,169	399,513	421,905
Other fish	3,157,465	3,112,018	3,246,770	3,293,729	3,340,120	3,308,788
Shrimp	240,438	245,913	208,539	227,164	258,976	236,922
Seaweed	64,610	8,677	9,670	4,996	4,643	2,917
Others	292,699	232,918	198,350	220,341	237,939	240,459
Total	4,383,103	4,320,241	4,408,499	4,512,191	4,734,280	4,701,933

(Source: DG of Capture Fisheries & DG of Aquaculture, MMAF, 2009)

Catch volume by type of fishing gear shows that purse-seine, with about 800 thousand tons of production, is the highest, followed by about 530 thousand tons with drift gill net, and 420 thousand tons with fish net. Production using these types of fishing gear has remained steady for the past 10 years. However, shrimp trawl has been decreasing drastically. The catch volume in major fishing ports in 2007 totaled 46,492 tons in Ambon, 13,123 tons in Bitung, 21,865 tons in Kendari and 145,666 tons in Tual.

The production volume of fresh fish remains the highest, about 3.03 million tons, followed by 460 thousand tons of frozen fish, 450 thousand tons of salted and dried fish, 140 thousand tons of boiled fish, and 65 thousand tons of smoked fish. These numbers have tended to increase almost annually since 1999 when fishery production started to be recorded in official statistics.

(2) Trend of fishers and private fishing enterprises

As of 2008, the number of marine capture fishers is about 2.24 million in the whole of Indonesia. 49.6% of this total is full-time fishers. The number of marine capture fishers shows a 32% decrease from 2003 to 2008. In the 6 years from 2003 to 2008, the number of full-time fishers has been decreasing. The number of part-time fishers who engage principally in fishing decreased until 2006 but has increases after 2007. The number of part-time fishers who engage in supplemental fishing decreased until 2005, but has increased after 2006.

Table 2.2-2 Number of marine capture fishers (2003—2008)

Marine capture fishers	2003	2004	2005	2006	2007	2008
Full-time fishers	1,729,671	1,182,604	1,145,653	1,293,530	1,095,399	1,111,069
Part-time fishers (Part-time fishers (Mainly fishing))	1,112,217	826,206	648,591	626,065	805,011	800,096
(Part-time fisher (Supplemental fishing))	469,933	337,972	263,742	283,817	331,557	328,902
Total	3,311,821	2,346,782	2,057,986	2,203,412	2,231,967	2,240,067

Several business units are considered as private marine capture fisheries enterprises. Statistical data describes only fish processors and KUB².

The number of fish processors is as follows:

² An abbreviation for *Kelompok Usaha Bersama*, self-run organizations for fishers that are targeted as support groups of the MMAF. It is also defined as a unit for small-scale business.

Table 2.2-3 Number of fish processing business units and fish processors

Places	No. of business units	No. of fish processors	Places	No. of business units	No. of fish processors
Sumatra Is.	8,342	53,429	Bali • Nusa Tenggara	3,076	19,966
N. Aceh Darussalam	1,183	4,559	Bali	439	9,023
North Sumatra	1,164	11,111	West Nusa Tenggara	2,173	8,811
West Sumatra	903	4,751	East Nusa Tenggara	464	2,132
Riau	932	3,148	Kalimantan Is.	5,548	21,132
Jambi	228	1,169	West Kalimantan	1,980	5,684
South Sumatra	1,954	9,315	Central Kalimantan	1,401	4,276
Bengkulu	423	1,147	South Kalimantan	1,485	3,639
Lampung	972	15,209	East Kalimantan	682	7,533
Bangka Belitung District	276	938	Sulawesi Is.	11,970	70,225
Riau District	307	2,082	North Sulawesi	802	9,994
Java Is.	27,912	179,839	Central Sulawesi	5,319	32,342
DKI Jakarta	471	2,288	South Sulawesi	1,703	11,065
West Java	6,198	52,161	Southeast Sulawesi	3,189	14,677
Central Java	3,576	26,594	Gorontalo	276	938
D.I. Yogyakarta	401	1,663	West Sulawesi	681	1,209
East Java	16,288	93,221	Maluku • Papua	4,543	19,389
Banten	978	3,912	Maluku	3,642	12,474
			North Maluku	265	963
			West Papua	405	4,538
			Papua	231	1,414
			Total	61,391	363,980

(Source: Marine and Fisheries in Figures 2009)

Fish processing units are concentrated in Java and Sulawesi Islands. The trend by province shows a high concentration in East Java Province. In 2009, East Java Province shows the principal number of fish processing units to be 16,288, followed by 6,198 in West Java Province, 5,319 in Central Sulawesi Province, and 3,642 in Maluku Province. 3,959 KUBs existed in 2009 in the whole of Indonesia, of which 1,461 KUBs (37%) are in Sumatra Island.

Fish processing factories located in inland areas process the catches caught outside of Indonesia's EEZ by foreign fishing vessels. There are three patterns seen in fish processing factories, namely, Indonesian enterprises, joint ventures with foreign enterprises and foreign enterprises. MMAF promotes the idea that Indonesian fishing vessels and boats catch the fish that they then supply to fish processing factories associated with foreign

enterprises.

(3) Fish processing

The classification of processed fish products described in the statistics for Indonesia consists of salted and dried fish, boiled fish, fermented fish (berachan, peda, fish sauce), smoked fish, frozen fish, canned fish, and fish meal. In 2008, frozen fish was produced the most, about 460 thousand tons, followed by salted and dried fish, about 450 thousand tons. These 2 items cover around 75% of the total production of processed fish products.

(4) Support system

MMAF issues a certificate of authorization for fish processors. The following table shows the number of yearly certificate issuances. MMAF states that all exporting enterprises acquire HACCP and/or GMP (Good Manufacturing Practice). MMAF covers the expenditures for this certification, such as inspection expenses, instruction fees, and the handling charge for issuing the certificate, etc. Enterprises don't need to pay for these expenses. The annual budget for this is about IDR2.5 billion. Three levels have been introduced for HACCP acquisition: C, B and A. The applicants must be certified as level A within 3 years. MMAF checks the levels annually.

Table 2.2-4 Number of certificate issued for fish processors

2005	2006	2007	2008	2009
48,624	43,732	44,572	48,202	39,432

(Source: Marine and Fisheries in Figures 2009)

MMAF offers micro finance called KKMB (Konsultan Keuangan Mitra Bank: Financing Service of Mitra Bank). The number of financing arrangements in 2009 was 917 loans totaling IDR3.845 billion. In addition to the KKMB, the Directorate General of Marine, Coastal & Small Islands (DGMCSI) of MMAF implements other microfinance projects such as KUR (Kredit Usaha Rakyat) and KKPE (Kredit Ketahanan Pangan dan Energi: The yearly interest is 6%, lower than KUR.) for KUB. KUR and KKPE target not only KUB but also KUD (Koperasi Unit Desa) managed by the Ministry of Cooperatives and Small & Medium Enterprises.

2.2.2 Distribution and consumption of marine fishery production

Quantitative data on fish distribution in the domestic market of Indonesia does not exist. According to the Directorate of Domestic Marketing (DDM) of the Directorate General of Fisheries Product Processing and Marketing (DGFPPM) of MMAF, the data for 400 thousand consumers sampled in a survey in each province, which is conducted annually by the National Bureau of Statistics, shows the trends for fish consumption by species and province. The DDM, in 2008, explained that 85% of fishery products were consumed in Indonesia

and the remaining 15% were exported.

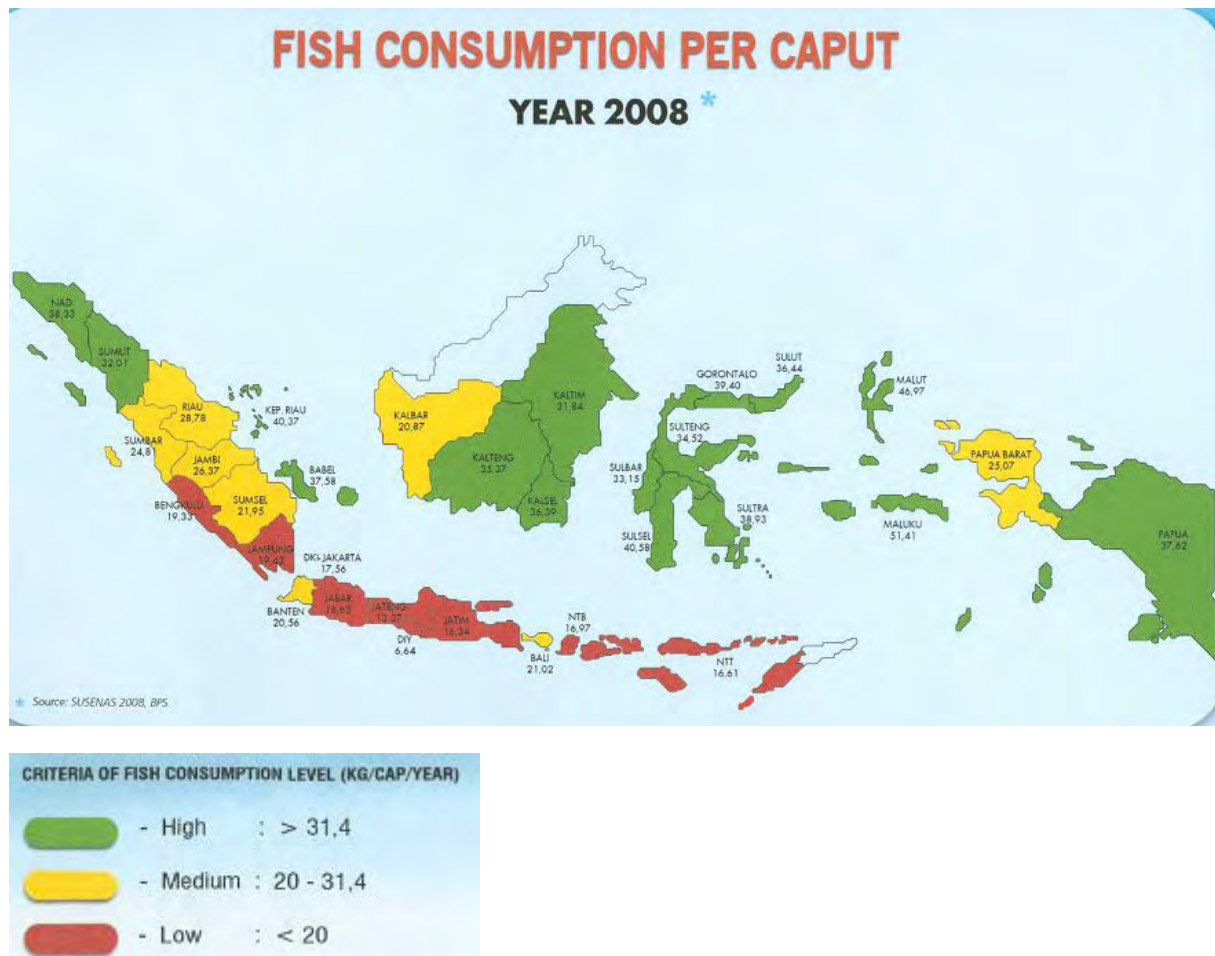


Fig. 2.2-1 Per-capita consumption volume of fishery products by province (Source: DGFPPM, MMAF)

The average per capita consumption volume of fishery products in 2008 in Indonesia was 28.0 kg. The above figure shows the difference of per capita consumption by province. Per capita consumption lower than the national average can be seen in Java Island, except for West Java Province, Bengkulu Province and Lampung Province in South Sumatra, West Nusa Tenggara Province and East Nusa Tenggara. Per capita consumption higher than the national average can be seen in provinces in Kalimantan Island, except for West Kalimantan Province, Sulawesi Island, Maluku Province, North Maluku Province, Papua Province, Aceh Special Province, and North Sumatra Province. The same indicator for the capital city, Jakarta, shows 17.56kg, which is low per capita consumption. Per capita consumption of just fish, other than shrimp and other non-fish commodities, is 46.44kg in Maluku Province and 40.66kg in North Maluku Province; for fresh fish, 1.46kg in Maluku Province; and 3.11kg in North Maluku Province for processed fish. It is obvious that people prefer fresh fish in Maluku and North Maluku Province. Regarding processed fish consumption, some provinces have lower per capita consumption than North Maluku Province, these are East Nusa Tenggara Province (2.64kg), East Kalimantan Province (2.91kg), and North Sulawesi Province (2.94kg). This shows that North Maluku Province consumes fresh fish selectively but the same province also consumes processed fish much more than other provinces.

Processed fish are consumed in large quantities in South Sulawesi Province (4.89kg) and West Nusa Tenggara Province (4.81kg).

2.2.3 Status of fisheries resources

MMAF monitors catches in each FMA of the 11 FMAs, since many factors such as a change in the natural conditions, etc., affect the trends in fishery resources in marine capture fishery production. Yearly, 6.4 million tons as MSY is biologically calculated and 5.12 million tons, 80% of MSY, is set as TAC in all Indonesian waters. The number of FMA was 9 initially but changed to 10 in 2006. It was again reviewed and became 11 in 2009. Table 2.2-7 outlines the change of MSY from 9 FMAs and 11 FMAs after the review in 2009.

With regards to MSY, overexploitation exceeding MSY can be observed in WPP-RI571 (Malacca Strait/Andaman Sea) and WPP-RI714 (Toro Bay/Banda Sea), and the catch is excessive for the recovery of fishery resources. Excessive fishing over TAC can be seen in WPP-RI572+573 (West Sumatera, Indian Ocean + South Java/South Nusa Tenggara/West Timor, Indian Ocean) and WPP-RI712 (Java Sea) in addition to the above 2 fishing management areas.

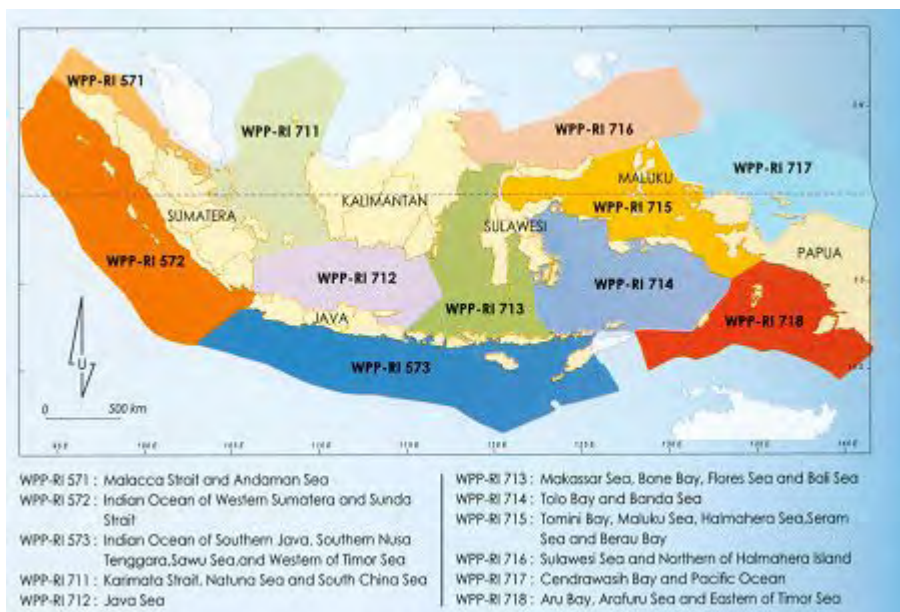


Fig. 2.2-2 Fishing Management Areas in Indonesia

(Source: Ministerial Decree of MMAF No. Per. 01/MEN2009 about Fishing Management Area of 2010)

Table 2.2-5 Volume of marine capture fishery production by fishing management area 2003-2008

Fisheries Management Area	2003	2004	2005	2006	2007	2008	Increasing average (2003-2007) (%)
Total	4,383,103	4,320,241	4,408,499	4,512,191	4,734,280	4,701,933	1.44
WPP - RI 571	328,226	337,289	386,404	...	-
WPP - RI 572	390,303	424,675	497,216	...	-
WPP - RI 573	435,498	417,539	437,998	...	-
WPP - RI 711	509,667	484,871	510,605	...	-
WPP - RI 712	782,513	788,866	778,227	...	-
WPP - RI 713	489,396	554,735	569,262	...	-
WPP - RI 714	486,019	512,831	455,145	...	-
WPP - RI 715	330,707	325,557	396,570	...	-
WPP - RI 716	156,847	160,429	175,329	...	-
WPP - RI 717	112,228	96,284	117,181	...	-
WPP - RI 718	387,095	409,115	410,343	...	-

(Source: DGCF, MMAF)

Table 2.2-6 describes outline of transition of MSY in 9 FMAs and 11 FMAs after a review in 2009. In the table, KEPMENTAN means KEPUTUSAN MENTERI PERTANIAN (Minister Decree of MMAF), PRPT: FKPPS (Forum) means KOMNASJISKAN (Office of National Committee for Fish Stock Assessment).

Table 2.2-6 Trend of MSY in marine capture fisheries

Unit: 1,000 tons

9&11 FMA (Code No.)		MSY (TAC=80%MSY)				
		1991 MSY	2001 MSY	1999KEPMENTAN MSY	2006KEPMENTAN MSY	PRPT: FKPPS2008 MSY
1—9 Total (Catch comparison with 2008)		6,276.4 >4,701.9	6,409.3 >4,701.9	6,258.3 >4,701.9	8,136.9 >4,701.9	4,016.0 <4,701.9
1	(WPP571) Malacca Strait & Andaman Sea	239.2	276.0	239.2	300.9	597.5
2	(WPP711) Kalimata Strait, Natua Sea & S. China	1,252.3	1,057.1	1,252.4	1,605.1	280.7
3	(WPP712) Java Sea	852.0	796.6	852.0	1,115.8	915.4
4	(WPP713) Makassar Sea, Bone, Flores & Bali	679.4	929.7	678.6	658.6	494.7
5	(WPP714) Tolo Bay & Banda Sea	248.4	278.0	248.4	245.4	311.9
6	(WPP715) Tomini, Maluku, Halmahera, etc.	605.7	590.6	587.0	578.2	324.9
7	(WPP716&717)	690.4	632.8	691.4	1,047.5	154.0
7-1	(WPP716) Pacific & Cendrawashi Bay	-	-	-	636.8	83.2

7-2	(WPP717)	-	-	-	410.8	70.8
8	(WPP718)	792.2	771.6	792.1	1,423.2	385.7
9	(WPP572&573) Indian Ocean	916.7	1,076.9	917.5	1,162.2	551.2
9-1	(WPP572) Indian Ocean of W. Sumatra & Sunda	-	-	-	581.1	308.5
9-2	(WPP573) Indian Ocean of S. Java, S.NT, Sawu & W. Timor	-	-	-	581.1	242.7

(Source: DG of Capture Fisheries, MMAF, 2009, others)

2.2.4 Fishery resource management measures

Since 2000, in Indonesia, a new system for fishery resources management has been introduced and progress has made in decentralization of power. The authority to manage fishery resources and capture fishery is shared among 3 different levels: central government, province, and district/city. The district/city manages the area within 4 nautical miles of the coastal, the province manages marine areas from 4 nautical miles up to 12 nautical miles. Central government is responsible for the management of fishing operations in EEZ over 12 nautical miles and international waters. Due to progress being made in decentralization, some activities for the sustainable utilization of fishery resources in the coastal zone among coastal small-scale fishers have been ongoing in some locations. This fact means that the participatory and collaborative system for fishery resources management has become common in some areas. In the suburbs of Likupang City in North Sulawesi Province, local fishers and fisheries administration in the area cooperate with each other and ban fishing in some coral reef areas, the spawning ground of bottom fish as well as the nursery ground of juveniles and fingerlings. The Directorate General of Marine & Fisheries Resources Surveillance and Controlling (DGMFRSC) of MMAF states that fishing activity in the outer-ring areas of Indonesia is minimal except the areas within 4 nautical miles of the coast and the areas from 4 nautical miles up to 12 nautical miles. The reasons are a shortage of modern fishing technology, lack of improvement of infrastructure such as fishing ports, and a delay in the modernization of fishing vessels/gears/methods and security countermeasures, etc. This allows for the continued illegal fishing by foreign vessels.

One of the fishery management measures demands that foreign fishing vessels and Indonesian fishing vessels exceeding 100GT are obliged to be equipped with a Vessel Monitoring System (VMS). Fishing vessels over 60GT up to 100GT are to be provided with a transmitter, and fishing vessels smaller than 60GT are to be provided with off-line type transmitter for VMS by MMAF. According to MMAF, 3,500 fishing vessels were equipped with VMSs from 2003 to 2010; this number is about 80% of the total number of fishing vessels over 100GT. As for fishing licenses, central government deals with fishing vessels over 30GT, provinces with 10-30GT fishing vessels, and districts/cities with fishing vessels/boats smaller than 10GT, respectively. Other necessary

needs are the surveillance and capture of IUU fishing vessels/boats. The Navy, Marine Police, and DGMFRSC of MMAF have the power to do these operations. The Marine Police has jurisdiction only in Indonesian waters, while the DGMFRSC of MMAF controls not only Indonesian waters but also the EEZ. These 3 groups collaborate with each other. Basically, patrol vessels/boats are allocated to fishing ports in each area, but the number and the allocated ports are insufficient. About 500 fishing inspectors are assigned throughout Indonesia, a half of them are officials of provinces and districts.

The working team consists of LIPI (The Indonesian Institute of Sciences), the Agency of Marine and Fisheries Research of MMAF, universities and NGOs and evaluates MSY (Maximum Sustainable Yield) biologically once every 5 years and sets TAC (Total Allowable Catch), which is 80% of the MSY. The result of a comparison between MSY, TAC and catches in each fishing management area is described in Table 2.2-7. The catch volume for 2007 is used since the catch volume in each fishing management area in 2008 has not been published yet.

Table 2.2-7 MSY and TAC in each FMA

FMA	MSY	TAC	Catch (2007) tons	To MSY	To TAC
WPP-RI 571 (West)	276,000	220,800	386,404	-110,404	-165,604
WPP-RI 572 (West)	1,076,900	861,520	497,216	141,686	-73,694
WPP-RI573 (West/East)			437,998		
WPP-RI711 (West)	1,057,100	845,680	510,605	546,495	335,075
WPP-RI712 (West)	796,600	637,280	778,227	18,373	-140,947
WPP-RI713 (East)	929,700	743,760	569,262	360,438	174,498
WPP-RI714 (East)	278,000	222,400	455,145	-177,145	-232,745
WPP-RI715 (East)	590,600	472,480	396,570	194,030	75,910
WPP-RI716 (East)	632,800	506,240	175,329	340,290	213,730
WPP-RI717 (East)			117,181		
WPP-RI718 (East)	771,600	617,280	410,343	361,257	206,937
Total	6,409,300	5,127,440	4,734,280	1,675,020	393,160

Note: In the table “West” means Western part of Indonesia, and “East” means Eastern part of Indonesia.

(Source : Committee Fishery Resources Assessment (PRPT FKPPS2008))

The above table shows that the catch in the western part of Indonesia is over 80% MSY, and in the eastern part the amount that can afford to be caught is 12.6% until the catch reaches 80%; it is currently standing at 67.4%, if you compare MSY and the catch dividing FMA in the eastern and western parts of Indonesia. Eastern Indonesia means eastern areas from Bali Island and East Kalimantan Island, including the both Islands. FMA WPP573 is

equally divided into two parts since the FMA covers Eastern and Western Indonesia.

Table 2.2-8 Comparison of catch and MSY, TAC in FMAs in Eastern and Western Indonesia (Unit: tons)

Total		Western		Eastern	
MSY	Catch volume	MSY	Catch volume	MSY	Catch volume
TAC		TAC		TAC	
6,409 (100%)		2,937 (45.8%)		3,472 (54.2%)	
5,127 (80%)	4,734 (73.8%) [92.3%]	2,349 (36.6%)	2,391 (37.3%) [101.8%]	2,777 (43.3%)	2,343 (36.5%) [84.4%]

Note: Catch volume % in [] shows ratio against each TAC.

(Source: Study based on Committee for Fishery Resources Assessment (PRPT FKPPS2008))

As mentioned above, the extent of the utilization of fishery resources in Eastern Indonesia is not high when compared to Western Indonesia. Since the TAC and catch volume gap is about 400 thousand tons, and it is concentrated in Eastern Indonesia, it can be discerned that the extent of the utilization of fishery resources in Eastern Indonesia is not high. TAC is the quantity of fishing allowable under the clear conditions of the scientific basis of the MSY, and resource conditions for each fish species are fully clarified through statistics. As fishery resources are easily influenced by ocean meteorological conditions and other natural environmental conditions, although fishery resources are self-renewable resources, it is necessary to evaluate the resources comprehensively and the extent of the utilization cannot be measured by a mere comparison with TAC.

2.3 Issues on marine capture fisheries and countermeasures taken

(1) Production

Fishers tend to concentrate their fishing activities within 12 nautical miles of their base. This is due to the lack of advanced fishing technology, etc. Illegal, Unreported, Unregulated (IUU) fishing activities by foreign fishing vessels, etc, has been rampant outside of the 12-nautical-mile areas. Therefore, it is an urgent issue to strengthen the MCS (monitoring, control and surveillance) system and utilize fishery resources effectively. As a countermeasure to IUU fishing, MMAF is implementing strengthened surveillance of IUU fishing vessels using VMS. MMAF has set up a monitoring room in the Ministry for supervising fishing vessels and has been improving the development of IUU countermeasures by examining information sent to the monitoring room in real time and cooperating with relevant bases where patrol vessels/boats are stationed.

“A plan for building 1,000 fishing vessels” is also examined for sustainable utilization of unused fishery resources. A sum of IDR150 million is planned to be allocated for 5 years from 2010. This plan is considered to be of great importance, together with fishing port improvement. The concept of increasing the number of fishing vessels aims for the undertaking of effective utilization of fishery resources in the areas where fishers have not fully developed fishing and the areas outside of the 12-nautical-mile line in order to utilize unused fishery resources. The modernization of fishing vessels/boats improves navigation and the safety of fishers while at sea especially those changing their areas of operation.

(2) Fish distribution and consumption

The Minapolitan Development Plan in the National Mid-term Development Plan (2010-2014) mentions some countermeasures in this field, which are ongoing. These include i) the improvement of infrastructures for fish distribution and processing, ii) promotion of the export of fishery products by supporting small-medium enterprises, iii) promotion of investment, iv) support for formulation of small-medium business units in communities, v) development of financial institutions for fishers' organizations, vi) development of infrastructures in 100 small and archipelagic areas, and vii) strengthening the capabilities of organizations and enterprises engaged in fish processing and distribution.

For exporting companies, MMAF requires them to acquire an international standard of quality control such as HACCP and GMP, and supports the necessary expenses from the national budget.

(3) Fishery resources management

The method for collecting catch data, the basis of fishery resources management, varies between districts. Therefore, an unification of data collection standard is required. At present, each district sends the catch data monthly to MMAF through the Internet. In each district, 3 staff works on fishery statistics regarding aquaculture, capture fishery, and fish processing. They collect data on a daily basis from KUD, working under the Ministry of Cooperatives and Small-Medium Enterprises, but where KUD does not operate they conduct direct sampling at fish markets and fish landing beaches. However, their sampling frequency and method are not standardized.

Therefore, the information's validity is somewhat doubtful. MMAF asks experts on fishing management to check the data sent from provinces and districts twice a year.

The appropriate management and sustainable utilization of fishery resources in adjacent waters is a core purpose of UNCLOS 1982. Therefore, the policy on fishery resources management of any country must be economically realistic for the fishery industry and must be socially and politically acceptable in Indonesia as well as overseas. It is therefore more important to promote the strengthening of fishery resources management on the basis of scientific data.

2.4 Other donors' assistance

An example of other donors' assistance programs for the improvement of infrastructure, such as fishing port facilities, is the Kendari Fishing Port Construction of ADB, which was completed in 2000.

Other bilateral assistance projects in the fisheries sector in Indonesia are diverse. Cooperating countries include China, India, Iran, Japan, Kenya, Korea, Norway, PNG, Philippines, Sweden and the USA in the fields of aquaculture, fish processing, fishery resources management, and water environment conservation, etc.

Chapter 3 Current status of fishing port development

3.1 Administrative arrangement

(1) Department and agencies

1) Ministry of Marine Affairs and Fisheries

The Ministry of Marine Affairs and Fisheries (MMAF) was established in 1999, independent from the Ministry of Agriculture. The current MMAF mission, functions, organizational structure and position in the cabinet are determined by Presidential Decree No. 165 in 2000. The Presidential decree No. 9 in 2005 stipulates that its main mission is as follows¹:

- The formulation of national policy, implementation policy and technical policy in the Marine and Fisheries sector;
- The implementation of governance in the Marine and Fisheries Sector;
- The management of state-owned properties under MMAF;
- The supervision of MMAF mission implementation;
- Delivery of reports to the President regarding evaluations, suggestions and consideration on MMAF missions and functions.

Table 3.1-1 shows the number of civil servants in MMAF by type of job position. From 2005 to 2009, MMAF increased its number of personnel by 2,096. There is also local administrative staff in local fishing port jurisdiction offices.

Table 3.1-1 MMAF Civil Servants, 2005-2009

Type Of Job Position	Year				
	2005	2006	2007	2008	2009
Total Number	7,565	8,152	9,185	9,112	9,661
<i>Echelon I</i>	13	14	14	13	14
<i>Echelon II</i>	62	68	68	68	71
<i>Echelon III</i>	255	282	301	296	311
<i>Echelon IV</i>	656	731	782	782	824
<i>Echelon V</i>	7	23	26	29	33
<i>CERTAIN FUNCTIONAL</i>	662	1,646	1,486	1,473	1,787
<i>GENERAL</i>	5,910	5,388	6,508	6,451	6,621
<i>FUNCTIONAL</i>					

(Source: Marine and Fisheries in Figures 2009, MMAF)

2) Directorate General of Capture Fisheries (DGCF)

The Directorate General of Capture Fisheries (DGCF), which is in charge of the fisheries sector within MMAF, has been stipulated its task and functions by KEP.07/MEN/2005 (Organization and

¹ Web Site of MMAF, viewed on Sep./01/2010, <http://www.dkp.go.id/dkp5en/index.php/ind/newsmenus/2/mmaf-history>

Working Management of Ministry of Marine Affairs and Fisheries), and they are as follows²:

Main Duty: To compose and conduct the policies and technical standardization in Capture Fisheries

Functions:

- To prepare the policies of MMAF concerning capture fisheries
- To conduct the policies of capture fisheries according to regulations
- To compose standards, norms, guidelines, criteria, and procedures in capture fisheries
- To provide technical assistance and evaluation on capture fisheries
- To conduct administration tasks in DGCF.

In relation to the management of fishing ports, DGCF mandates the tasks and functions of Directorate of Fishing Port, as follows:

- Revitalization of fishing ports
- Outer Ring Fishing Port Development
- Fishing port/fish landing center development, particularly in eastern areas
- Fishing Port Information Centre development related to marine and fisheries information system
- Human resources enhancement for fishing port/fish landing centers

(2) Fishing port classification

Indonesian fishing ports are classified into 4 types by Ministry Decree No. PER16/MEN/2006 and No. KEP.10/MEN/2004 as follows:

Table 3.1-2 Classification of fishing port ³

Class of Fishing Port	Amount and Jurisdiction	Technical Criteria	Fishing Operation
A: Oceanic Fishing Port PPS: Pelabuhan Perikanan Samudera/	6 ports, MMAF	<ul style="list-style-type: none"> - Have mooring/docking facilities for 60GT fishing vessels at minimum. And have port pond for 100 fishing vessels with minimum depth of 3m. - Minimum length of pier is 300m, etc. 	<ul style="list-style-type: none"> - operational/fisheries activities in Territorial water, EEZ and offshore - 18,000 to 120,000 tons of fishing catch
B: Archipelago Fishing Port PPN: Pelabuhan Perikanan Nusantara	13 ports, MMAF	<ul style="list-style-type: none"> - Have mooring/docking facilities for 30GT fishing vessels at minimum. - Have port pond for 75 fishing vessels with minimum depth of 3m. - Minimum length of pier is 150m, etc. 	<ul style="list-style-type: none"> - operational/fisheries activities in Territorial water and EEZ - 7,200 to 18,000 tons of fishing catch
C: Coastal Fishing Port PPP: Pelabuhan Perikanan Pantai /	2 ports, MMAF	<ul style="list-style-type: none"> - Have mooring/docking facilities for 10GT fishing vessels at minimum. 	<ul style="list-style-type: none"> - operational/fisheries activities in inland water and archipelago.
	44 ports, province	<ul style="list-style-type: none"> - Have port pond for 30 fishing vessels with minimum depth of 	<ul style="list-style-type: none"> - operational/fisheries activities in inland

² Indonesian Fishing Ports 2009, DGCF, MMAF, JICA

³ Indonesian Fishing Ports 2009, DGCF, MMAF, JICA

		2m. – Minimum length of pier is 100m, etc.	water, archipelago and territorial water – 3,000 to 7,200 tons of fishing catch
D: Fishing Landing Place PPI: Pangkalan Pendaratan Ikan	895 places, province and regency/city	– Have mooring/docking facilities for 3GT fishing vessels at minimum. – Have port pond for 20 fishing vessels with minimum depth of 2m. – Minimum length of pier is 50m, etc.	– operational/fisheries activities in inland water and archipelago

(Source: DG of Capture Fisheries, MMAF, 2009)

(3) Budget for fishing port development

Until 2004, MMAF had developed 5 PPS (Oceanic Fishing Port), 11 PPN (Archipelago Fishing Port), 16 PPP (Coastal Fishing Port) and 168 PPI (Fish Landing Place) through APBN funds, while 400 PPI had been developed through APBD funds. On the northern coast of Java Island, 7 PPP and 38 PPI had been developed by APBN, and about 160 PPI had been developed by APBD.

In 2010, the number of Indonesian fishing ports reached 968, with 6 PPS, 13 PPN, 45 PPP, 902 PPI and 2 private fishing ports. Here, the development of PPI was carried out by APBD Murni and TP, the development of PPP was carried out by APBD Provinsi and TP, the development of PPN and PPS was carried out by APBN/APBD Provinsi/TP/DAK.

APBN : Government budget

APBD Murni : Local government budget

APBD Provinsi: Provincial government budget

TP : Task Assistance fund

Deco : Deconcentration fund

DAK : Special Allocation Fund from Ministry of Finance

The budget allocation of MMAF is shown in the following table⁴.

Table 3.1-3 Budget allocation of MMAF, unit: billion IDR

	Year					Increasing Rate (%)	
	2005	2006	2007	2008	2009	2005-2009	2008-2009
MMAF Total	2,449.833	3,012.629	3,271.871	3,019.138	3,447.594	9.51	14.19
-Rupiah Murni	1,938.480	2,470.766	2,747.311	2,485.535	2,748.649	9.93	10.59
-PHLN	511.353	541.863	524.560	533.603	663.820	7.23	24.40
-Rupiah Murni Pendamping	-	-	-	-	3.457	-	-

⁴ Kelautan dan Perikanan dalam Angka 2009, (Marine and Fisheries in Figures 2009), Kementerian Kelautan dan Perikanan, (Ministry of Marine Affairs and Fisheries), pp-8.

-PNBP (Non-tax revenue)	-	-	-	-	31.667	-	-
DAK total	622.00	1181.68	1534.36	1534.36	1513.36		
MMAF	322.00	775.68	1,100.36	1,100.36	1,100.36	45.69	0.00
City/District	300.00	406.00	434.00	434.00	413.00	9.35	-4.84
Total	3,071.83	4,194.31	4,806.23	4,553.50	4,960.95		

The budget for MMAF in 2006 was increased 37% from 2005; more than 3,000 billion IDR was allocated every year until 2009. The DAK fund allocates about 1,500 billion IDR every year after 2007. Thus, in recent years, the total budget for MMAF is about 4,500 to 5,000 billion IDR.

(4) Fishing port operation

1) Administrative Structure of Fishing Ports

Figure 3.1-1 shows the administrative structure of fishing ports. Here, SYAHBANDAR handles the operation of piers and jetties, records of entry and clearance of the port, fishing catch records, etc. There are certain staff (usually 3~6 persons) who collect fish landing information. Ice/water/fuel distribution, cleaning and disposal of rubbish, security, and conservation of facilities are undertaken as day-to-day operations. However, in some cases, such as a small-scale PPI, there is only one permanent staff and it is hard to prepare/collect fishing catch information.

The revenue of fishing ports comes from ice, fuel and water distribution, and ground rent. The non- tax revenue of MMAF is shown in Table 3.1-4.

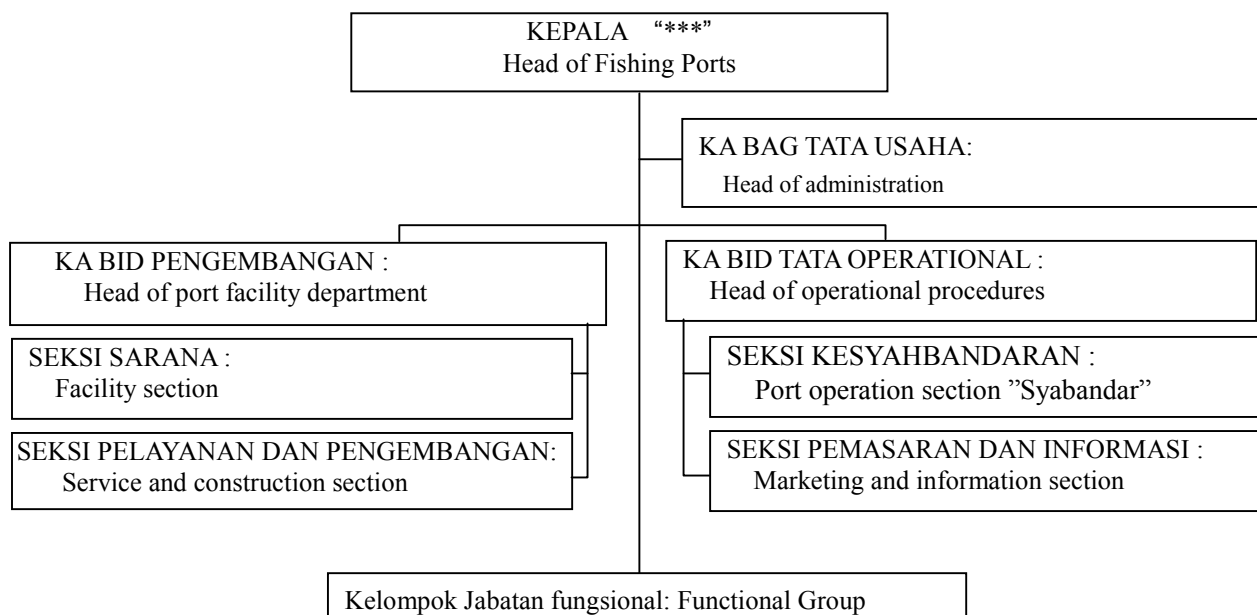


Fig. 3.1-1 Administrative structure of fishing ports

2) Activity situation

The staff of the official post, Shabandar (fishing port), in a main fishing port (shown in the previous figure) is in charge of issuing instructions and permission for mooring wharf use, the record of departure and entry of fishing boats, and collection management of the fish catch data shipped and unloaded. The authorized staff (around 3 ~ 6 persons) deals with data collection of the unloaded catch. The other main daily operations, that is the sale of ice/fuel/water, cleaning, trash processing, security and management of the fishing port area are also carried out.

However, among PPI the staff is limited in small fishing ports, and there are cases where the regular staff dealing with management only numbers one. In such a fishing port, it is not easy to collect appropriate fishery data.

Income in a fishing port is from the sale of ice/fuel/water and the site usage fee. The transition of nontaxable revenue to MMAF is shown in the following table.

Table 3.1-4 Non-Tax Revenue (PNBP) of MMAF in 2005-2009 unit: billion IDR

	Year				
	2005	2006	2007	2008	2009*)
Total	293.91	215.34	134.63	104.64	90.23
SDA (Natural resources; Land, water, etc.)	272.22	198.76	114.84	77.64	66.72
Non SDA	16.71	16.58	19.79	27.00	23.52
BMKT (Sunken ship salvage)	4.98	-	-	-	-

SDA: Sumber Daya Alam; Natural resources (water, land. etc.)

*) Data until Sep. 2009

3) Maintenance and management of fishing ports

There is not enough budget for the conservation and maintenance of fishing port facilities in most of the fishing ports, so most of the facilities are untouched after their initial construction. Thus, many of the aged facilities have deteriorated, especially in small PPI. Through this survey, the deterioration of pavements on jetties and quays, collapsed wooden jetties, poor drainage and insanitary conditions, collapsed auction halls, and disabled ice-making machinery are seen in many small PPI.



Upper Left : PPI Tanjung Luar⁵(degraded pavement)

Upper Right: PPI Sebatik⁶(collapsed wooden jetty)

Left : PPI Rajawari⁷(insanitary conditions)

Fig. 3.1-2 Facilities damaged in small PPIs

On the other hand, in fishing ports classified into PPP/PPN/PPS on this survey, most of the facilities were maintained and were in good condition, thus working properly. In PPS Bitung, in 2000, an unsanitary apron pavement was improved by upgrading the pavement, developing a sunshade roof and developing an auction hall.

3.2 Outer-ring fishing port (ORFP) development

3.2.1 ORFP development master plan

(1) Study of ORFP development Master Plan, 2004

1) Background of the Study

In the development of the fisheries sector, which is recognized as a part of the economic

⁵ West Nusa Tenggara, , 2010/04/21, Fig. 5.2-2

⁶ Sebatik Is. in East Kalimantan, 2010/05/13, Fig.5.2-10

⁷ Makassar in South Sulawesi, 2010/04/30, Fig. 5.2-4

progress of Indonesia, the improvement of the livelihood of capture fishers and aquaculture fishers is one of the most important objectives. There are adequate resources in the field of Indonesian fisheries to meet this objective. However, regarding whether fishing production can be maintained or increased, the utilization rate of marine fishery resources in Indonesia is not equivalent between territories. Some areas are over exploited and others are not optimally utilized. This disparity is related to the development level of the fishing port facilities. In Indonesia, most of the fishing ports are small-scale PPI, and are located in Java, the east coast of Sumatra and the archipelago coast, which makes up about 70% of the total. Only about 20% of the fishing ports are located in the eastern part and outer ring area⁸.

In connection with this deviation of fishing port distribution, fishery resources are considered not to be optimally utilized in the outer ring area such as the Indian Ocean (West Coast of Sumatra Island), South China Sea, Arafura Sea, Sulawesi Sea and so on, even when taking into consideration the IUU fishing from other countries. It is considered that there are underutilized resources in this area. However, the widespread location of fishing ports in the outer ring area makes it difficult to monitor fishery resources and fishing activity in the EEZ, etc. Furthermore, the outer ring territory not only has a minimal amount of fishing port facilities, but also the territory lags behind in terms of economic and industrial growth.

Thus, it is important to exploit the underutilized resources of the outer ring area not only through the fisheries sector but also through social, economic-related and environmental forces, operating under the sustainable management principle. This development requires fishing port facilities in the outer ring area as a stronghold for capture fisheries and fishery business as well. The fishing ports in the outer ring area are expected to have an important role in improving functional relations between fishing and aquaculture, improving rural economic activity, supporting the growth of small- and large- scale fishing in parallel, and supporting the implementation of fishing production centers. Furthermore, fishing ports in border territories can play an important role in border security and prevention of IUU fishing by other countries.

The Government of Indonesia had built 813 fishing ports by the year 2004. However, many PPI, which is the dominant type of the 4 types of fishing port, have various problems such as insufficient quantity and low quality of mooring facilities and lack of ice/water/fuel. The information concerning the conditions (such as fishery resources, fishing and fisheries, social, economic, borders and political) of each site, which vary widely, is not comprehensive enough.

Therefore, it becomes necessary to conduct a study to assess the future development of fishing ports in the outer ring area by examining the location, development plans and phased construction. The study on the outer ring fishing port development master plan (*Pe kerjaan Penyusunan Masterplan Pengembangan Pelabuhan Perikanan di Lingkar Luar Wilayah Indonesia, Developmental Master Plan Composition, Outer Ring Fishing Port of Indonesian Territory (CODE: SU-01), Dec. 2004, Final*

⁸ Marine and Fishery statistics of Indonesia (DKP, 2007)

Report ; PT. Perentjana Djaja) was carried out in 2004.

Meanwhile, prior to this study, MMAF had carried out a study on each fishing management territory to provide several growth centers. The areas selected to be growth centers are expected to become strongholds for capture fisheries not only in their specific areas but also to be engines for adjacent areas, through the development of fisheries sectors and by support from various policies and measures. Through this policy, selected areas will be guaranteed to receive support from central and regional governments through the development of infrastructure and facilities and other measures, and from stakeholders as well. The study on the outer ring fishing port development master plan was carried out based on the results of this former study.

2) Objectives of the plan

The objectives of this study are as follows:

- To evaluate the availability, functionality and adequacy of fish landing bases and fishing ports in the outer ring territory of Indonesia.
- To determine fishing port development locations and their alternatives in the outer ring territory considering fishery resource availability, fishing techniques, local economy and social conditions.
- To examine and study fish landing base/fishing port development plans which can serve optimally according to the national main plan.
- To study operational relations between the existing fishing ports and planned outer ring fishing ports.

From a series of investigations, this study aims to report on:

- Obtaining regional policy on fishing management especially on capture fisheries.
- Recommendation of fish landing bases and fishing ports to develop, including fishing port type/classification, location and facilities.
- Designing a master plan and realization steps for the development of fish landing bases/fishing ports in the outer ring territory.

3) Scope of work

In accordance with the above objectives, the scope of the work done in the study in 2004 is as follows:

i) Examination of outer-ring territory:

- Identifying all the fish landing bases and fishing ports in the outer ring territory.
- Survey and evaluation of functions, availability and adequacy of above fish landing bases/fishing ports.
- To study the outer ring fishing port development policy and location referring to four main

elements, namely fishery resource conditions, fishers concentration and location, accessibility to landing both from sea and land, and market conditions for capture fishery business, and in addition, social and economical aspects, and regional/central government policy as well.

ii) Information gathering for selected sites:

- Current status of capture fisheries in each WPP fishery area and resource conditions.
- Natural conditions, local economy, fishing port/facilities condition, capture fisheries, fishers, and fishing boats, in 25 selected locations for outer ring fishing port development. Clarifying the problems with fishing ports.

iii) Objectives of outer-ring fishing port (ORFP) development:

- Optimizing fishery resources, reducing IUU and losses, creating new growth, international standard facilities, fishing port network, fishing port hierarchies.

iv) Master plan of outer-ring fishing port (ORFP) development:

- Potential of capture fisheries.
- Objectives and development plan of outer ring fishing port.
- Short-term and long-term targets, site conditions, resource conditions in 25 outer ring fishing port development sites.
- Hierarchies of each fishing port by estimated maximum available fishing catch.

v) Priority of outer-ring fishing port (ORFP) development sites:

- To evaluate the priority of each development site by considering natural condition, territory development, potential of fishery, aspect for reducing conflict.

(2) Summary of outer-ring fishing port (ORFP) development Master Plan

A series of investigations was carried out and following results were reported by *Pe kerjaan Penyusunan Masterplan Pengembangan Pelabuhan Perikanan di Lingkar Luar Wilayah Indonesia (Developmental Master Plan Composition, Outer Ring Fishing Port of Indonesian Territory (CODE: SU-01), Dec. 2004, Final Report ; PT. Perentjana Djaja*) in 2004.

1) Objectives and main policies

Objectives and main policies of the outer ring fishing port development are submitted as follows:

- i) Optimizing fishery resources: To exploit fishery resources in the EEZ⁹ and high seas by improving fishing port facilities and operation management, and develop outer ring territory.
- ii) Regional cooperation: Outer ring fishing ports to become special check points and new growth centers in the territory by intensifying fishery resources management in under-exploited waters.
- iii) Reducing IUU and losses: Outer ring fishing ports will intensify the control of foreign flagged

⁹ Exclusive Economic Zone, (Indonesian: *ZEEI*, Zona Ekonomi Eksklusif Indonesia)

ships which operate in the surrounding waters and will reduce the losses which are estimated to be about 4~6 billion USD.

Illegal transactions such as the transshipment of fishing catch is widespread in Indonesian waters, and it threatens resources management, lessens not only tax revenues but also fish prices, and become an obstacle for the development of the fisheries sector. This occurs because of the limited fishing boat capacity of Indonesian fishers, and lack of infrastructure for fishery product marketing. Furthermore, many foreign ships, which operate in Indonesian waters, land their catch at foreign ports due to the lack of landing, marketing and processing facilities in Indonesia. The outer ring fishing ports plan to provide adequate facilities for foreign ships to land their catch.

iv) Creating new growth: Since the focused areas are close to fishing grounds dominated by foreign ships, the development is expected to create new employment with skilled labor to meet global market demands, and reduce cheap migrant labor.

v) International standard facilities: In order to increase the competitiveness of fishery products in the international market, to have adequate facilities to meet international demand and quality standards is a major criterion. For example, in tuna export, the capacity of 100 to 200GT fishing boats is said to be the most economical for exporting. Thus, the outer ring fishing ports must be capable of handling these ships and have a cold storage capacity of 100-200 tons. This could also reduce transshipment activity. In order to provide high-quality fishing catch, the further supply capacity of ice and fresh water is also needed. Thus, the following infrastructure and facilities will be needed for outer ring fishing ports.

- Port basin and berth that can accommodate mother ships and container ships of 6,000 GT for export fishing ports.
- Facilities which can accommodate 100-200GT boats to transfer catches to export fishing ports in feeder fishing ports.
- Administration offices and business offices, ice factory, cold storage, etc.
- Cranes and forklifts.
- Shopping centers to support fishery activities.
- Industrial estates and associated infrastructure (electricity, water supply, communication tools, waste treatment plant, etc.)
- Access roads, neighborhood roads and other supporting facilities.
- Export service facilities, such as quarantine centers and quality test centers.

vi) Fishing port network: In the development of outer ring fishing ports, their function is classified as feeder ports and exporting ports, and linkage between the present fishing ports and outer ring fishing ports will be built to achieve synergistic operations.

vii) Hierarchies of fishing ports: Outer ring fishing port classification will follow the existing

fishing port hierarchies, which consists of 4 main categories: PPS (Ocean Fishing Port), PPN (Archipelago Fishing Port), PPP (Coastal Fishing Port) and PPI (Fish Landing Site/Jetty).

2) Appointment of 25 sites for outer-ring fishing port (ORFP) development Master Plan

In the Outer Ring Fishing Port Development Master Plan, 25 locations/sites in 20 provinces were selected from 813 fishing ports, which were built by 2004, to be developed. In the final report of Outer Ring Fishing Port Development Master Plan, site locations, natural conditions, current fishing port facilities, fishing boats, and fishery conditions are described briefly.

3) Priority of the sites

In the final report of Outer Ring Fishing Port Development Master Plan, the selected 25 sites were evaluated by considering four aspects: natural conditions, territory development, potential of fisheries and aspect for reducing conflict. Each aspect was broken into the below factors:

- Natural conditions: bathymetry, waves, tides, currents, navigation space, sedimentation
- Territory development: layout planning, land status and development probability, domestic market access, airport/export facilities access, processing/industrial access, tourism location
- Potential of fisheries: fish resources, trend of fishers' number, trend of fishing boats, profitability
- Lessen underdevelopment aspect: income per capita, general allocation of funds, population
- Aspect for reducing conflict: local area, regional and national, international

And in all 25 sites, each factor was marked from 1~5 and compiled with a weighting rate between each factor. Thus, the primary priority of the 25 development sites is determined by the total (the larger the total is, the higher the priority), which can be seen in the following table.

In addition, the report sets higher importance on the following two aspects:

- Optimization of underutilized fishery resources (mainly in Seram Sea and Tomini Strait, Arafura Sea, South China Ocean, Sulawesi Sea and Pacific Ocean, Indian Ocean)
- Replacing losses due to illegal fishing

Considering these two aspects and the fact that around Maluku and North Maluku the waters are rich in underutilized fishery resources, it was concluded that the fishing port networks in North Maluku, Southeast Maluku, North Sulawesi and the northern coast of Papua have top priority in outer ring fishing port development.

Table 3.2-1 Summary of outer-ring fishing port (ORFP) development master plan in each site

No.	Name of fishing port	Provinces	Type	Total Score	Rank	Fishing catch		Status	Short-Term Target	Notes
						Catch(t)	Trend			
1	Sabang	Nanggroe Aceh Darussalam	PPI	72	1	1,808	+3.7%	Feeder	200GT class facility Ice factory, cold storage	Catch exceeds capacity of 1500t, but no upgrade of fishing port.
2	Bitung	North Sulawesi	PPS	70	2	61,452 (2010)	+9.42%	Export	Ice factory, cold storage	Catch is overestimated. (including adjacent PPIs)
3	Nunukan	East Kalimantan	-	67	3	1,000t/year (assumed)		Feeder -	200GT class facility, Patrol ships and navy ships	New site. Users and fishery conditions not studied yet.
4	Labuhan Haji		PPI	65	4	3,650? (increasing, no individual data)		Feeder	200GT class facility	Problems in transporting fishing catch
5	Perigi	East Java	PPN	65	5	10,000->40,000		Feeder	Ice factory, cold storage, Expansion of port capacity	Problems on fish catch data and future estimation.
6	Tual	Maluku	PPN	64	6	56,000 ~82,672 ; -4.6%		Export	Ice factory, cold storage	Catch exceeds capacity of 8,000t, but no upgrade of fishing port.
7	Bungus	West Sumatra	PPS	64	7	2,833	-0.5%	Feeder	Ice factory, cold storage, move fish industry	Low activity, port is not used appropriately in spite of PPS.
8	Biak	West Papua	PPI	61	8	9,507 →584 ton in 2003		Export	Ice factory, cold storage	Sharp decrease in tuna/skip jack fishing boats.
9	Pelabuhan Ratu	West Java	PPN	60	9	2,890	-3.0%	Export (by air)	Ice factory, cold storage	Facilities have enough room for planned catch.
10	Sibloga	North Sumatra	PPN	60	10	1,403	+0.79%	Feeder	Relocation, 200GT class facility	Unable to use fishing port for 30GT fishing boats which operate in this area.
11	Kupang	East Nusa Tenggara	PPP	60	11	2,267	+1.9%	Export	Ice factory, cold storage	Actual condition of shortage of facilities is not recognized
12	Tarempa	Riau Island	PPP	59	12	1,588	-1.6%	Feeder	200GT class dredging, upgrading facilities	Catch and demand from fishing boats are both struggling after law-related operation activity.

13	Teluk Awang	West Nusa Tenggara	PPI	59	13	1,207	+0.07%	Export	Ice factory, cold storage	New site. Users and fishery conditions not studied yet. Port facility is not considered.
14	Merauke	Papua	PPI	59	14	60,000, stable		Export	Ice factory, cold storage, 200GT class facility	Port capacity is 1,500 tons. Catch is transshipped at sea through lack of facilities.
15	Cilacap	Central Java	PPS	58	15	7,381	-12.39%	Export	Ice factory, cold storage	Analysis into decreasing trend would be needed. Feeder port to DKI Jakarta, but named to be export port.
16	Ternate	North Maluku	PPN	58	16	3,754 (2003)	increasing	Export	Ice factory, cold storage	Port facility (capacity of 8,000 tons) is reasonable for actual catch.
17	Sorong	West Papua	PPP	57	17	3,786	+4.6%	Export	Ice factory, cold storage	To utilize redundant fish catch, and to move fish processing industry.
18	Kwandang	Gorontalo	PPI	56	18	3,960	+6.0%	Feeder	Ice factory, cold storage	Catch exceeds capacity of 1,500t, but no upgrade of fishing port.
19	DKI Jakarta	Jakarta	PPS	55	19	82,569	+2.0%	Export		
20	Pulai Baai	Bengkulu	PPI	55	20	3,050? (increasing, no individual data)		Feeder	100GT class dredging, upgrading quay	Sedimentation
21	Pemangkat	West Kalimantan	PPN	55	21	3,615	-2.17%	Feeder	100GT class dredging	
22	Sadeng	DI Yogyakarta	PPI	54	22	363t? (increasing, no individual data)		Export?	Ice factory, cold storage	Low fishery activity according to the current data.
23	Pengam-bengan	Bali	PPI	53	23	11,464	-2.8%	Export (by air)	Ice factory, cold storage	Catch exceeds capacity of 1500t, but no upgrade of fishing port.
24	Belawan	North Sumatra	PPS	53	24	36,013	-0.09%	Export	No need to be developed	
25	Untia	South Sulawesi	-							
26	Pondok Dadap	Primary survey was carried out but no description in Master Plan. Instead, PPI Perigi has been implemented.								

Note: Gray colored rows indicate 7 sites in this investigation.

3.2.2 Road map of ORFP development

In 2010, MMAF has formulated the “ROAD MAP, OUTER RING FISHING PORTS DEVELOPMENT, Pengembangan Pelabuhan Perikanan di Lingkar Luar Wilayah Indonesia, 2010, DIRECTORATE GENERAL OF CAPTURE FISHERIES”, which provides an overview of the ORFP development plan, its ongoing status, current activity and step-by-step execution of the plan. The number of fishing port has increased from 813 to 968 in 2010.

(1) Execution plan of ORFP development

In the road map, the implementation process of ORFP development is divided into the following three processes.

i) Master plan (2004)

The master plan outlines the direction and measures needed, so that the fishing ports that spread throughout the outer ring territory could form a synergistic network, and provide benefits to those involved and prosperity for the fishers.

ii) Selection of development site (2004)

In the final report of the Master Plan¹⁰, there is no description about the process for selecting the development site. On the other hand, according to the road map, the site selection was carried out in line with the master plan by considering the following aspects:

- The site will not create friction with local fishers or the community.
- Backing of high-technology industries.
- Having competitive potential and advantages to attract foreign fishing fleets.
- Accountable for biological, environmental, technological, social and economical aspects.
- Adequate access from land, sea and air.
- Good local facilities and infrastructure support.
- Complying with national master plan.

iii) Feasibility study and detail design

Based on the master plan, the concept of ORFP development will be followed up by a feasibility study on technical, environmental, economic, financial and social investigations. Then, a detailed design, including an engineering-related design, will be the guideline for implementing physical construction.

¹⁰ Pe kerjaan Penyusunan Masterplan Pengembangan Pelabuhan Perikanan di Lingkar Luar Wilayah Indonesia (Developmental Master Plan Composition, Outer Ring Fishing Port of Indonesian Territory (CODE: SU-01), Dec. 2004, Final Report; PT. Perentjana Djaja) in 2004.

(2) Expected impacts

The expected impacts in ORFP development are as follows:

- Creating new employment, especially from foreign investment
- Creating a spread effect on the Indonesian macro and micro economy
- Countering the economic losses caused by IUU fishing and using fishing ports abroad (It is estimated that 1~1.5 million tons of IUU fishing causes losses of about 3~4.5 billion IDR.)
- Increasing foreign exchange and economic impact through fish exports from ORFP, expecting 3 billion USD from 1.0 million tons of catch in ORFP in total.
- Improvement of fishing vessel services
- National security/secure territorial areas
- Security for fishers
- Optimizing the enforcement of the “Code of Conduct for Responsible Fisheries”
- Development of areas and even spread of marine affairs and fisheries development

(3) Cost estimation on ORFP development

The budget plan for the implementation of ORFP, which was estimated on the basis of the Master Plan, can be seen in the following table. The budget amount for 25 sites is estimated at 6,500 billion IDR, excluding Untia/Makassar. This amount includes development study works (site selection, feasibility study and master plan of fishing ports), detail design and supervision, construction and improvement of fishing port facilities that comply with international standards, improvement of capabilities of human resources, and monitoring and evaluation of the program.

As the funds needed are considerable, the government of Indonesia expects the source of financing, besides from the National Expenditure Budget, to come from foreign aid funds (loans and grants). Generally, the process of securing foreign funding would require a relatively long time period; for the time being, the funding is expected to come under the budget of Task Assistance (TP), Deconcentration Fund (Deco Fund), Special Allocation Funds (DAK) and local budgets as well.

Table 3.2-2 Cost estimation for outer ring fishing ports (ORFP) development

No.	Name of fishing port	Provinces	Type of existing port	Proposed type	Cost Estimation (IDR Billion)
1	Sabang Labuhan Haji	NAD	PPI PPI	PPS PPN	368 245
2	Belawan Sibloga	North Sumatra	PPS PPN	PPS PPN	245 307
3	Bungus	West Sumatra	PPS	PPS	184
4	Tarempa	Riau Island	PPP	PPN	307
5	Pulai Baai	Bengkulu	PPI	PPN	245
6	Pemangkat	West Kalimantan	PPN	PPN	245
7	Nunukan	East Kalimantan	-	PPN	245
8	DKI Jakarta	Jakarta	PPS	PPS	184

9	Pelabuhan Ratu	West Java	PPN	PPN	245
10	Cilacap	Central Java	PPS	PPS	184
11	Sadeng	DI Yogyakarta	PPI	PPN	184
12	Prigi Pondok Dadap	East Java	PPN PPP	PPS PPN	184 245
13	Penganbengan	Bali	PPI	PPN	184
14	Teluk Awang	West Nusa Tenggara	-	PPN	307
15	Kupang	East Nusa Tenggara	PPP	PPN	245
16	Kwandang	Gorontalo	PPI	PPN	307
17	Bitung	North Sulawesi	PPS	PPS	368
18	Tual	Maluku	PPN	PPS	307
19	Ternate	North Maluku	PPN	PPN	245
20	Merauke	Papua	PPI	PPS	368
	Biak	West Papua	PPI	PPN	368
21	Sorong	West Papua	PPP	PPN	184
26	Untia (Makassar)	South Sulawesi	-	PPN	
	Total 25 locations				6,500

(Source: ROAD MAP, OUTER RING FISHING PORTS DEVELOPMENT, 2010)

(4) Development scenario

The outer ring fishing port development is planned to be implemented through the following three stages:

Phase I : To allocate a high priority to eastern Indonesia and the border area. The development study was carried out for 8 locations (Bitung, Merauke, Pengambengan, Nunukan, Ternate, Teluk Awang, Kupang, Makassar), and drawing a detailed design for 6 locations and implementation of development/improvement of fishing ports for 4 locations were carried out at a total estimated cost of 1.08 trillion IDR over 5 years.

Phase II : To complete the high priority locations and the remaining locations in eastern Indonesia and to start work in western Indonesia. The development study for 9 locations, compiling of detailed designs for 10 locations and implementation of development/improvement of fishing ports for 9 locations was carried out at a total estimated cost of 1.08 trillion IDR over 5.5 years.

Phase III : Phase III is the final stage of the ORFP Development, which expands fishing ports in western Indonesia, at a total estimated cost of 3.05 trillion IDR over 5.5 years.



Fig. 3.2-1 Location of selected survey sites

(Source: ROAD MAP, OUTER RING FISHING PORTS DEVELOPMENT, 2010)

The proposal for the development of 8 fishing ports selected in Phase-I were sent to BAPPENAS in 2006; it was regarded as a priority project in the Blue Book 2006-2009. Measures, which have been carried out from 2004, are seen in the following table. In 2005, Untia fishing port (Makassar) was added as an ORFP, making 26 locations in total.

(5) Progression of ORFP development

In the Phase-I period, construction work has started in 12 of the outer ring fishing ports. Construction work in the Jakarta Fishing Port was carried out with the assistance of a JICA Loan. In the Belawan Fishing Port and Sibloga Fishing Port, detailed design work was carried out with the assistance of an IDB Loan.

Within the seven fishing ports that are the subject of this investigation, construction work has started in the three new fishing ports of Teliuk Awang, Nunukan and Untia/Makassar, and one existing fishing port, Bitung. In the Teluk Awang Fishing Port, detailed design work was carried out in 2004, and construction work started in 2005. At present, land reclamation, trestles for bunkers and small boat jetties, common lodging, kiosks, small houses for fuel stations and gates have already been completed.

In the Nunukan Fishing Port, detailed design work was carried out in 2004, and construction work started in 2005. From 2004 to 2008, 13.8 billion IDR of the budget was allocated, while 245 billion IDR will be required to cover the total project costs. However, a contractor bungled a job, and

recovery work is being carried out by the same contractor.

In the Untia Fishing Port, a review of the project and detailed design work were carried out in 2005, and construction work started from 2006. From 2005 to 2009, 19.3 billion IDR of budget was allocated, while 364 billion IDR will be required to cover the total project costs. At present, reclamation of roads and two-thirds of the trestle for access to the offshore fishing port facilities has been completed.

In the Bitung Fishing Port, a 6m quay (pile-supported jetty) was constructed in 2002; the auction hall, sun shade roof, apron pavement and stair landing quay were constructed in 2004; and one hectare of land was then reclaimed. Work on the access jetty and completion of the periphery of the reclaimed land (revetment/quay) is currently under way in 2010. Completion of the new jetty is expected in 2012.

The progress of ORFP Development is shown in the following tables.

Table 3.2-3 Planning/development process of ORFP development		2004	2005	2006	2007	2008	2009	2010
Colored cells show the seven surveyed sites		Preparation and detailed FS for the designing of new location (a); Teluk Awang, Nunukan, Merauke)	Proposals; submitted to Blue Book of Bappenas	Proposals of Outer Ring Fishing Port (15 locations) to the Blue Book Proposal 2006-2009	Construction through Task Assistance of District; (a) Construction through Special Allocation Fund; (b) Construction through Deco Funds; (c)	Construction through the Task Assistance of District; (a) Construction through Deco Funds; (c) Signing : Loan Agreement of Technical Assistance Agreement between IDB ; (d) Operational & Rehab./Improv. of Fishing Port Facilities; (e)	Proposal of Technical Assistants to JICA Construction through the Task Assistance; (b) Construction through the Special Allocation Funds; (c) Implementation of Development / IDB; (d) Operational & Rehab./Improv. of Fishing Port Facilities; (e)	Preparation of proposal for the Blue Book, Bappenas 2010-2014 for Outer Ring Fishing Ports Development Construction through the Task Assistance of Province; (b) Construction through the Task Assistance of District; (c) Operational & Rehab./Improv. of Fishing Port Facilities; (d) Institutional Reform and detail design through IDB; (e)
Outer Ring Fishing Port	Province	Review of the Master Plan (b); Belawan, Bungus, Pemangkat) Rehab./Improv. of Jakarta Fishing Port ; (d) Operational & Rehab./Improv. of Fishing Port Facilities; (e)	Study & Detail Design ; (a) Construction Work of New Fishing Port; (b) Operational and Rehab./Improv. of Fishing Port Facilities; (c)	Study & Detail Design; (a) Master Plan & Detail Design; (b) Signing Aide Memoire; (c)				
Sabang Labuhan Haji	NAD	e	e		b c; Construction	c; Construction c; Construction	c; Construction	
Belawan Sibloga	North Sumatra	b e	e e	c c		d, e d, e	d, e d, e	d, e d, e
Bungus	West Sumatra	b, e	e	Review Master Plan		e	e	d
Tarempa	Riau Island				a, c; Construction	c; Construction		
Pulau Baai	Bengkulu	e	e	a	b, c; Construction	c; Construction	□; Construction	b; Construction
Pemangkat	West Kalimantan	b, e	e			e	e	d
Nunukan	East Kalimantan	a	b; Construction	Construction	a; Construction	□; Construction		
Jakarta	Jakarta	d ; JBIC Loan Phase-V, e		Implementation of D/D & Rehab./JICA		Implementation of Rehab & Improv./JICA	Implementation of Rehab & Improv./JICA	Rehab & Improv./JICA
Pelabuhanratu	West Java	e	e	b		e	e	d
Cilacap	Central Java	e	e	Development / Improv.		e	e	d
Sadeng	DI Yogyakarta	e						
Prigi Pondokdadap	East Java	e	e		b, c; Construction	c; Construction	b, c; Construction	b; Construction
Pengambengan	Bali					e	e	d
Teluk Awang	West Nusa Tenggara	a	b; Construction, e	Construction by Deco Funds for NTB	c; Construction	a; Construction	b; Construction	c; Construction
Kupang	East Nusa Tenggara			a				
Bitung	North Sulawesi		b; Construction	Review Design				
Kwandang	Gorontalo				c; Construction	c; Construction	b; Construction	b; Construction
Tual	Maluku	e	e	Reclamation etc.		e	e	d
Ternate	North Maluku		e			Land Acquisition, e	e	d
Merauke Biak	Papua West Papua	a	b; Construction a	Construction by Deco Funds	b, c; Construction	a; Construction	b; Construction	c; Construction
Solong	West Papua				b			

Untia/Makassar	South Sulawesi		@				Construction	
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Table 3.2-4 Progress of ORFP development in target survey areas

	2004	2005	2006	2007	2008	2009	2010
Bitung	2002 : Jetty(-1m×149m) Construction 2004 : Apron pavement, Auction Hall, Shade, Water supply, APBN, Lighting etc. through DAC		Review of Design /Deco Fund			Review Master Plan and Engineering Detail Design of Jetty (APBN/DIPA)	Construction (APBN): Apron Pavement for new reclaimed area (4.5 billion). Trestle×185m (14 billion) 2011-2012: Jetty×150m (27 billion)
Kupang	1977:4.7ha, Jetty 2000: 70 Billion IDR for Reclamation, Jetty, Auction Hall, etc. 2001: Transferred to the Province	~2005: Jetty (substitute for the development of commercial port)	Study & Detail Design		FAO: Cool Box ×20		
Makassar		Study & Detail Design	Transferred to Province Development started		Strategic Plan Transferred to Kota	Transferred to Province Construction	

Nunukan	Preparation & FS/Detail Engineering Design; 448mil IDR/APBD Murn Pile Driving (0.5m×12m, n=61); 863mil IDR, APBD Murni	Reclamation of 50*60m ; 2,373 mil IDR, APBN	Construction works by Nunukan District : Land acquisition 50ha, Access road 1.5km Reclamation : Deco, APBN 2,438mil IDR Fishers' Housing 55unit/Cross sectoral fund Pile driving (n=120);1,349mil IDR, APBD Provinsi	Pile driving (n=102) 2,600mil IDR/APBD Provinsi Quay wall; 2,230mil IDR/APBN(TP)	Construction works : Pile Driving; n=35etc.,1,463mil IDR, APBD Provinsi		Construction works : Quay wall; 2,700mil IDR, DAK,
Teluk Awang	Preparation & FS/Design		Construction works by Dcon. Fund	Construction works by Dcon. Fund	Construction works	Construction works by Task Assistance	Construction works by Task Assistance of District
Ternate	1980-1993: wooden jetty was rebuilt as RC Jetty 1993-1996: T-shape Jetty 2003: Expansion of the Jetty	Rehabilitation & Improvement: New Jetty		Rehabilitation & Improvement	Land acquisition Rehabilitation & Improvement	Rehabilitation & Improvement	Rehabilitation & Improvement
Tual	Rehabilitation & Improvement	Rehabilitation & Improvement	Review of Master Plan Detail Design, EIA Land Reclamation	Rehabilitation & Improvement	Rehabilitation & Improvement	Rehabilitation & Improvement	Rehabilitation & Improvement

3.3 Issues to be addressed in implementing the ORFP development plan

(1) Characteristics of ORFP development plan

The ORFP Development Master Plan, formed in 2004, provides a brief description of current facilities, fishing catch estimation, fishing port classification, sorting port type as either a feeder or export port, and a short summary of the development direction of the 25 selected ORFP development sites. In the case of export fishing ports, 6,000GT-class fishing boats or container ships are expected to enter. Other ORFPs are determined as feeder ports, which are expected to be capable of dealing with 100-200GT-class fishing boats and carrying boats.

The fishing port classification is determined by the maximum allowable catch based on estimated fishery resources in the WPP fisheries management area, which each fishing port shares. Then the size of the facilities and improvement measures are determined in accordance with this fishing port classification. Thus, the planned fishing port class and development scale tend to overtake the current demand and activities.

The specific plan for each site then undergoes detailed design and examination work, so that the specific image of each ORFP could not be seen in the master plan. The examination of the detailed plans has started at all eight sites selected by Phase-I activities.

(2) Review on the ORFP development plan

1) Objective of ORFP development Master Plan

i) To optimize fishery resources exploitation

Assuming that the fishery resources estimation in each WPP fisheries management area is correct, there might be an enough room in the underutilized resources in the outer ring area. And it is considered that the ORFP policy to utilize these resources in an optimum manner through the development of ORFP with resources management and fisheries management could attain some positive results. According to the strategic plan of DKP¹¹, the fishing catch is expected to increase at a rate of 0.55% per year from 2005 to 2009. In this regard, the reduction of fishing catch caused by attempts to halt over-fishing might be counterbalanced by IUU repression measures and utilization of underutilized resources. Thus, the 0.55% increasing rate would be considered as a realistic target.

On the other hand, information quality for fishery resources conditions at present is not capable of producing collective estimates of fishery resources. Therefore, intensifying resource surveillance and upgrading data/information such as fishing catch and CPUE, would be needed in parallel with ORFP measures. Here, ORFP is expected to play the role of fishery information center. For that purpose, measures to let all the fishing boats and fishers use the fishing ports and provide actual

¹¹ RENCANA STRATEGIS PEMBANGUNAN KELAUTAN DAN PERIKANAN TAHUN 2005 – 2009, DKP, 2005.

fishing data have to be implemented.

The management process for fishing catch and fishery resources has been introduced through the fishing license system. Here, the fishing license is issued by fishing operation area that is from shore to less than 4 miles, 4-12 miles, 12 miles to EEZ, and EEZ. However, at present, it seems that the system has not progressed to the stage of managing license issuance through feedback from the information of fishing catch and current status of resources. Thus, it is important for the ORFP development to work together with related policies and measures on resource and fisheries management

ii) Reducing IUU and catch losses

Newly constructed fishing ports can help with the utilization of patrol boats in the outer ring territory. In order to control IUU fishing, it would be important to enhance the surveillance system and patrol boats in parallel.

iii) Creating new growth

The ORFP Development Master Plan aims to enhance regional improvements through accommodating large-scale foreign fishing vessels. However, many of the selected sites have not accommodated foreign ships before, and current demands from foreign ships in each territory are not investigated in the master plan. Actually, the local fishers and their fishing boats might be the main users in the early stages of development. At this point, it is important to investigate actual demands from fishers and fishing boats in the following detailed design and planning stage.

iv) International standard facilities

Even in export fishing ports in ORFP, only a limited number of sites have accommodated large carry vessels before. Therefore, the actual development plan and detailed design would be best to consider private sector trends and conditions in each location, and not be trapped into standardized, uniform measures for every site.

Today, major commercial ports in each region have already started container services which correspond to the national container network system. Thus, it is practical to use this service for the transportation of fishery products. On the other hand, as fishing vessels and carry boats of 100-200GT are actively operating in Indonesian waters, it is reasonable to consider improving fishing port facilities to accommodate these vessels considering their current status and trend.

In most of the fishing ports, the ice and fresh water supply does not fully satisfy the demand. Today, the fish processing industry requires international standard quality and hygiene for fish material and its treatment. Thus, improvement in the ice/water supply and hygiene system in fishing ports is increasing in importance.

2) Selection of ORFP development site

The study report of ORFP Master Plan does not describe the process of how it selected 25 sites. However, the selected 25 sites are spread out to the outer ring territory at appropriate intervals. It is considered that most of them are major bases in each region, or that they are expected to have potential to be major bases. Thus, from the point of view of dispersing fishing activity throughout the outer ring territory, this site distribution would be effective.

The budget amount for the 25 sites is estimated as 6,500 billion IDR, excluding Untia/Makassar. However, progress at the 8 sites selected for phase-I development has been delayed owing to the lack of funding. In fact, BAPPENAS is expecting 900 billion IDR from foreign funding to complete this project. Thus, it is considered that the scale of this project means the government of Indonesia cannot complete it within its own budget and within the allotted planning period.

3) Review of ORFP development plan

i) Future estimation of fishing catch

At each site, the future fishing catch is roughly estimated. However, the fishing catch data used in the ORFP Master Plan is not good for a precise estimation. In addition, in the estimation process using liner prediction analysis, a large gust change is not excluded. Thus, it should be noted that this fishing catch estimation has a fair degree of deviation. Since this fishing catch factor is used for determining improvements in fish landing facilities, it is important to investigate the actual condition and expected fishing catch at the next stage of development.

ii) Fishing port classification and scale of facilities

In the ORFP Master Plan, the fishing port classification and the size of the facilities to be improved are based on the total allowable catch of the WPP fisheries management area, which each fishing port shares. And the actual demands and conditions of each site, such as resources, catch, fishing boats, fishers, market, fish processing and distribution are not particularly investigated. Thus, there is the need to investigate these aspects in the following detailed design and planning works.

iii) Users of fishing port

Since facility improvement planning is carried out in the above manner, the actual users of each fishing port are not clearly considered in the Master Plan. Especially in the case of newly constructed fishing ports, problems might occur in their reasonableness. Furthermore, demarcation for utilization, users and objectives against neighboring PPI is not clear. Thus, it is of concern that the objectives, functions and stakeholders might overlap between neighboring fishing ports. On the other hand, in the Bitung fishing port plan, the actual fishers and fishing boats, which are expected to use the fishing port, are investigated in the detailed design taking into consideration the previous detailed design which was carried out by JICA.

4) Distribution of fishery products toward the outside of the region

The oceanic fishing ports (PPS) and archipelago fishing ports (PPN) are expected to help transfer fishing catch and processed fish activities toward the outside of the region. In terms of fishery product distribution toward the outer region, it is important to have a reefer container service to be able to accommodate large carry vessels in the fishing ports, and to be able to use airline services. In addition, access roads to commercial ports, which have regular container services, airports and major industrial areas for fish processing are also needed.

Today, in Indonesia, a regular container service network spread throughout the country and connects major commercial ports in each region, even in the outer ring area. This has been developed through the improvement of container handling facilities in commercial ports by the Indonesian government. Therefore, fishery products are already shipped by reefer containers from the eastern outer ring territories. The regular container service network in the eastern area starts from Surabaya to Makassar, and then spreads to the eastern territories along some major lines. Makassar is playing the role of a major transit port to the eastern area. The container export network starts mainly from Surabaya and partly from Makassar, then to Singapore and Hong Kong, working as an international hub in Asian waters. Then containers are transported to Japan, EU, the USA and other countries.

Recently, in huge consuming regions like Jakarta and Bali, and southeastern countries, the demand for live fish has been increasing. These live fish are mainly transported by air. Thus, the air cargo service for fishery products would increase in importance.

5) Budget and project implementation

In some fishing ports the development work has been delayed owing to the lack of funding. For example, in certain sites, the annual budget is not enough for the construction of the main facilities such as jetties, so only small back-up facilities could be developed; the development scale and total budget is so large that it will take many years to complete; to save on costs, construction has been carried out without consulting expert engineers and as a result critical problems have occurred at the facilities. In addition, repeated jurisdiction-related changes might cause mix ups and the crossing of paths during the implementation of the project.

Thus, a lot of attention is needed as regards the budget and implementation policies to carry out the project.

6) Expected benefits from ORFP development

It is expected that benefits will appear as a result of the development of outer ring fishing ports. The possible benefits are as follows:

- i) It is expected that ORFP will become the basis for utilizing fishing catch in the eastern waters of Indonesia, which exceeds local consumption, and to provide the catch to huge consuming

regions in western Indonesia.

- ii) In newly constructed sites, the development is expected to provide a consolidated base for landing, handling, preparing and cold storage, thus becoming a regional center for fishery and shipping bases for the outer region. As for small-scale fishers, their catch is usually bought directly by a middleman once onshore. The development is expected to defuse this one-sided market feature by enabling the fishers to sell their catch in the fishing port market.
- iii) To meet the quality requirements from processors by handling the fishing catch under hygienic conditions in the fishing port.
- iv) MMAF has already developed an Internet system to collect fish catch data from every fishing port. However, in many sites, fishing ports are not capable of dealing with fishers' and fishing boat's demands, so some are transshipping catches to large boats offshore and some are landing and selling to the middleman directly. This situation makes it difficult to collect actual fishing catch data. Outer ring fishing ports could improve this situation and become a basis for more accurate fishing catch data.
- v) To raise fishery information accuracy and simultaneously enhance fishery resources management through license issuance to fishers and fishing boats.
- vi) Outer ring fishing ports could be the base for fishing activities in border areas and play an important role in border security and prevention of IUU by other countries.

However, in order to achieve these benefits, the following are necessary:

- Each development plan should take into account local demands and various site conditions.
- Related policies and measures should be implemented together with ORFP development.

Chapter 4 Results of site surveys at the target fishing ports

4.1 Selection of the target fishing ports

25 fishing ports covering 21 provinces were selected after evaluation in the master plan study in 2004 from among 968 fishing ports distributed among 33 provinces throughout Indonesia. Afterwards, one fishing port, which can be the base for the eastern outer-ring fishing port (ORFP), was selected in addition, thus there were 26 in total.

Among these 26 fishing ports, fourteen (14) are located in west Indonesia (Java island, Sumatra, and west Kalimantan, etc.), and the remaining 12 are located in the eastern part of Indonesia (East Kalimantan, Sulawesi island, Bali, East and West Nusa Tenggara, Maluku and North Maluku, Papua and West Papua, etc.).

As for the population distribution in Indonesia, 60% of the total population of 231 million is in Java island, therefore, economic development in the border area and the archipelago areas in eastern Indonesia is an especially pressing need, and eight (8) fishing ports were then selected as Ph-1 from among 11 fishing ports, except one that was added later.

In this survey study, Penganbang of Bali and Merauke of Papua were excluded by JICA because Bali had already been surveyed last year by JICA and Papua has security problems.

Moreover, the Makassar fishing port was added as the base port in eastern Indonesia to the outer ring fishing ports to be surveyed by the study team because the Nizam Zachnan (Jakarta) fishing port is included as the base port in the 14 fishing ports of western Indonesia. Through the selection process mentioned, eventually, seven (7) study target areas in the eastern part of Indonesia were confirmed.

Table4.1-1 List of survey sites

No.	Name of fishing port	Provinces	Type of existing port	Proposed type	Location	
					West	East
①	Teluk Awang	West Nusa Tenggara	-	PPN		Yes
②	Makassar	South Sulawesi	-	PPN		Yes
③	Kupang	East Nusa Tenggara	PPP	PPN		Yes
④	Nunukan	East Kalimantan	-	PPN		Yes
⑤	Bitung	North Sulawesi	PPS	PPS		Yes
⑥	Ternate	North Maluku	PPN	PPN		Yes
⑦	Tual	Maluku	PPN	PPS		Yes
No. of ORFPs 7 (East)						7

(Source: Edited by survey team using MMAF documents)

4.2 Current situation of the target fishing ports

4.2.1 General information of the survey areas

(1) Seven fishing port sites

The following table shows the outline of the seven (7) selected fishing port sites among 9 in the Ph-1 outer ring fishing port development plan.

Table 4.2-1 Outline of the target survey areas

Site	Province/location	Fishing port facilities/equipment	Fishing boats and fishermen	Remarks
1. Teluk Awang	West Nusa Tenggara (approx. 50km from Mataram, located at Ekas bay, south east end in Lombok Island)	Newly designed fishing port (under construction)	Artisanal traditional fishing boats, fish landing on the natural beach	Mataram city, Awan village and others
2. Makassar	South Sulawesi	Newly designed fishing port (under construction)	Paotere fishing port (PPI), fish processing companies (active)	Largest city in east Indonesia, Makassar port, PPI Paotere
3. Kupang	East Nusa Tenggara (approx. 2km north from Kupang city center)	Started in 1977, facilities: approx. 80m jetty, auction hall, ice-making machine, air blast freezer, cold storage, fuel station, administration offices, etc.	Fishers: 115,015 Fishing boats: 30GT below= 404 30GT more= 338	Provincial capital; Kupang (Population 450,000)
4. Nunukan	East Kalimantan, (Nunukan island located in the border area with Malaysia)	Newly designed fishing port (under construction)		Population 34,000
5. Bitung	North Sulawesi (Calm and good harbor area facing Lembeh strait)	Facilities: jetty 126m, wharf 115m (depth 5m and 1m), auction hall, ice making machine, etc. Common use by local artisanal fishers and bigger fishing boat operators	Fishers: 5,425 Fishing boats: 20GT below=195 50-100GT=25% of total (bigger boats increasing)	Bitung city; Population 174,003
6. Ternate	North Maluku (Ternate Island)	Facilities: jetty (enough depth), auction hall, administration office, ice making machine 30t/day, freezer, workshop, etc.	Fishers :2,268 (Non-power boats: 4,278), 10GT below=38 10-20GT=33 20-30GT=11	Center of the Province Population 163,166 (2005) Nine (9) active enterprises in Ternate port.
7. Tual	Maluku (Kai Islands)	Facilities: jetty (enough depth), suction hall, administration office, ice crushing machine 5t/hr, guesthouse, etc.	Fishers:4,622 100-200GT=32 200GT more= 47 Over 100GT is dominant.	Center city in Kai Islands

(Source: survey team using MMAF documents)

(2) Private fishing port facilities

1) Tual

In Tual (North Maluku province), one foreign investment company (PT. Maritim Timur Jaya) owns a large fishery complex with a quay for large fishing vessels, a processing factory and cold storage. The company owns 140 ha of land in Tual and is conducting fishery business.

Table 4.2-2 Fishing port facilities of the private sector (PT. Maritim Timur Jaya)

Quay	330m × 13m, depth of water 6~9m
Electric Power Plant	4 × 1,140kwh
Fuel Tank	500kl × 3
Cold Storage for Block Ice	500 tons + 700 tons (2 rooms)
Cold Storage	1,500 tons (375 tons × 4 rooms) 250 tons × 2 rooms
Ice Making Plant	200 tons/day
Processing Factory	2,040m ² , Filet Processing, etc., 100 tons/day

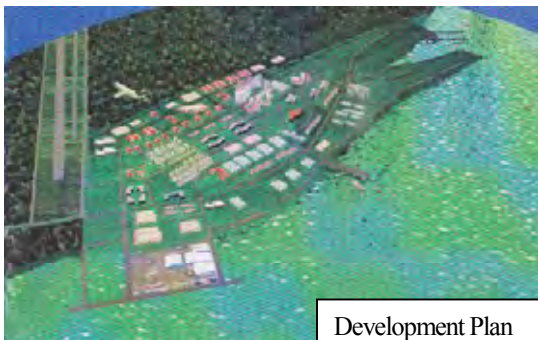


Fig. 4.2-1 PT. Maritim Timur Jaya
(upper left: <http://www.kimi-mtj.com/>, upper right: Google Earth, lower photos: Tual City Presentation)

2) Bitung

In Bitung city, there are many fish processing factories operating in such fields as canning, katsuobushi (dried bonito) and frozen fish. There is a joint-venture company, with Japanese backing, in the katsuobushi processing field. Canned products are mainly exported to the USA and Japan (canned tuna), as well as Middle East countries. Katsuobushi products are exported to Japan. One company is presently planning to build a new processing factory in Bitung.

Several companies own private jetties and buy fish from carry boats and collecting boats. In addition, fish processors also procure stock from Bitung fishing port. About four private jetties, which are capable of dealing with 100-200GT-class fishing boats, are on the coast of Bitung city facing the Lembeh strait. In addition, there are many small private jetties (not for fishery purposes) west from Bitung commercial port.

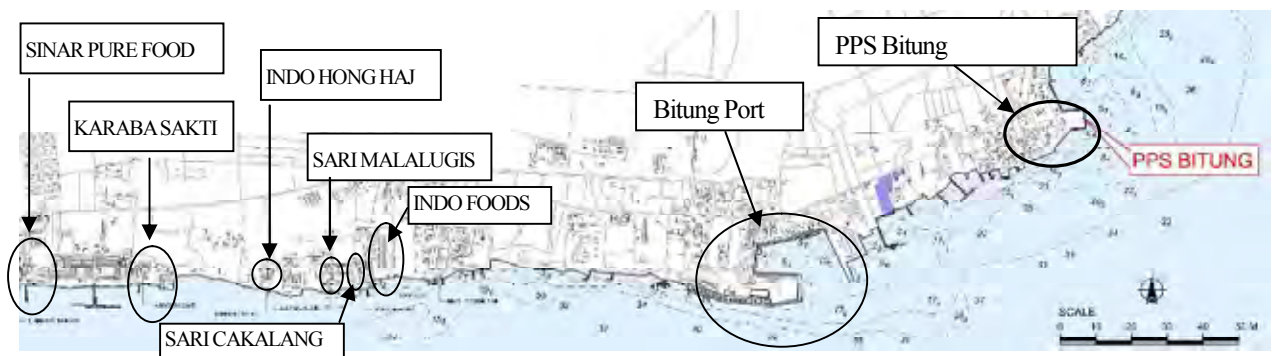


Fig.4.2-2 Fish processors in Bitung

3) Moves for investment in eastern Indonesia

Medium and large-scale business owners operate in Makassar, Bitung and Tual, and some are planning to expand their facilities such as those at Bitung and Tual. However, foreign investment is lacking.

In Papua, joint enterprises with Japanese backing are operating. However, the companies with foreign backing are facing difficulties in regards to business expansion, after the introduction of a new fisheries law in 2006 by MMAF. Some middle to small-scale processors own private jetties for procurement of fish in parallel with purchasing from middlemen and from the fishing port market. Most of the small to micro-scale processors in the eastern part of Indonesia are not capable of purchasing decent sized jetties. Most of them use very small and simple wooden facilities to moor.

4.2.2 Characteristics of the target fishing ports

(1) TELUK AWANG

① Teluk Awang Region

The Teluk Awang Fishing Port is located in Lombok Island and administratively located in Pujut Sub District, Central Lombok District, West Nusa Tenggara Province. West Nusa Tenggara province is composed of Lombok Island, Sumbawa Island and 282 smaller islands with a total area of 49,312.19km². This province is bordered by the Flores Sea to the north, the Indian Ocean to the south, Lombok Strait and Bali Province to the west, and Sape Strait and East Nusa Tenggara Province to the east. (Statistics of West Nusa Tenggara Province, 2009)

Based on the data of the National Economic and Social Survey 2008, the population of West Nusa Tenggara is 4,363,756. Generally, the population in West Nusa Tenggara grows at an average rate of 1.66 % per year. The data shows that the highest number of people is in East Lombok District (1,068,486), while Central Lombok is the second (844,105).



Fig. 4.2-3 Administrative map of West Nusa Tenggara (NTB) Province (Edited by survey team)

② Outline of Fisheries in the Province

Fisheries production in West Nusa Tenggara is shown in the following table. In 2008, total fishery production was 188,368 tons, while capture fisheries totaled 101,746 tons (53%) and aquaculture fisheries production was 89,389 tons (47%). Fishery production in Central Lombok District was 1,173 tons in 2008¹. In capture fisheries, pelagic fish such as sardines, mackerels and Spanish mackerels are the dominant species by volume.

¹ Annual Report of Marine Affairs and Fisheries Service of NTB Province, 2009

Table 4.2-3 Volume of total fishery production in the West Nusa Tenggara Province in 2004-2008

Type of Fisheries	Year				
	2004	2005	2006	2007	2008
Capture Fisheries	86,611.50	95,171.20	91,373.60	102,130.40	101,746.30
- Marine capture	83,692.10	81,610.20	90,296.50	99,553.70	98,979.80
- Inland capture	2,919.40	13,561.00	1,077.10	2,576.70	2,766.50
Aquaculture	53,238.20	50,288.90	74,482.80	101,844.00	146,091.70
- Marine aquaculture	40,839.90	36,424.70	55,880.80	75,655.90	116,622.20
- Brackish water aquaculture	10,127.30	11,221.30	15,694.70	23,072.90	25,818.10
- Freshwater aquaculture	2,271.00	2,642.90	2,907.30	3,115.20	3,651.40

(Source: Annual Report of Marine Affairs and Fisheries Service of NTB Province, 2009)

Table 4.2-4 Volume of capture fisheries production in the West Nusa Tenggara Province 2004-2009

Area	Year					
	2004	2005	2006	2007	2008	2009
West Nusa Tenggara Province (tons)	83,692.10	81,610.20	90,296.50	99,553.70	98,979.80	93,003.60
Central Lombok District (tons)	1,080.60	1,125.20	1,076.20	1,263.70	1,173.50	1,211.20
Contribution (%)	1.29%	1.38%	1.19%	1.27%	1.19%	1.30%

(Source: Statistics of Marine Affairs and Fisheries Service of NTB Province, 2010)

③ Fish Resources

The seawater area of West Nusa Tenggara is part of two FMAs: FMA 713 (Flores Sea, Bone Strait, and Makassar Strait) and FMA 573 (Indian Ocean at the southern part of Java, Bali, West Nusa Tenggara and East Nusa Tenggara). Estimating that the seawater area of West Nusa Tenggara comprises 20% of the total area of FMA 713 and 573, and assuming that the fish are distributed equally, it can be roughly estimated that the marine fisheries resources potential in West Nusa Tenggara is 342,863 tons/year (Table 4.2-5). According to the National Commission for Stock Assessment (2006), moderate utilization status in FMA 713 is applied to the pelagic fishes, especially small pelagic fishes, while the bottom fishes and other fishes are already over-exploited. Meanwhile, the utilization status in FMA 573 is already fully exploited for all resource groups.

Table 4.2-5 Estimation of fishery resource potentials in the West Nusa Tenggara

Fisheries Resources Group	Fisheries Resource Potential (tons/year)		Total	Estimated Fisheries Resource Potential 20% x Total (tons/year)
	FMA 713	FMA 573		
Large pelagic	193,600	193,130	386,730	77,346
Small pelagic	605,440	263,285	868,725	173,745
Bottom fishes	333,350	67,565	400,915	80,183
Others	43,480	14,465	57,945	11,589
Total	1,175,870	538,445	1,714,315	342,863

(Source: National Commission for Stock Assessment)

④ Summary of Fisheries sector

The most dominant types of fishing gear in NTB are the hand line with FAD (Fish Aggregating Devices), troll line, pole and line, purse seine, boat seine, lift net, and set bottom long line, etc. While the most dominant types of fishing gear in Teluk Awang are the hand line, troll line, gill net and portable trap, etc.

The total number of fishing boats in NTB province is 19,264; out-board motor boats make up 58%, non-powered boats 26%, and less than 10GT inboard motor boats 16%. Within Central Lombok District, there are 788 fishing boats; outboard motor boats make up 76% of the total and inboard motor boats only 7%. It is said that the modernization of fishing boats is not proceeding². Since Teluk Awang is a traditional small-scale fishing village, most of the fishing boats, 145 in total, are small sampan-type wooden boats. However, some fishers are starting to upgrade their boats to FRP boats.

Table 4.2-6 Number of fishing boats by size in the West Nusa Tenggara Province and Central Lombok District, 2009

Type of Vessel		West Nusa Tenggara	Central Lombok	
Total		19,264	788	
Non-powered boat	<i>Sub total</i>	4,995	184	
	<i>Jukung</i>	3,177	13	
	Board boat	Small	1,306	81
		Medium	461	90
Large		51	-	
Outboard motor boat		11,132	597	
Inboard motor boat	<i>Sub total</i>	3,137	7	
	Vessel size	< 5 GT	2,096	3
		5-10 GT	896	4
		10-20 GT	145	-
		20-30 GT	-	-
30-50 GT		-	-	

(Source: Statistics of Marine Affairs and Fisheries Service of NTB Province, 2010)

² Statistics of Marine Affairs and Fisheries Service of NTB Province

⑤ Fishers

Lombok Island where Teluk Awang located, has a population concentrated in Mataram, which is the capital city of West Nusa Tenggara Province, and Ampenan. These cities are the main fish consumption places in the island.

There were 120,413 fishers in West Nusa Tenggara Province in 2009. Meanwhile, the total number of fishers in Central Lombok is 9,815. During 2004-2009, the number of fishers increased quite significantly, for example from 3,701 fishers in 2008 to 9,815 fishers in 2009, an increase of 165%.

Table 4.2-7 Number of fishers in the Central Lombok District 2004-2009

Fisher's Category	Year					
	2004	2005	2006	2007	2008	2009
Full-time fishers	1,183	1,183	1,185	2,757	3,046	7,453
Main part-time fishers	187	187	188	437	483	1,788
Additional part-time fishers	65	65	67	156	172	574
Total	1,435	1,435	1,440	3,350	3,701	9,815

(Source: Statistics of Marine Affairs and Fisheries Service of Central Lombok District, 2010)

⑥ Fish Distribution and Processing

Most of the small-scale fishers bring their catch to Labuhan Lombok fishing port, Tanjun Luar fishing port and the shore of Teluk Awang to sell to middlemen. Middlemen bring the fish to the places of consumption such as Mataram, etc. Most of the fish are caught for local consumption. However, the freshness of many of the fish in the market has declined. Also, the hygienic condition of the market is not good. The unloaded volume of fish in Teluk Awang is 3 tons a day, less than that of the two other fishing ports.

There is one large fish processing company, which collects 80% of the fish (yellow fin tuna, skipjack, octopus, etc.) unloaded in Labuhan Lombok fishing port from about 4,000 fishers, and produces frozen fish for export, shipping it to Bali and Surabaya.

Based on the data and information obtained during the survey, the inter-regional markets served from Teluk Awang are shown in the following figure.

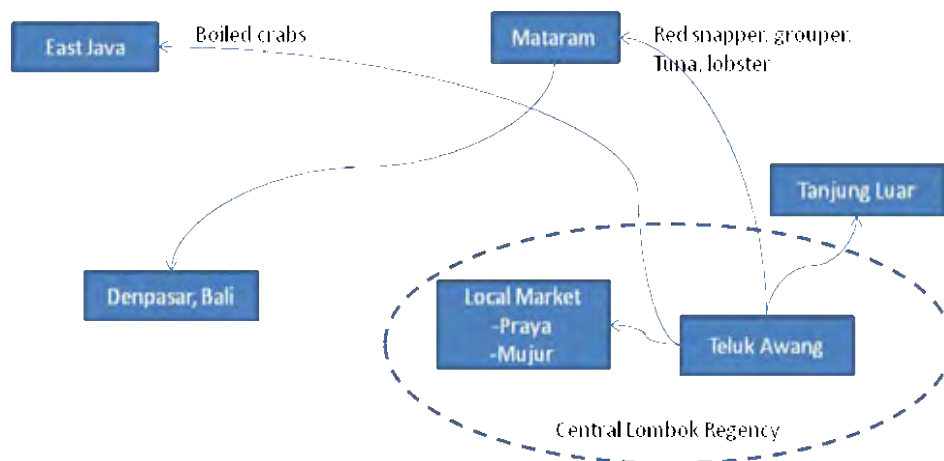


Fig. 4.2-4 Local and inter-regional marketing & distribution of fishery products from Teluk Awang
(Source: Survey team)

Many fishers get assistance in procuring certain materials such as fishing gear and engines and commodities for daily living from middlemen and/or fish processors. Therefore, it is difficult for fishers to sell fish to whomever they want to. They have no choice but to sell fish to their middlemen and/or fish processors who have a special relationship with them. A fishermen's organization exists but little action is taken.

In the Teluk Awang area, about 300 small-scale fisher households exist. Most of the fishers catch barracuda, skipjack, tuna (only one fisher), grouper, lobster and squid, etc. within 3-8 miles from the shore. They land their catch on the shore, the middlemen then buy their catch and bring it to the Mataram area. In the village of Teluk Awang, electricity is available only in public facilities. Thus, ice must be found in outer areas. Usually, the ice is not used while bringing their catch to Mataram, and the quality declines. Furthermore, a water system has not been developed in the village, so fresh water is provided from wells.

In Teluk Awang, fish processing activity is at the home-industry level. Around 50 wives of fishers in the village produce boiled skipjack and a sardine called "Pindang", and they sell these products at the market of Praia City. They have formed 5 Kelompoks and get assistance from the district. However, they do not have sufficient capital to invest in more value-added products such as smoked fish. Some middlemen in the village near Mataram City produce Pindang using scad and tuna on a commercial scale.

Around the mouth of Awang Bay, a lobster spawning ground is located and some fishers collect juveniles to sell.

The following figure shows the sum of fishery activity in Teluk Awang and Lombok Island.

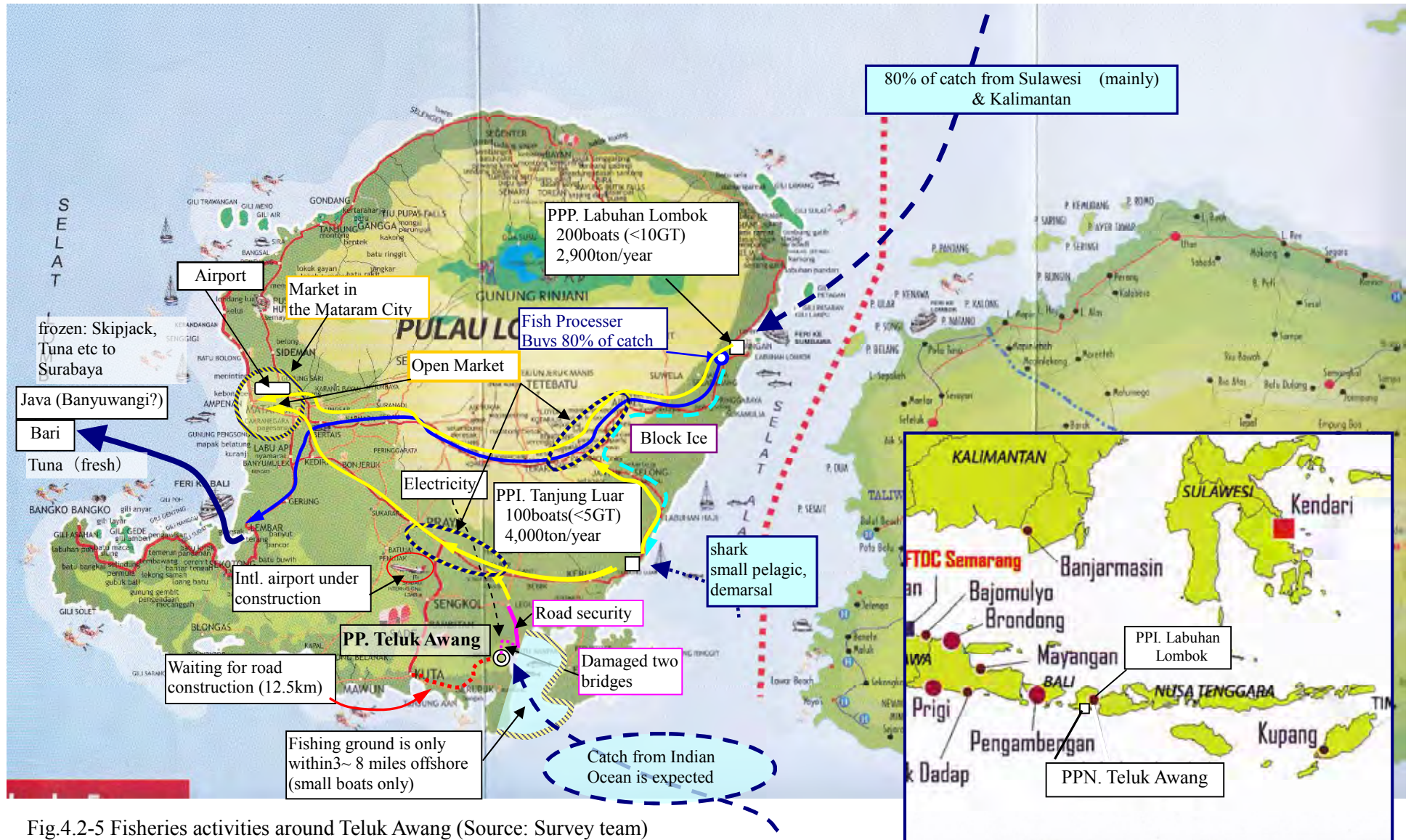


Fig.4.2-5 Fisheries activities around Teluk Awang (Source: Survey team)

⑦ Fishing Port Development

Teluk Awang fishing port is located in the southeast part of Lombok Island, facing Awang Bay, which is located on the south side of Ekas Bay, about 30km south from the capital city, Praya, and 65km west from Mataram city.

Originally, there were no fishing port facilities in Teluk Awang; this is a new fishing port development. The following figure shows the development plan for PPN Teluk Awang.

In 2004, the detail design for PPN Teluk Awang was carried out and construction work started in 2005. In 2006 and 2007, development work was carried out under the control of the provincial office, then it was handed over to the district (kabupaten) in 2008. The main facilities are reclaimed land (6ha) and the revetment, the main jetty (length: 145m + 205m, depth: 3m), a sub jetty for fuel and small boats, auction hall, meeting hall, and accommodation. The following table shows the current completed facilities.

Table 4.2-8 Planned facilities and infrastructure in PPN Teluk Awang, 2009

No	Facilities	Size		Remarks
1	Port Area	60,000	m ²	Reclamation of sea area, planned to be 90,000 m ²
2	Trestle	301	m ²	To be built in 2005
3	Tallud/Revetment with rock pile		m	To be built in 2005 - 2009
4	PPN Administrator Office	240	m ²	To be built in 2009
5	Fisher's Meeting Room	120	m ²	To be built in 2009
6	Gas Station / Fuel Depot	120	m ²	To be built in 2007
7	Gateway		m ²	To be built in 2009
8	Wall Fence		m	To be built in 2009
9	Guard Post	18	m ²	To be built in 2009
10	Net Storage Place	550	m ²	To be built in 2009

(Source: PPN Teluk Awang Annual Report, 2009)

The budget is from the government as APBN. According to the detail design, 23 billion IDR is required to complete the planned works, 31% of which has already been completed. The budget for 2010 work is 3.0 billion IDR, but it's not enough for the construction of the main jetty, which requires 25 billion IDR to build. Thus, the completion of work on the revetment and other small-scale projects are planned to be carried out in 2010. The following table shows the estimated cost of this fishing port development project.

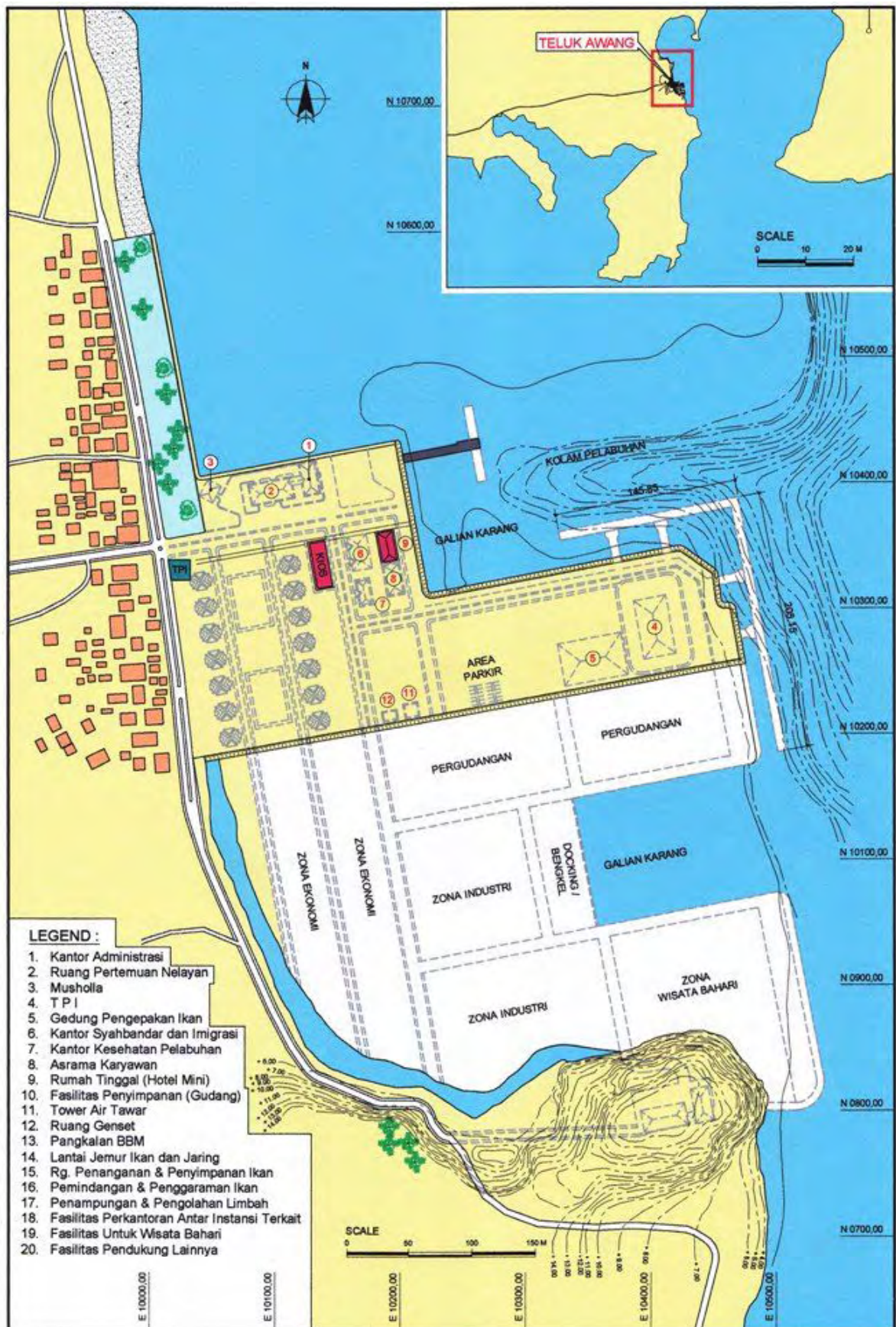


Fig. 4.2-6 PPN Teluk Awang development plan (Source: Survey team)

Table 4.2-9 Teluk Awang fishing port development cost

Annual Development Plan	Cost (IDR)
Phase-1 (2005-2012) Total Cost	49,825,478,000
2005	3,537,000,000
Access road, Revetment (10,000m ²), Trestle Consulting	
2006	4,000,000,000
Land reclamation (10,000m ²), Revetment (land: 26,250m ²), Fece Consulting	
2007	3,660,000,000
Land reclamation (26,250m ² , Revetment (6,300m ²) Consulting, Project organizer	
2008	3,744,831,000
Land reclamation, Revetment (10,800m ²), South area land reclamation (16,259m ²) Consulting	
2009	6,500,000,000
Land reclamation (27,091m ²), Revetment (6,650m ²), Facilities: Gate, Guard post, Fence Administration office, Meeting hall, Working space Review design of Trestle and Jetty , Consulting, Project organizer	
2010	2,000,000,000
Revetment (south area), Land reclamation (7,830m ²), Consulting, Project organizer	
2011	12,500,000,000
Superstructure of trestle (130m ²), Superstructure of jetty (1,062m ²), etc	
2012	13,883,647,000
Superstructure of trestle (130m ²), Superstructure of jetty (874m ²), etc. Facilities: kiosk (180m ²), Fishers' rest stop (300m ²), Work shop (80m ²), Fuel supply, Ice factory, Cold storage (36m ²), Sports field (400m ²), paved road (5,326.99m ²), etc.	
Phase-1 (2013-2014) Total Cost	66,760,014,000
2013	32,339,732,000
Sheet piling, Land reclamation (90,000m ²), Fence Consulting, Project organizer	
2014	34,420,282,000
Superstructure of trestle (120m ²), Quay (1,600m ²) Facilities: Processing plant, Fish handling space, Paved road, Parking (8,000m ²), Navigation office, Administration office, Street light, Sports ground, Consulting, Project organizer	

(2) UNTIA (MAKASSAR)

① Makassar Region

The Untia Fishing Port site is located 10 km north from the city of Makassar, which is the capital of South Sulawesi province. The city of Makassar is the largest city east from Surabaya and is a center of transportation and logistics. The population of Makassar is about 1,130 thousand. Untia is located near Desa Nelayan, south west from the Kima area, which is the industrial complex of the city.



Fig. 4.2-7 Location of PPN Untia (Source: Edited by Study team)

② Fishery of South Sulawesi

The fisheries subsector in South Sulawesi is dominated by marine capture fisheries. The most dominant fish are tuna, skipjack, baby tuna, and several pelagic fish. The regions that contributed the most to fish production in South Sulawesi are Bone, Bulukumba, Sinjai, Palopo and Makassar. Generally, the fish catches landed in South Sulawesi are consumed locally, while the rest is distributed through the inter regional and export marketing channel.

Fish production in Makassar is focused in two marketing locations: PPI Paotere and PPI Rajawali. However, those fishing port facilities are aged, lacking in sanitation, and do not have enough scale for current activities. The main fishing ground is Makassar Strait (FMA:WPP713). The fishing catch in Makassar City was about 16,000 tons in 2009. In Makassar, there has been a notable increase recently in fish processing companies and middle to small-scale processors.

Paotere Fishing Port is managed by the Makassar City and Fishery Cooperative. However, the cooperative is an organization of profit-oriented businessmen and the main members are middlemen. About 1,000 fishers live in 13 islands located offshore of Makassar City and about 420 fishers live in a village located near Paotere Fishing Port. Their main fishing methods are gill net, purse-seine and bagan fishing.

In addition, the state-managed shipyard, which is capable of handling cargo ships and ferry boats as well as

fishing boats, is operating in Makassar.

Table 4.2-10 Marine capture fisheries production in volume and value 2004 – 2008

Year	Volume (Ton)	Proportion (%)	Value (x 1,000IDR.)	Proportion (%)
2004	13,589.1		25,044.638	
2005	20,337.0	33.18	45,957.965	45.51
2006	15,559.6	30.70	47,193.740	2.62
2007	15,670.6	0.71	71,768.105	34.24
2008	15,827.5	0.99	88,643.564	19.04

(Source: Strategic Planning 2010 -2014; Marine, Fisheries, and Husbandry Agency of Makassar)

③ Characteristics of Fisheries sector

Most of the fishers are small-scale fishers. No small-scale fishers unload fish directly at the fishing port. The majority of the fishers get assistance from middlemen and they have difficulty in changing their dependency on these middlemen. Many fishers entrust fish collectors to sell the fish. Thus, since there are many intermediate stakeholders in fish distribution between fishers and end consumers, the income of fishers is low and their quality of daily life is deemed to be bad in general. Many fish collectors have debts with boat owners and their business scale seems to be small.

Generally, the vessels carrying fish to Makassar are not fishing boats, but collecting boats (perahu jolor) that collect fish from other islands or at sea. The dominant types of fishing gear in Makassar are varied, such as gillnet, long line, hand line and purse seine. These types of gear are operated within relatively small vessels. The abovementioned types of gear generally do not have a significant contribution to fish production in PPI Paotere. The fish landed in PPI Paotere is mostly (80%) obtained from purse seine fishers from East Kalimantan, South Sulawesi and the adjacent sea of Surabaya. Types of fish landed in PPI Paotere are scad, baby tuna, snapper, and grouper.

The quantity of the fish unloaded is 30-40 tons a day. If the fish is unsold on the day of unloading, it is put on sale the next day at a cheaper price. The remains are processed as feed for poultry farming and therefore there is no fish waste.

④ Fish Distribution and Processing

The city of Makassar is a logistics center for eastern Indonesia. The port in Makassar has a container handling yard and a core airport, making the terminal extremely competitive. Recently, many fishery products from eastern Indonesia are transported by container services to Surabaya and Jakarta via Makassar, contributing to the expansion of the container network in eastern Indonesia.

The distribution of fish is dealt with in the traditional OTC (over the counter) manner, led by middlemen, while the fishers remain in a vulnerable position. The fish distribution structure in Makassar is not simple as there are complications for stakeholders from fishers, fish collectors (Jolor), middlemen, retailers, and fish processors. However, fish processors regularly quote from a fish price list.

There are varieties of fish processors from large-scale processing companies, which supply fishery products to overseas and/or domestic big markets, to home industries, which produce mainly dried and salted products. There are about 30 cold storage facilities and almost the same number of fish exporters in Makassar. However, only 50% of the capacity of their cold storage is operating because of the lack of materials.

Table 4.2-11 Fish processing units based on cold storage ownership in Makassar 2009

No	Company Name	Capacity (Tons)	Type of Product	Market Destination
1	PT. Citra Arisco Mina	200	Frozen shrimp	Japan, Thailand, Taiwan, the Netherlands
2	PT. South Suco	750	Frozen shrimp	The Netherlands, Thailand, the USA, Italy, China, Germany, South Korea, Belgium, Vietnam, Hong Kong
3	PT. Wahyu Pradana Bina Mulia	100	Frozen shrimp	Japan, Thailand, the Netherlands, France, Belgium
4	PT. Multi Monodon Indonesia	150	Frozen shrimp	Japan, France, Taiwan, China
5	PT. Mitra Kartika Sejati	300	Frozen shrimp	Japan, the USA, the Netherlands, Thailand
6	PT. Sinto Mas Mulia	100	Frozen shrimp	Hong Kong
7	PT. Perikanan Samudra Besar	50	Fresh/Frozen Fish	Singapore, Taiwan, Korea, Japan
8	PT. Dataran Bosowa	100	Frozen shrimp	Japan
9	PT. Amal Jaya Puskopal	50	Frozen Fish	Japan, Korea
10	PT. Prasadanya Mukti	50	Frozen Tuna	Singapore, Hong Kong, Japan, the USA
11	PT. Sinar Graha	50	Frozen Fish	Singapore, Hong Kong
12	PT. Marina Seafood Proesor	40	Fresh/Frozen Fish	Australia
13	CV. Chen Wood Fishery	50	Fresh/Frozen Fish/Frozen shrimp	Korea, Singapore, Japan
14	PT. Bogatama Marinusa	300	Fresh/Frozen Fish/Frozen shrimp	Japan
15	PT. Nuansa Cipta Magello	50	Canned Crabs	Makassar
16	PT. Mega Pratama Indo	100	Fresh/Frozen Tuna	Japan
17	PT. Prima Indo Tuna	100	Fresh/Frozen Tuna	Japan
18	PT. Prima Bahari Inti Lestari	150	Fresh/Frozen Fish	Singapore
19	PT. Parlevliet Praba Seafood	50	Fresh/Frozen Tuna	Japan
20	PT. Hacho Bumi Abadi	200	Frozen shrimp	Korea
21	PT. Maju Indah Jaya Marine	100	Frozen shrimp	Japan
22	PT. Sea Fresh Internasional	100	Fresh/Frozen Tuna	Japan

(Source: Strategic Planning 2010 -2014; Marine, Fisheries, and Husbandry Agency of Makassar)

Most of the fish processors are located in the KIMA industrial area, which is located in a suburb of Makassar, near Untia. Fish and shrimp processors buy materials unloaded at Paotere Fishing Port through large-scale middlemen, and ship the products to Surabaya or Jakarta by reefer containers. These products are exported to the USA, EU and Japan via Singapore. These exporting processors acquire international hygiene standards such as HACCP. The quality of the fish catch is mainly controlled by the usage of ice.

There are also live fish traders who send the fish to Hong Kong by air. Some fresh yellowfin tuna are transported by air from Bitung, etc. to Makassar.

Processors who make dried and salted fish buy numerous fish species for their raw materials, which takes around 3 days after unloading at Paotere Fishing Port, at cheap prices and sell the final products at higher prices.

The following figure shows the sum of fisheries activity in the Makassar area.

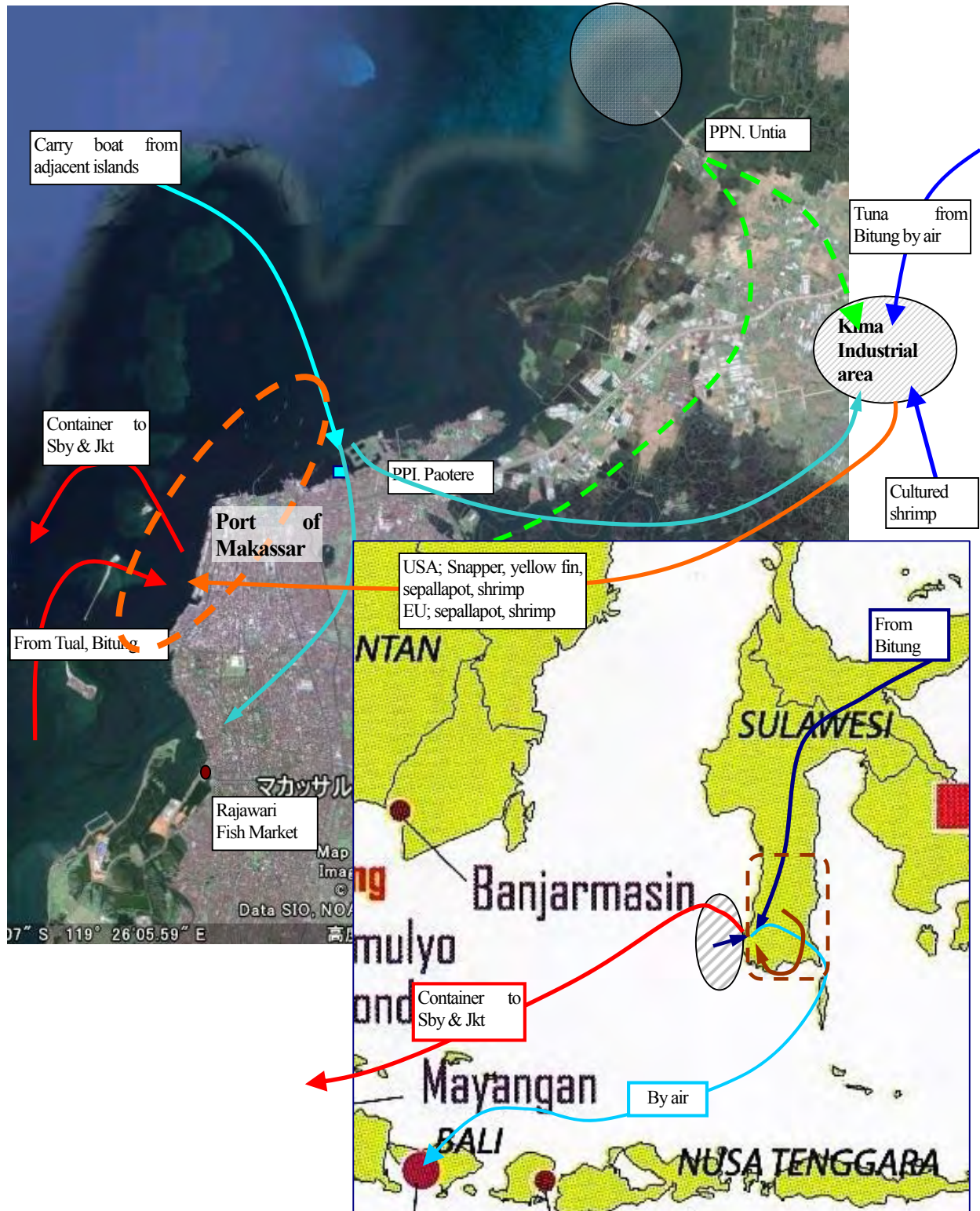


Fig. 4.2-8 Fisheries activities in Makassar (Source: Survey team)

⑤ Fishing Port Development

The Untia fishing port is located in the Untia area, about 10km north of the existing PPI Patere. There was no fishing port facility in Untia before, and this is a new fishing port development. Here, the Untia fishing port was added to the ORFP as the base port in eastern Indonesia to the outer ring fishing ports, because the Nizam Zachnan (Jakarta) fishing port is included as the base port in the 14 fishing ports of western Indonesia.

At present, reclamation of the access road has been completed and the pile-supported trestle is under construction as in project phase-1. Phase-2 and phase-3 projects are expected to begin. However, vertical piles are poking out from the seabed at a height of about several meters. If these piles are not embedded enough into the seabed, the piles cannot work as an independent entity against horizontal forces, as required in the structural design. This should be noted.

The following figure shows the development plan of PPN Untia. The main facilities are reclaimed land of 300m×250m, reclaimed road of 50m, trestle of 200m (pile supported), reclaimed road of 460m, breakwater of 3,763m, dredging of 265,000m³, complex road and drainage, electricity, auction hall, cold storage, fuel supply and water supply.

The location of this PPN is in a very shallow lagoon area. Thus, the reclaimed land, which provides functional facility space and the quay, is to be located about 500m offshore, and is connected by the trestle and reclaimed road to the land. The breakwater protects the anchor basin and quay from waves and sedimentation from the outer area. Even then, the anchor basin has to be dredged.

In 2005, the detail design and review of PPN Untia was carried out, and concluded that an amount of 364 billion IDR would be required for the completion of the project. Within this total, 317 billion IDR was for civil works. In 2006, the jurisdiction of the fishing port was handed over to provincial office, and the development project was started. Then in 2008, the jurisdiction was returned to the city of Makassar, but in 2009, it was handed over to the province again. In the same year, construction work started. From 2006 until 2009, APBN of 16.78 billion IDR and APBD of 2.3 billion IDR were granted for this project. Based on this budget, the revetment, reclaimed road, box culvert for drainage and pile-supported trestle measuring 175m were constructed.

In 2010, it is planned to construct the rest of the pile-supported trestle (L=75m) through APBN of 4.88 billion IDR to complete the first stage of the development. In the development plan, since the quay and anchoring basin are not completed yet, it is expected that small fishing vessels will use the trestle for unloading work only during high tide.

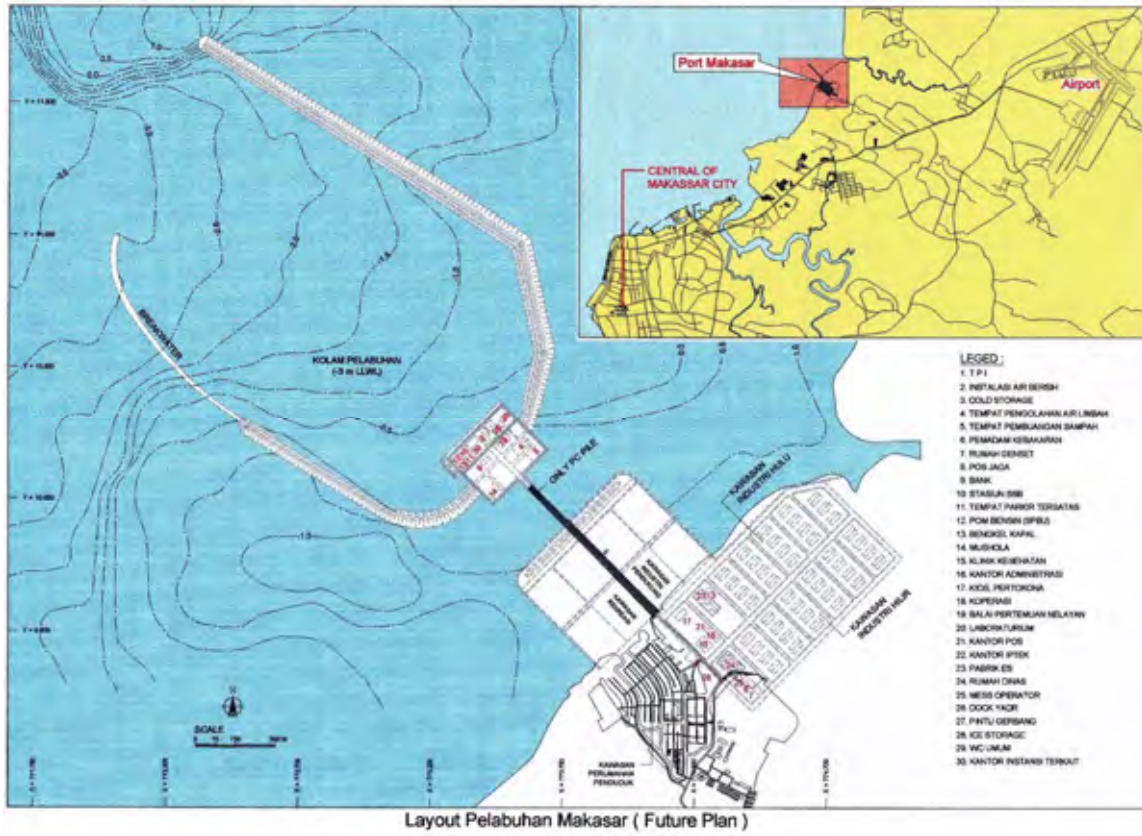


Fig. 4.2-9 PPN Untia development plan (Source: Survey team)



Fig. 4.2-10 Current view of the construction site of PPN Untia (Source: Survey team)

Table 4.2-12 Cost of the Untia fishing port development project

Items	Cost (IDR)
<u>Fishing port facilities</u>	
Preparation works	130,363,500
Breakwater	20,606,026,400
Quay	13,423,962,600
Trestle	7,433,042,700
Dredging	51,821,139,500
<u>Reclamation of land</u>	
Right area	4,209,561,000
Left area	406,948,300
Backyard for industry	173,576,814,700
Quay and fishery facility	19,055,490,500
<u>Road</u>	222,883,400
Waste water	15,280,838,800
Fence	10,816,876,400
Sub total	316,983,947,800
<u>Facilities</u>	
Water line	281,369,100
Cold storage	246,102,000
Ice factory	1,336,589,000
Waste water treatment	335,412,000
Hydrant	9,200,000
Generator house	376,440,700
Fuel supply	546,787,200
<u>Backyard facilities</u>	
Auction hall	
Gatem, Guard post	4,281,100,300
Waiting area	117,953,800
Mosque	222,883,400
Clinic	482,983,600
Administration office	2,235,826,000
Laboratory	2,309,034,700
Post office	900,171,700
IPTEK office	573,325,200
Kiosk	625,953,400
Office for cooperative	393,979,900
Fishers' meeting hall	307,778,900
Housing for officials	1,392,932,500
Workshop	653,172,900
Mess Operator	381,103,500
Gate	1,571,609,800
TPS	150,180,400
	129,896,100
Sub total	19,861,786,100
Total	364,102,222,400

(Source: DKP, Review Desain Pelabuhan Perikanan Di Sulawesi Selatan 2005)

(3) KUPANG

① Kupang Region

The Kupang Fishing Port (PPP Kupang) is located in Timor Island, which is located in Kupang City, Nusa Tenggara Timur (NTT) Province. There are 19 fishing ports in NTT, consisting of 1 PPN and 18 PPI. The total land area of NTT is 47,349.9km², covering 566 islands. The province is bordered by the Flores Sea to the north, the Indian Ocean to the south, Sape Strait and Nusa Tenggara Timur Province the west, and Maluku Province and Timor Leste State to the east. The total population of NTT is 4,534,319, with 676, 818 in Kupang and Kupang City. (Source: National Socio Economic Survey, Statistics of Nusa Tenggara Timur Province, 2009)



Fig. 4.2-11 Nusa Tenggara Timur (NTT) Province (Source: Edited by survey team)

② Fisheries of Nusa Tenggara Timur

In 2008, the total fishery production of NTT province was 247,801 tons: capture fisheries make up 114,294 tons (46%) and aquaculture fisheries make up 133,507 tons (54%). Kupang city makes up 18,154 tons.

Table 4.2-13 Volume of fishery production in NTT (2004-2008) (Unit: tons)

Type of Fisheries	Year				
	2004	2005	2006	2007	2008
Capture Fisheries	103,707.30	106,258.23	108,872.19	114,550.44	114,294.58
Aquaculture Fisheries	867,632.73	1,062,503.04	1,301,141.22	1,593,377.54	1,951,250.14

(Source: Strategic Planning of Marine Affairs and Fisheries Service of NTT Province, 2009)

Table 4.2-14 Capture fisheries production in the Kupang City and NTT Province (Unit: tons)

Area	Year				
	2004	2005	2006	2007	2008
NTT Province	103,707.30	106,258.23	108,872.19	114,550.44	114,294.58
Kupang City	18,153.00	25,184.10	15,725.00	17,289.90	18,154.40
PPP Kupang	-	-	-	-	5,612.16

(Source: Strategic Planning of Marine Affairs and Fisheries Service of NTT Province, 2009, Statistics of Marine Affairs and Fisheries Service of Kupang Municipality, 2010, and Annual Report of Kupang Fishing Port, 2009)

The Port of Kupang adjacent to the PPP Kupang is controlled by PELINDO-III and serves as a logistic base in this region. In this commercial port, the container wharf and container yard were developed through Japanese government assistance at the same time as the Port of Bitung in 2005. Thanks to this expansion program, the handling of container cargoes is increasing. The fishery products that are unloaded and processed in the PPP Kupang also use this container service, mainly for reefer containers. There are many flights to major cities in Java from Kupang airport.

There are 8 PPI in the province and one in Kupang city (PPI Oeba). Most of the small-scale fishers unload their catch at PPI Oeba and its adjacent beach (mainly this adjacent beach). Fishing boats, which are larger than 10GT, are not able to enter the PPI Oeba where there is a center for small-scale fishers.

The unloaded fish are transported to some markets in Kupang city. PPP Kupang and PPI Oeba are under the control of the province, while Oesapa is under the control of Kupang city.

There is a new project plan (ECO PORT PROJECT) by the city office to develop a fisheries complex with a new PPI, market, tourism area and processing industry on the coast of Kupang city, which is taken into account by MINAPOLITAN.

③ Fishery Resources

Based on the Fisheries Management Area (FMA) issued by Ministry of Marine Affairs and Fisheries (MMAF), the sea area of NTT is part of FMA 713 (Flores Sea, Bone Bay, and Makassar Strait) and FMA 573 (Indian Ocean in the south part of Java, Bali, and NTT). According to the National Commission for Stock Assessment (PRPT FKPPS2008), both of the FMAs have marine fisheries potential of 494,700 tons/year (FMA 713) and 242,700 tons/year (FMA 573).

If it is assumed that the seawater area of NTT is around 20% of the total area of FMA 713 and 573, also, if it is assumed that the fish are distributed evenly, it can be roughly estimated that the marine fishery resources potential of NTT is 342,863 tons/year, consisting of large pelagic fishes (77,346 tons/year), small pelagic fishes (173,345 tons/year), bottom fishes (80,183 tons/year) and others (coral fishes, lobster, etc.) of 11,589 tons/year.

Table 4.2-15 Estimation of fishery resources potentials in NTT waters

Fishery Resources Group	Fishery Resource Potential (tons/year)		Total	Estimated Fishery Resources Potential 20% x Total (tons/year)
	FMA 713	FMA 573		
Large Pelagic Fishes	193,600	193,130	386,730	77,346
Small Pelagic Fishes	605,440	263,285	868,725	173,745
Bottom Fishes	333,350	67,565	400,915	80,183
Others	43,480	14,465	57,945	11,589
Total	1,175,870	538,445	1,714,315	342,863

(Source: National Commission for Stock Assessment)

④ Fisheries in Kupang

The most dominant types of fishing gear in NTT are hand line, troll line, gillnet, pole and line, purse seine, boat seine, lift net, and set bottom long line. While the most dominant types of fishing gear in Kupang are hand line, set bottom long line, boat seine, pole and line, gill net, and lift net. The fishing technology in Kupang is relatively advanced, with the exception of hand line usage. The main fishing grounds are the Indian Ocean for snapper and grouper, and Flores Islands, Sabu Sea and Suma Island waters for small tuna and skipjack.

In Kupang fishing port, tuna and skipjack are mainly unloaded. In 2007, 879 fishing boats entered the fishing port, while long line fishing boats and hand line fishing boats made up 58%³.

Table 4.2-16 Volume of fish landed in PPP Kupang, 2007

NO	MONTH				Amount of kg
		Tuna and Skipjack kg	snapper, grouper and other kg	shrimp kg	
1	January	31,250	164,704	1,184	197,138
2	February	12,302	145,897	-	158,199
3	March	28,500	103,868	2,630	134,998
4	A p r i l	11,150	116,614	85	127,849
5	May	7,795	702,444	290	710,529
6	June	22,540	571,041	978	594,559
7	July	-	350,859	2,616	353,475
8	August	6,050	487,528	350	493,928
9	September	53,573	343,038	-	396,611
10	October	545,300	551,820	-	1,097,120
11	November	742,340	457,171	130	1,199,641
12	December	177,135	353,812	911	531,858
	Total	1,637,935	4,348,796	9,174	5,995,905

(Source: PPP Kupang Annual Report, 2007)

³ PPP Kupang Annual Report, 2007

Table 4.2-17 Number of fishing boats using PPP Kupang in 2007

Month	Boats/Type of Gear									Total Visit Frequency
	Traps	Pole and Line	Long Line	Fish Trawl	Gill Net	Transport Boats	Carrier Boats	Export Boats	Hand Line	
1	2	5	21	-	1	-	1	-	-	30
2	-	4	-	1	2	-	2	-	13	22
3	2	6	-	-	6	1	2	-	17	34
4	1	7	6	-	1	3	3	-	5	26
5	3	8	36	1	1	7	4	-	7	67
6	5	12	48	-	7	7	4	-	18	101
7	4	4	46	1	5	4	4	-	8	81
8	6	10	40	-	1	7	5	-	10	79
9	5	18	40	1	2	10	5	-	7	88
10	10	28	55	1	-	17	5	-	15	131
11	11	26	60	1	5	17	5	-	8	143
12	8	20	27	-	1	7	2	-	9	74
Total	57	156	379	6	32	80	42	-	127	879

(Source: PPP Kupang Annual Report 2007)

Generally, there are three categories of fishing boat/vessel operated by the fishers in NTT: non-powered boats, outboard motor boats, and inboard motor boats. The total number of fishing boats in NTT in 2009 was 19,264, with non-powered boats dominating (17,899 units or 68.9%). On the other hand, in Kupang, inboard motor boats dominated (79.6%). Among the inboard motor boats, less than 30GT-class fishing boats were in Kupang fishing port. Here, it can be seen that Kupang is a key player in this province in the fisheries sector. However, most of the fishing boats, including commercial fishing boats, are wooden boats. Thus, the modernization of fishing boats is needed to improve safety.

One characteristic in this area is that the fishing port users are well demarcated between commercial fishery, which uses PPP Kupang, and local small-scale fishery, which uses other PPI.

Table 4.2-18 Number of fishing boats by size in Kupang 2004-2009

Type of Vessel	Year					
	2004	2005	2006	2007	2008	2009
Non-Powered Boat	204	212	151	67	68	68
Outboard Powered Boat	156	70	59	73	73	81
Inboard Powered Boat :						
3 - 5 GT	7	199	199	271	271	271
5 - 10 GT	79	189	194	194	194	194
10 - 20 GT	3	55	42	66	59	48
20 - 30 GT	20	41	41	41	41	41
30 - 50 GT	21	24	25	22	22	22
50 - 100 GT	6	7	4	4	4	4
100 - 200 GT	-	-	3	3	3	3
Total	496	797	718	741	735	732

(Source: Statistic of Marine Affairs and Fisheries Service of Kupang City, 2010)

⑤ Fishers

According to Kupang City Office, the number of fishers is 7,237 and 90% of the fishing boats are traditional wooden boats. Fishers, whose income levels are low, get assistance from the middlemen. They must sell their fish to those middlemen who assist them. However, there is a cooperative (KUD) that consists of mini purse-seine fishers, and the 310 members of the cooperative do not have debts with middlemen. Therefore, they can sell their fish to anybody.

⑥ Fish Distribution and Processing

Fish for export are tuna, skipjack, etc., which are exported to Japan via Bali, Surabaya, and Makassar. About 80% of the exported fish are frozen and the rest are katsubushi. Exports to Japan total 2,339 tons, which makes up 77.93% of the total exports in Kupang (Source: LPPMHP Kupang, 2010.). Frozen tuna is transported to Surabaya by reefer containers. The only product exported to China is dried seaweed, while Singapore prefers live mud crab. There is also shark fishing (shark fins are exported to Hong Kong via Bali), grouper cage culture, pearl culture, and seaweed culture in Kupang. The inter-regional and export marketing channel from PPP Kupang is shown in the following figure.

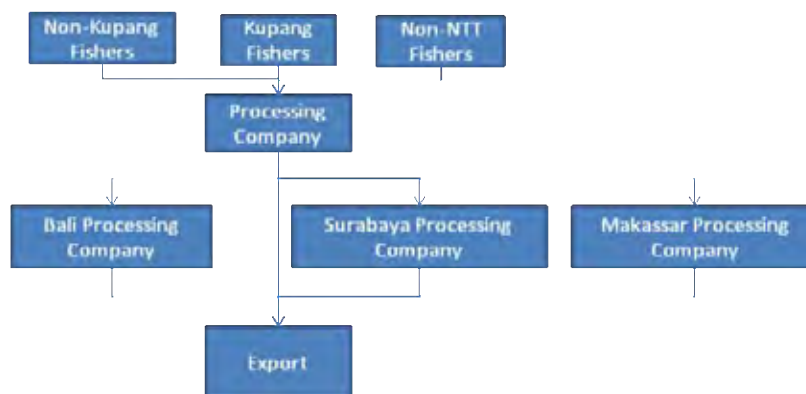


Fig. 4.2-12 Fish marketing channels for inter-regional and export destinations (Survey team)

Less fishing boats unload fish directly to PPP Kupang. However, some middlemen who own 30GT fishing boats, which catch grouper, red snapper, skipjack, and little tuna, transport the fish from PPP Kupang by fish carrier boats to other regions.

There are some traders who deal in tuna mainly for export at Oaba Fishing Port. Some traders ship live lobsters to Hong Kong via Bali and Jakarta. Fish caught by small-scale fishers is transferred to fish collectors called “Boditepa” at Oaba Fishing Port and Oesaba beach; the Boditepa bring fish to the market at and near the fishing port. Structural complications in fish distribution can be observed as there are special relationships between middlemen and Boditepas or fishers, and also between Boditepas and fishers. Less than 10% of the fish unloaded at PPP Kupang is distributed in the market at Kupang. Over 90% of the fish for consumers in Kupang are unloaded at Oaba Fishing Port and Oesaba beach. Among these fish treating facilities and areas, the fish quality is

maintained by ice, but usually, hygiene conditions are not good.

One of the dominant products in Kupang is loin tuna (yellow fin). The fishes larger than 40 kg will be sold as a whole, while the fishes smaller than 40 kg will be processed into loin tuna. Loin tuna and whole tuna (for sashimi) are sold to the exporting companies in Bali and they are transported by airplane. Another type of modern fish processing in Kupang is frozen fish. There are two companies producing frozen fish. Both of them have processing facilities in PPP Tenau-Kupang. The product is mainly sold to a processing company in Surabaya.

In addition, there is a women's Kelompok, which produces smoked jerky of Jack trevallies and sells it to Java. The production volume is very limited.

The following figure shows the sum of fisheries activity in the Kupang area.

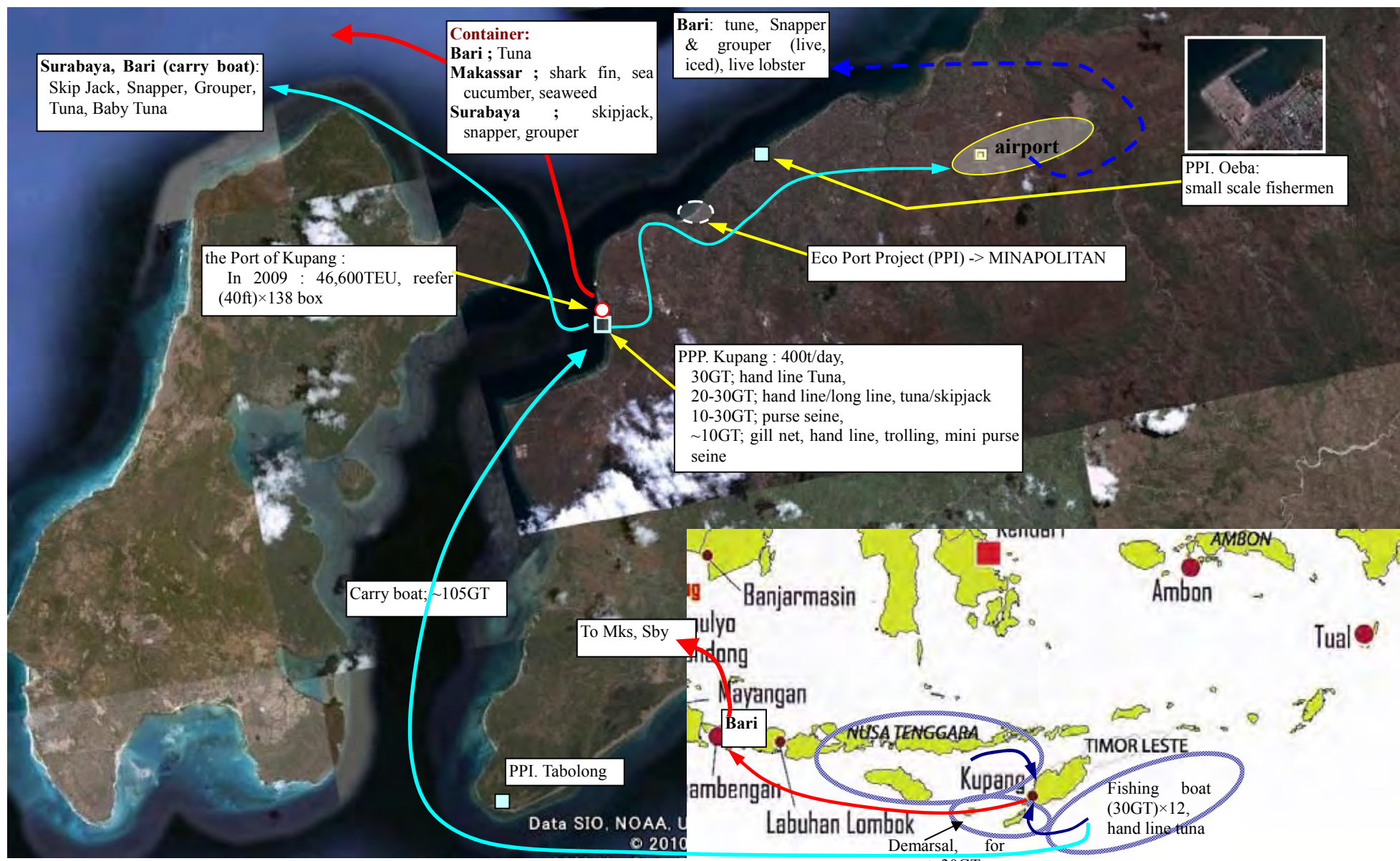


Fig. 4.2-13 Summary of fishing activities in Kupang and in the region (Source: Survey team)

⑦ Fishing Port development

The ORFP development in Kupang is to upgrade the fishing port classification from PPP (Type-C) to PPN (Type-B). The jurisdiction of PPP Kupang was handed over to the province from central government in 2001 along with the decentralization agenda. Within the fishing port area, there are a katsuobushi factory, ice factories and cold storage facilities. The development plan aims to promote processing companies by improving the mooring capacity and land area. However, on the east side of the PPP is located the commercial port of PELINDO-III; therefore, reclaiming the west side area of the PPP is considered in the development plan. Furthermore, according to the large seasonal variation in fishing activities, it would be important to investigate the size and specification of the facilities, cost, and profitability of the development project, and alternatives as well.

Table 4.2-19 Main facilities of PPP Kupang

	Facilities	Dimension	Note
	Land	5,220ha	
①	Jetty-1	4m	Pile supported
②	Jetty-2	1m	Pile supported, for less than 10GT boats
③	Revetment		
	Road	2,550m ²	
	Port basin	10,500m ²	For less than 10GT boats
④			
⑤	Auction hall		
⑥	Processor (delayed)		
⑦	Ice factory	50t/day, block ice 25kg	CV NELAYAN HIDUP MAKMUR
⑧	Cold storage		PT TSPN
⑨	Cold storage, ice factory		CV IMMANUEL
⑩	KIOSK		
⑪	Workshop		
	Generator	200KVA	
⑫	Cold storage		PT. TSPN
⑬	Fisherman's meeting hall	125m ²	
⑭	Katsuobushi factory		PT. SANANA INDONESIA
⑮	PPP administration office		
⑯	Water tank		

(Source: PPP Kupang)

In Kupang fishing port, freshwater is obtained from the Kupang Drinking Water Company and PPP owns two units of artesian wells owned by PPP Kupang, with a total volume of 5.2 liters/second. The freshwater is

provided to fishing boats, ice factories, fish traders and for other usage. Local government revenues during 2007 in PPP Kupang can be seen in the following table.

Table 4.2-20 Revenues in PPP Kupang, 2007

NO.	Source of Income	Amount of Income (IDR)
1	Rent on the officers' house	4,200,000
2	Rent for fishermen's lodge	4,960,000
3	Water service charges	93,733,500
4	Fees for workshops	3,015,000
5	Fees for building rent	5,700,000
6	Fees for land rent	61,950,000
7	Cost of arrival at the port	7,020,000
8	Mooring fees	6,312,950
9	Levies on moored boats	9,962,550
10	Levy on ships' documents	30,095,000
Total		226,949,000

(Source: PPP Kupang Annual Report 2007)

⑧ Summary of the Development Plan

Summary

The main objective of the development plan is to break up congestion at the main jetty caused by 30GT-class fishing boats, and to expand the land for fishing/processing-related activities. Thus, the current development plan consists of land reclamation at the south side of PPP, a quay for 30GT fishing boats on the offshore side of the reclaimed land, and a dockyard on the north side of the anchoring basin. This detail design was carried out in 2006 by MMAF. (PEKERJAAN: STUDI DAN DETAIL DESAIN, PEMBANGUNAN PELABUHAN PERIKANAN KUPANG, NUSA TENGGARA TIMUR, FINAL REPORT)

Jetty Size Estimation

According to the survey, 4 to 5 days are required for 10 boats to complete a series of operations at the main jetty. Thus, if more than 10 fishing boats entered the fishing port, the boats are forced to wait until their turn when the jetty becomes vacant, which causes a huge problem.

Since 2005, in order to avoid this wasting of time and bottlenecks at the jetty, many fishing boats have been transferring their catches to registered carry boats in the fishing ground, and the carry boats have been transporting their catches directly to the final landing places. These carry boats declare their catch to the PPP Kupang. This operation is conducted only in the high season. In other periods, fishing boats unload at PPP Kupang and the carry boats load at PPP Kupang as well.

Based on the frequency of fishing boat visits in the fishing port and the number of fishing boats by type, the

number of fishing boats by type in high season (November, 143 fishing boats to enter) are estimated as follows:

20-30GT: hand line by 8, pole and line by 26, long line by 60

1~10GT: gill net by 5, 1~5GT ; trap by 11, Larger than 50 GT ; carry boat by 9

Assume the available factor of the jetty is 85%, and boats, which are larger than 20GT, use the main jetty. Each boats need to use the jetty for 24 hours (among 10 boats, 2 boats uses the jetty at the same time, for 5 days in total), and carry boats require 48 hours. Then, applying the current jetty length as one berth unit:

In-service period = $30 \text{ days} \times 0.85 = 25.5 \text{ days/month}$,

Number of 30GT-class boats = $8+26+60 = 94 \text{ boats}$

Total required jetty units by month

For 30GT class = $94 \times 24 / 24 \times 1/2 = 47 \text{ jetty units}$

For carry boats = $9 \times 2 = 18 \text{ jetty units}$

Total required jetty unit = $(47+18) \times 1/25.5 = 2.5 \text{ jetty units}$

Thus, excluding concentration, there is demand nearly three times the scale of the current jetty.

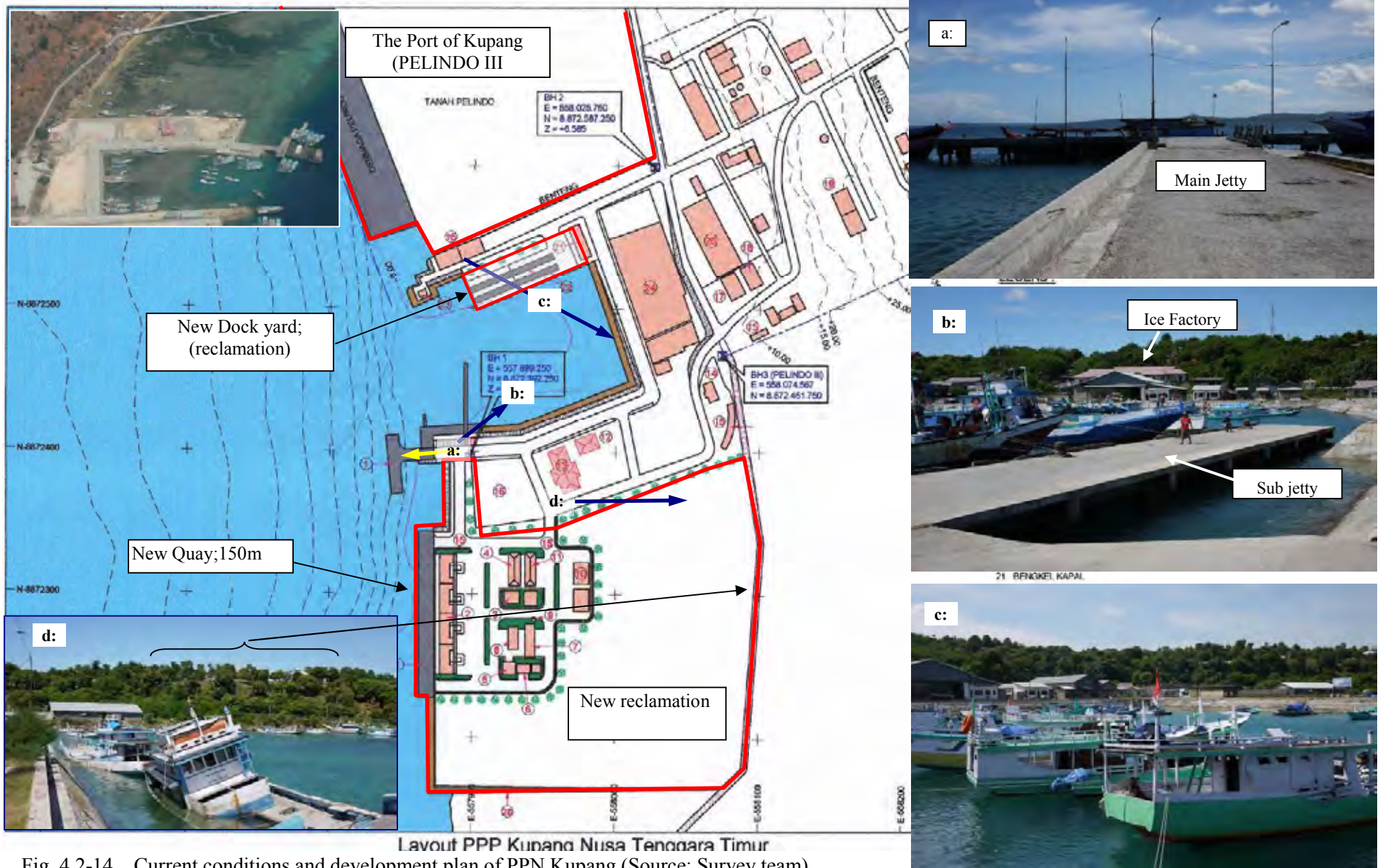


Fig. 4.2-14 Current conditions and development plan of PPN Kupang (Source: Survey team)

(4) NUNUKAN

① Nunukan Region

The Nunukan Fishing Port is located in Nunukan Island and administratively located in Nunukan Sub-district, Nunukan District, East Kalimantan Province. This province borders Malaysia to the North, and the Sulawesi Sea and Makassar Strait to the East.

The population of East Kalimantan was 3,094,700. The major cities in East Kalimantan are Samarinda, Balikpapan, Tarakan and Bontang City, with populations of 603 thousand, 507 thousand, 184 thousand and 134 thousand, respectively. (Source: Statistics of East Kalimantan Province, 2009)

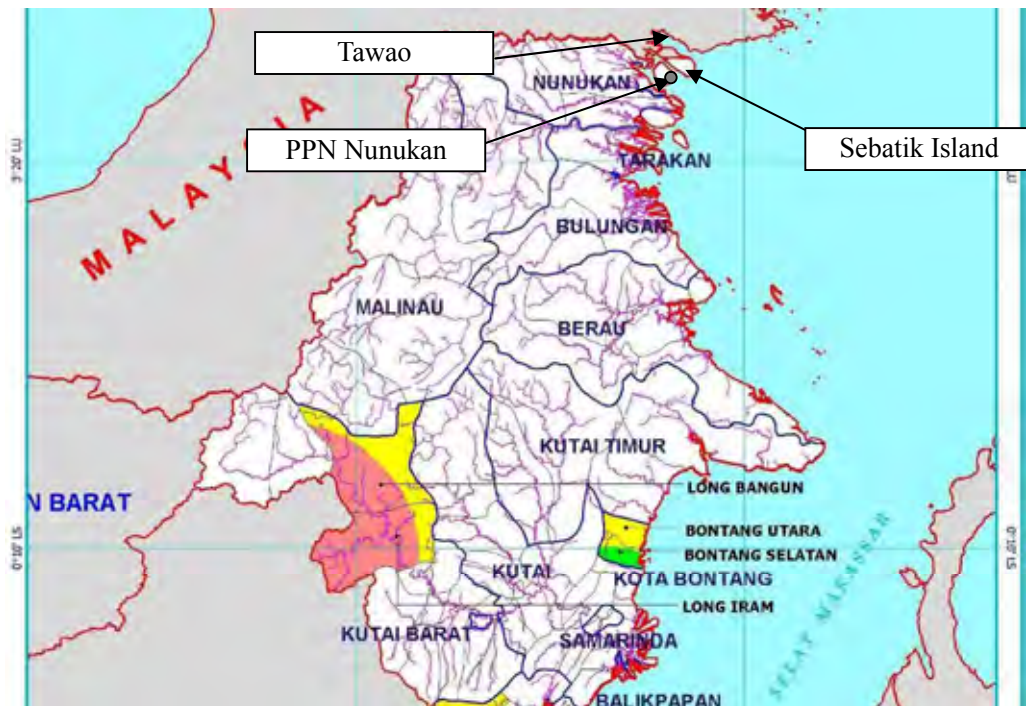


Fig. 4.2-15 Administrative map of East Kalimantan Province (Edited by Survey team)

② Fisheries in East Kalimantan

In 2008, the total fishery production volume in East Kalimantan Province was 183,898.20 tons, consisting of capture fisheries of 128,415.70 tons (69.83%) and aquaculture of 55,482.50 tons (30.17%). The proportion shows that capture fisheries dominated production volume. Fishery production in Nunukan District was 4,607 tons in the same year.⁴

⁴ Statistics of East Kalimantan Province, 2009

Table 4.2-21 Fishery production in volume in East Kalimantan, 2004-2008

Type of Fisheries	Year				
	2004	2005	2006	2007	2008
Capture Fisheries	126,805.6	130,284.4	114,690.0	127,586.6	128,415.7
- Marine capture	94,277.8	99,691.8	87,526.8	91,783.5	91,992.2
- Inland capture	32,527.8	30,592.6	27,163.2	35,803.1	36,423.5
Aquaculture	39,681.1	46,330.4	41,447.2	48,787.6	55,482.5
- Marine aquaculture	55.1	153.5	1,745.0	397.4	570.7
- Brackish water aquaculture	22,765.7	26,978.2	21,828.2	27,305.0	29,793.5
- Freshwater aquaculture	16,860.3	19,198.7	17,874.0	21,085.2	25,118.3

(Source: Statistics of East Kalimantan Province, 2009)

③ Fishery resources

There are two main sea areas in this province: the Sulawesi Sea and Makassar Strait. Based on the Fisheries Management Area (FMA) appointed by MMAF, the Sulawesi Sea is a part of FMA 716, while the Makassar Strait is a part of FMA 713. According to the National Commission for Stock Assessment (PRPT FKPPS2008), each of these FMAs possesses fishery resources potential that amount to 494,700 tons/year (FMA 713) and 83,200 tons/year (FMA 716).

④ Fisheries in Nunukan

The most dominant types of fishing gear used by fishers in East Kalimantan Province are hand line, portable trap, gill net, lift net, boat seine, and purse seine. While the most dominant types of fishing gear in Nunukan are gill net, portable trap, lift net, and hand line. The fishers in Nunukan still use relatively simple fishing technology on a small to medium scale.

Generally, there are three categories of boats/vessels operated by fishers in East Kalimantan: non-powered boats, outboard motor boats, and inboard motor boats. In 2008, the total number of fishing boats in East Kalimantan was 30,221, dominated by 21,542 inboard motor boats (71.28%). In Nunukan, outboard motor boats dominated (88.77%).

A number of fishers quit capture fisheries and changed to seaweed aquaculture in Nunukan due to the dissemination of Nunukan District's policy in 2008. Only a few fishers continue capture fisheries in Nunukan at present. The fishing ground is the coastal areas between Tarakan and Nunukan.

There are 1,874 fishers in Nunukan district and around 1,000 fishers live in Sebatik Island facing Nunukan. Their main fishing methods are scoop net, gill net, angling, long line, etc.

Some fishers in Sebatik get assistance from middlemen in Tarakan. They must unload their fish at Tarakan. The middlemen in Tarakan transport the fish to Tawau by their boats. Most of the fishing boats are traditional wooden boats built by boat builder in Sebatik.

Table 4.2-22 Number of fishing boats by category in Nunukan 2007-2009

Category of Vessel	Year		
	2007	2008	2009
Non-powered boat	65	19	56
Outboard motor boat	1,256	1,573	1,256
Inboard motor boat			
< 5 GT	428	180	195
5-10 GT	76	-	9
10-20 GT	-	-	-
20-30 GT	40	-	-
Total	2,284	1,772	1,516

(Source: Statistics of Marine Affairs and Fisheries Service of Nunukan District, 2010)

Table 4.2-23 Number of fishers/fisheries establishments in Nunukan by business scale, 2006-2008

Category of Fishing Establishment	Year				
	2004	2005	2006	2007	2008
Without boat	5	7	7	182	-
With non-powered boat	27	39	39	56	19
With outboard motor	947	969	945	1,106	1,675
With inboard Motor	367	387	375	538	180
Total	1,346	1,402	1,366	1,882	1,874

(Source: Statistics of Nunukan District, 2009)

⑤ Fish Distribution and Processing

Fish trading is carried out through middlemen, while fishers are in a vulnerable position. Fishes, who are supported by middlemen in Tarakan, land their catch at Tarakan. The middlemen transport fish to Tawau by their own boats. Both in Nunukan and Tarakan, fisher's organizations are not active. Furthermore, PPI in Sebatik is not used. This is because many small jetties are built nearby each village because the beach is very shallow around the island.

In Nunukan, there is no facility for fishing preparation, unloading, and distribution. However, a commercial port, which is capable of handling reefer containers, is available. In Nunukan city, middlemen ship fish, which is unloaded at Yamakar market, to retailers and other markets.

The main export destination of fishery products in Nunukan is Tawau (Malaysia). Export products are groupers (live and fresh), Spanish mackerel, white barramundi, snapper, *kuro*, *gulamah* and shrimp. Some middlemen ship high valued fish in good condition and live fish to Tawau in Malaysia (approx. 400kg a week). Live fish are exported from Tawau to Hong Kong and South Korea. Some fresh fish are sent from Tawau to Japan via Singapore.

The supply of ice is limited in Nunukan, so many fishers buy ice in Tawau. Some fishers bring their catch directly to Tawau since the distance is quite short from the Nunukan area to Tawau (approx. 15 minutes by boat). Malaysian fishers catch a considerable volume of fish in the adjacent sea of Nunukan

by using larger fishing vessels, and they bring the catch to Tawau. Some fish are brought to Yamakar market in Nunukan from Tawau, although the fish is originally brought to Tawau from the Nunukan area.

There are 8 exporters dealing with frozen fish and a number of middlemen in Tarakan who support fisheries in Sebatik island near Nunukan. Thus, inter-regional trade and the export of fishery products in Nunukan are carried out through these middleman in Nunukan and Tarakan.

The fisheries marketing channel in Nunukan is shown in the following figure.

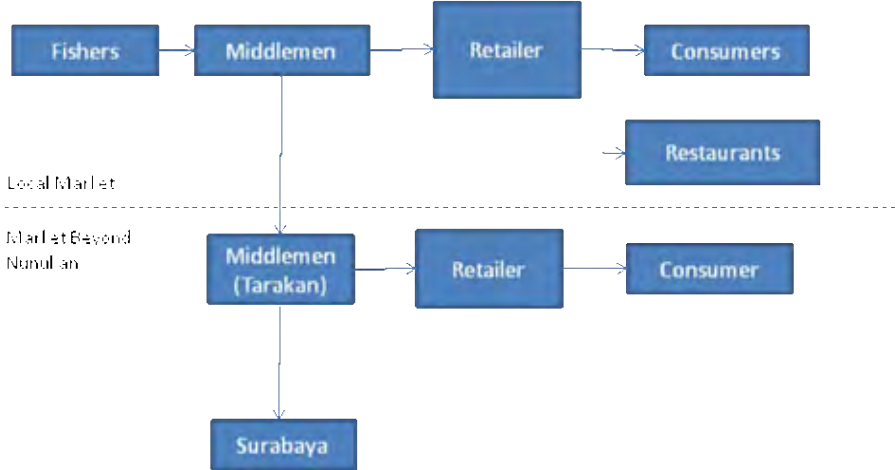


Fig. 4.2-16 Fresh fish marketing channels in Nunukan (Source: Survey team)

Tarakan is a base for fish distribution in East Kalimantan Province and many fishery products are sent to Singapore via Balikpapan from Tarakan. Around 70 middlemen in Tarakan buy fish from fishers near Nunukan and ship them to Tawau. One of the biggest middlemen ships about 100 tons of fish a month to Tawau. A fish processing company of Tarakan produces 200-300 tons of frozen shrimp in a month and the same company exports to Japan and other countries via Surabaya and Singapore. The volume of fish distribution between Tarakan and Tawau in a month is estimated at approximately 400-500 tons. The annual exporting volume of frozen fishery products from the 8 exporting companies in Tarakan is 10,800 tons. Most of this is shrimp.

Nunukan District consists of 5 sub-districts and has a wide area. However, most of the lands are mangrove swamps and therefore very little economic activity is observed. Seaweed from the farming disseminated to Nunukan in 2009 is collected by shippers through middlemen in Nunukan; it is then exported overseas via Makassar and Surabaya. Some middlemen in Sebatik Island support fishers in the same island and ship fish directly to Tawau.

At present there is no fish processing industry that is able to provide value added products in Nunukan except for a small processing factory of milkfish. There are some fishers who provide shrimp powder and small, dried fish. The shrimp powder is made by knocking a cloth bag, which is filled with dried shrimp, on a wooden anvil. This has become an important income source for fishers.

The following figure summarizes fishing activities around PPP Nunukan.

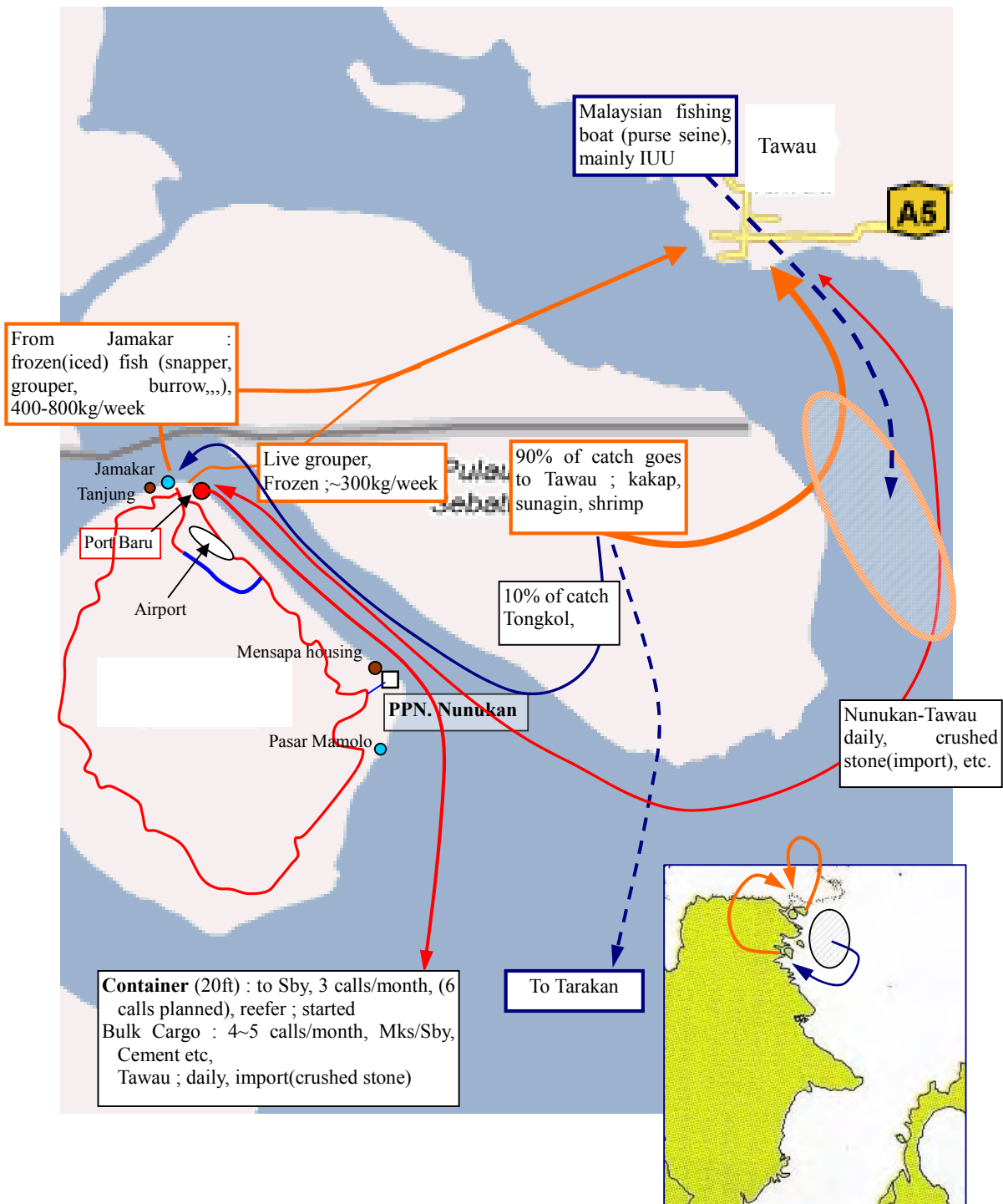


Fig. 4.2-17 Summary of fishing activities in Nunukan area (Source: Survey team)

⑥ Fishing Port Development

Previously, there was no fishing port in Nunukan; this is a new construction. At present, access road construction and land reclamation of the mangrove coast have been completed as the first stage of development. Now, the rehabilitation work on the access jetty is under way.

The development of PPN (Type B) as one of the outer ring fishing ports is positioned as a strategic center

for new economic growth and as a core at the development of the bordering areas. However, most of the capture fisheries of Nunukan is turning to seaweed aquaculture and the market is dependent on fishing activities of fishers in Sabatik Island next to Nunukan. It is important to control the increase of the loss of outgoing fishery resources by strengthening regulations of IUU fishing. Development of outer ring fishing ports as a core for fisheries management and fishery resources management is a very important issue for this goal.

The development plan for PPN Nunukan Fishing Port can be seen in the following figure. The main facilities are the jetty (100m×14m, 5m deep), trestle (110m), pier (110m) and revetment. As can be seen in the following table, the detail design was carried out in 2004 and construction then started. Then until 2008, the construction work had continued and a part of the trestle was constructed. Up to now, about 22 billion IDR has been invested.

Table 4.2-24 Implemented budget for the development of PPN Nunukan

Kronologis kegiatan pembangunan PP Nunukan dapat dilihat pada tabel sebagai berikut:

TAHUN	KEGIATAN	ANGGARAN (Rp)	SUMBER PEMBIAYAAN
2004	Detail Engineering Design	448.112.000,-	APBD Murni
2004	Pengadaan Tiang Pancang 61 buah (ϕ 50 cm L 12 meter)	863.207.400,-	APBD Murni
2005	Pematangan Lahan 50 x 60 m ²	2.373.769.000,-	APBN
2006	Pematangan Lahan 50 x 117,5 m ²	2.438.273.000,-	APBN
2006	Pengadaan Tiang Pancang 102 buah	1.348.691.000,-	APBD Provinsi
2007	Pengadaan Tiang Pancang 102 buah	2.600.000.000,-	APBD Provinsi
2007	Pembangunan Dermaga (Trestle)	2.229.776.000,-	APBN (TP)
2008	Pengadaan Tiang Pancang 70 batang berupa: - 35 batang @ ϕ 50 cm L=9 meter	1.462.587.000,-	APBD Provinsi

(Source Nunukan District)



Fig. 4.2-18 PPN Nunukan development plan (Source: Nunukan district)

However, because of shoddy pile driving workmanship, the piles fell over and the superstructure collapsed. Currently, reconstruction work is under way at the contractor's expense.



Fig. 4.2-19 Collapsed structure and current site view (Source: Survey team)

(5) BITUNG

① Bitung Region

The Bitung Fishing Port is located in Aertembaga Sub District, Bitung City, North Sulawesi Province. This province is bordered by the Sulawesi Sea, the Republic of the Philippines, and the Pacific Ocean to the north and the Maluku Sea to the east. The area of Sulawesi Utara Province includes 11 regions, 4 cities and 286 islands. The population in Sulawesi Utara according to data from 2008 was 2,208,000; the cities of Manado and Bitung had populations of 273,000 and 586,000, respectively, in 2008 (National Socio Economic Survey (Statistics of Sulawesi Utara Province, 2009).

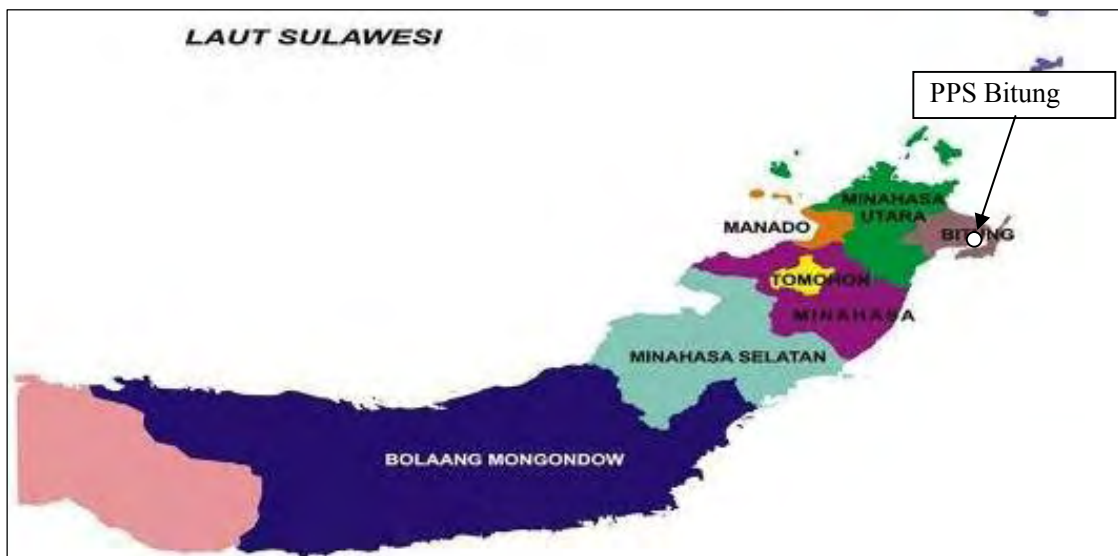


Fig. 4.2-20 Administrative map of North Sulawesi Province (Edited by Survey team)

② Fisheries in North Sulawesi

2008 fishery production in North Sulawesi was 237,506 tons, comprised of capture fisheries of 208,643 tons (88%) and aquaculture of 28,863 tons (12%). The number suggests that fishery production in North Sulawesi is still dominated by capture fisheries. Capture fisheries development in North Sulawesi during 2006 - 2009 generally increased by 2.17% annually. Bitung totaled 139,029 tons, which made up 67% of North Sulawesi in 2009⁵.

Table 4.2-25 Fishery production in North Sulawesi, 2006-2009

Type of Fisheries (ton)	Year			
	2006	2007	2008	2009
Capture Fisheries	195,904.50	187,595.20	206,112.60	208,643.00
Aquaculture Fisheries	14,575.40	15,684.40	23,519.50	28,863.30
TOTAL	210,479.90	203,279.60	229,632.10	237,506.30

(Source: Annual Report of Marine Affairs and Fisheries Service of North Sulawesi Province, 2010)

⁵ Source: Annual Report of Marine Affairs and Fisheries Service of North Sulawesi Province, 2010

North Sulawesi province has 13 PPIs. Around Bitung, 4 are to be found: PPI Kalijengki and PPI Tumumpa in Manado, PPI Likupang in the north, and PPI Kema 15km south from Bitung.

③ Fishery Resources

Based on the Fisheries Management Area (FMA) issued by MMAF, the sea surrounding North Sulawesi is part of two FMAs, namely FMA 715 (Seram Sea, Maluku Sea and Tomini Bay) and FMA 716 (Sulawesi Sea, Halmahera Sea and the Pacific Ocean). According to the National Commission of Stock Assessment (PRPT FKPPS2008), both of the FMAs have a total marine fisheries potential of 324,900 tons/year (FMA 715) and 83,200 tons/year (FMA 716).

The main fishing grounds are widely spread: Toro Bay, Banda Sea (FMA: WPP714), Tomini Bay, Maluku Sea, etc.(FMA: WPP715), Sulawesi Sea, etc. (FMA: WPP716) and Cendra Bay, Pacific Ocean (FMA: WPP717). From the aspect of fishery resources management, users of PPS Bitung share fishery resources with Maluku and West Papua Province, and with the Philippines in the Sulawesi Sea. Therefore, controlling IUU fishing becomes a big issue. At present, fishery patrol boats reside at the fishing port and have regular clamp downs; therefore, IUU fishing is decreasing. Bitung City also has a small patrol boat.

④ Fisheries in Bitung

There were 98,922 fishers in North Sulawesi in 2008. The most fishers reside in Manado, while the least fishers reside in Bitung (5,324 fishers). There are fishers' organizations but they are not active.

There are several dominant types of fishing gear in North Sulawesi, such as troll line, hand line, drift gill net, set gill net, purse seine, lift net, tuna long line, drift long line, set bottom long line, and pole and line. While the dominant types of fishing gear in Bitung are troll line, set gill net, pole and line, tuna long line, purse seine, and drift gill net. Generally, the fishers in Bitung already use advanced types of fishing gear in medium-scale business. The main fishing grounds are South Halmahera, Ceram and North Sulawesi.

Generally, there are three types of fishing boat/vessel operated by fishers in North Sulawesi: non-powered boats, outboard motor boats and inboard motor boats. The total number of fishing boats in North Sulawesi in 2009 was 23,135; the dominant type was the outboard motor boat, totaling 15,484 (66.9%). Based on the size, the dominant boat is below 10GT (99%). Middle and large-scale fishing boats are mainly found in Bitung. Most of the local fishing boats are wooden, while commercial fishing boats are steel. There is a shipbuilding yard, which is a branch of an enterprise in Makassar.

Table 4.2-26 Fishing boats condition by size in North Sulawesi and Bitung 2008

Vessel Category			North Sulawesi	Bitung
Total			23,135	2,369
Non-powered boat	<i>Sub total</i>		6,989	272
	<i>Jukung</i>		6,653	272
	Board Vessel	Small	336	0
		Medium	0	0
Large		0	0	
<i>Outboard Motor Boat</i>			15,484	1,822
Powered boat	<i>Sub total</i>		662	275
	Vessel Size	< 5 GT	249	10
		5-10 GT	121	14
		10-20 GT	111	95
		20-30 GT	50	35
		30-50 GT	58	50
		50-100 GT	32	30
		100-200 GT	20	20
		200-300 GT	21	21

(Source: Statistics of Marine Affairs and Fisheries Service of North Sulawesi Province, 2010)

Most of the fishers own their fishing boats and are not dependent on middlemen. This is the same situation for fishers in Manado. There are also a number of fishers who become partners of big fish processing companies on a contract basis and who are hired by vessel owners that supply fish to those fish processing companies. There seem to be few number of individual small-scale fishers who operate alone.

Kema Fishing Port is located 5km south of Bitung, where lots of fishers operate mini purse-seine fishing boats through cooperation with lighting boats. They mainly catch scad. A fishing village, located 10km north of Bitung, has about 4,000 fishers operate gill net and bagan fishing. The fishers there unload fish mainly in Bitung Fishing Port.

Table 4.2-27 Capture fisheries production by major species in Bitung 2009

No.	Fish Species			Production (ton/year)
	Local Name	International Name	Genus/Species	
1	Cakalang	Skipjack	<i>Katsuwonus pelamis</i>	61,364.8
2	Layang	Scad	<i>Decapterus spp</i>	22,452.1
3	Tongkol abu-abu	Longtail tuna	<i>Thunnus tonggol</i>	16,555.4
4	Albakora	Albacore tuna	<i>Thunnus alalunga</i>	15,313.5
5	Madidihang	Yellow fin tuna	<i>Thunnus albacares</i>	14,419.3
6	Tuna Mata Besar	Big eye tuna	<i>Thunnus obesus</i>	12,611.7

(Source: Statistic of Marine Affairs and Fisheries Service of North Sulawesi Province, 2010)

The volume of fish landed in PPS Bitung and sales values are shown in the following table. Here, 14.09 tons of fish is landed every day on average.

Table 4.2-28 Volume and value of fish landed at PPS Bitung 2008-2009

NO	MONTH	Year of 2008		Year of 2009	
		VOLUME	VALUE	VOLUME	VALUE
		(Ton)	(Rp)	(Ton)	(Rp)
1	January	889,62	5.887.488.000	1.251,00	17.179.264.000
2	February	1.095,38	7.585.164.500	675,78	7.388.195.000
3	March	1.150,88	9.788.335.000	900,72	9.750.932.000
4	A p r i l	1.286,15	10.873.797.500	1.203,55	13.290.281.000
5	May	613,17	40.062.606.378	1.099,36	12.318.746.000
6	June	991,95	15.507.392.000	1.215,56	16.080.871.000
7	July	982,51	9.755.440.750	1.144,71	14.663.206.000
8	August	2.566,67	29.157.725.150	1.280,87	15.951.833.000
9	September	1.594,84	16.934.217.755	1.920,12	23.976.602.000
10	October	1.319,07	15.315.159.320	1.915,41	19.394.913.000
11	November	1.694,00	12.676.121.180	1.347,50	14.323.494.789
12	Desember	936,16	9.384.890.000	1.644,23	21.042.398.950
	AMOUNT OF	15.120,40	182.928.337.533	15.598,81	185.360.736.739

(Source: Annual Report of PPS Bitung of year 2009)

⑤ Fish Distribution and Processing

Fishery products exported from Bitung are mainly transported by reefer containers through Jakarta, Surabaya and Makassar. They reach their destination countries via Singapore. Some are exported to Japan via General Santos in the Philippines. There are also many supplies shipped to large consumption cities like Jakarta in Indonesia. Some commodities such as tuna loin and fresh tuna are shipped to Bali by air from Manado.

Though the status of Bitung Fishing Port is PPS, small-scale boats also utilize the fishing port. Direct dealings between fishers and middlemen and between fishers and retailers are conducted at the port. There are also many fishers who sell fish to fish processing companies under a special contract base.

A total of 45 processors (6 canning factories, 3 sashimi plants, a katsuobushi factory, and frozen food factories) are located in the Bitung area. Many of these private enterprises own their jetties and undertake unloading activities with about 400 tons a day in total.

In Bitung, there is a large canning factory, which produces 85 tons of canned yellow fin tuna daily and exports this to Japan. Fishery products quality control such as HACCP, ice utilization, and frozen storage, etc., is widely installed among processing companies here. Residuum from processing factories are processed in a fishmeal factory; therefore, almost 100% of the raw materials are utilized.

Fish unloaded in Bitung Fishing Port are brought to 6 consumer markets in the city, since there is no fish market function in the fishing port. Industrially important fish species unloaded in Bitung are tuna,

skipjack, and scad. Pelagic fish are also distributed from Bitung to Manado and bottom fish are supplied from Likupan to Bitung.

The following figure summarizes fisheries activities in the region and PPS Bitung.

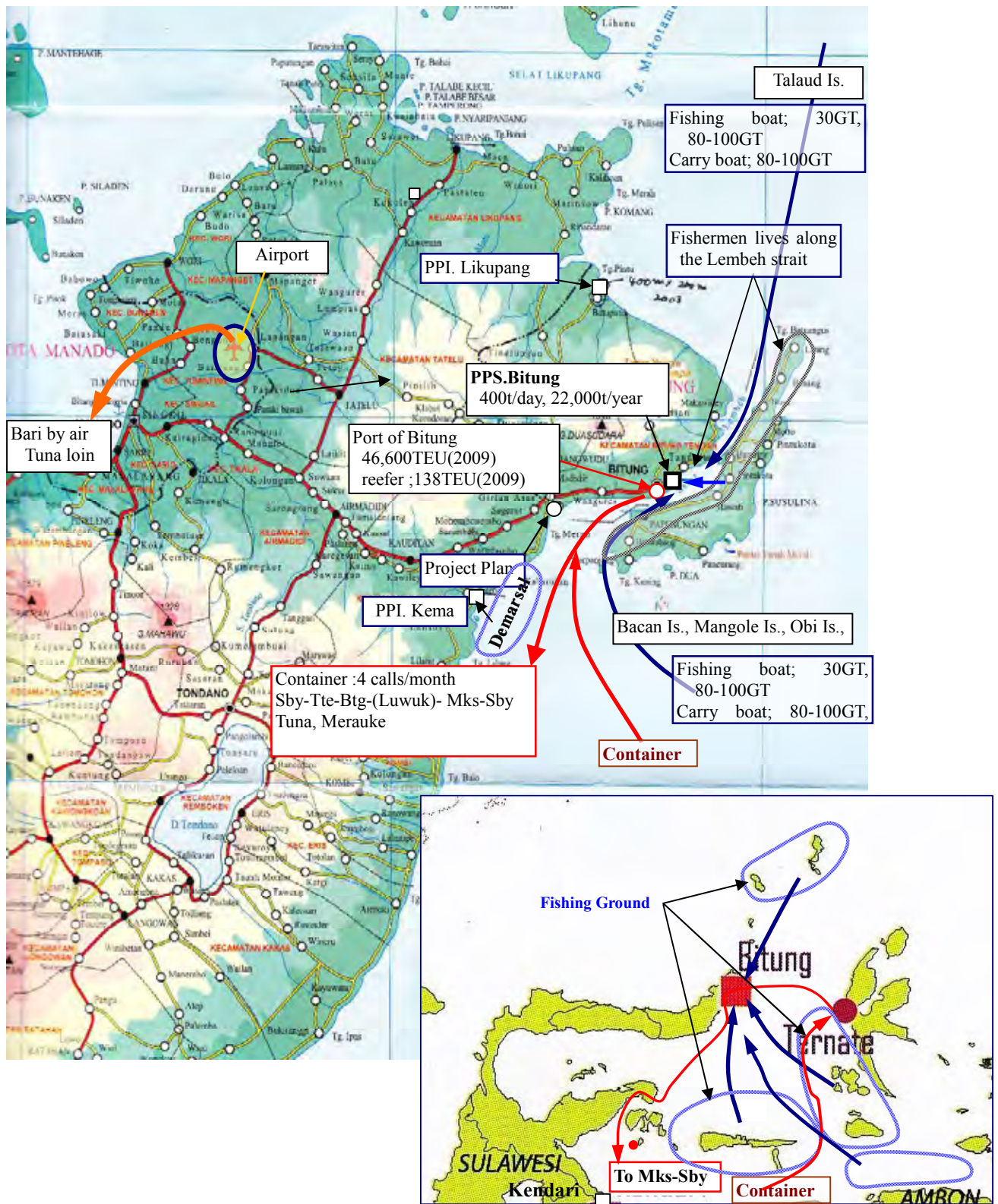


Fig. 4.2-21 Summary of fisheries activities in the region of PPS Bitung (Source: Survey team)

⑥ Development of PPS Bitung

Summary of the fishing port

Bitung City faces Lembeh Island and this natural condition provides a very good location for a port. The Bitung fishing port is classified as PPI (Type D), but the study team confirmed that the status of the fishing port had already been upgraded to PPS (Type A). Bitung Fishing Port has plans for expansion to settle the issue of a lack of mooring facilities. However, since Bitung Commercial Port (PELINDO-IV), a state-owned fishing company, private fish processing companies, etc, have their own jetties and wharfs near the PPS fishing port, and their lands fully occupy the coast, the expansion of the facility of PPS has its limitations. Therefore, Bitung City plans to build a new fishing port in the Special Economic Area, a new site for construction. PPS Bitung has been serving local fishers as a function of PPI and supporting large commercial fishing vessels.

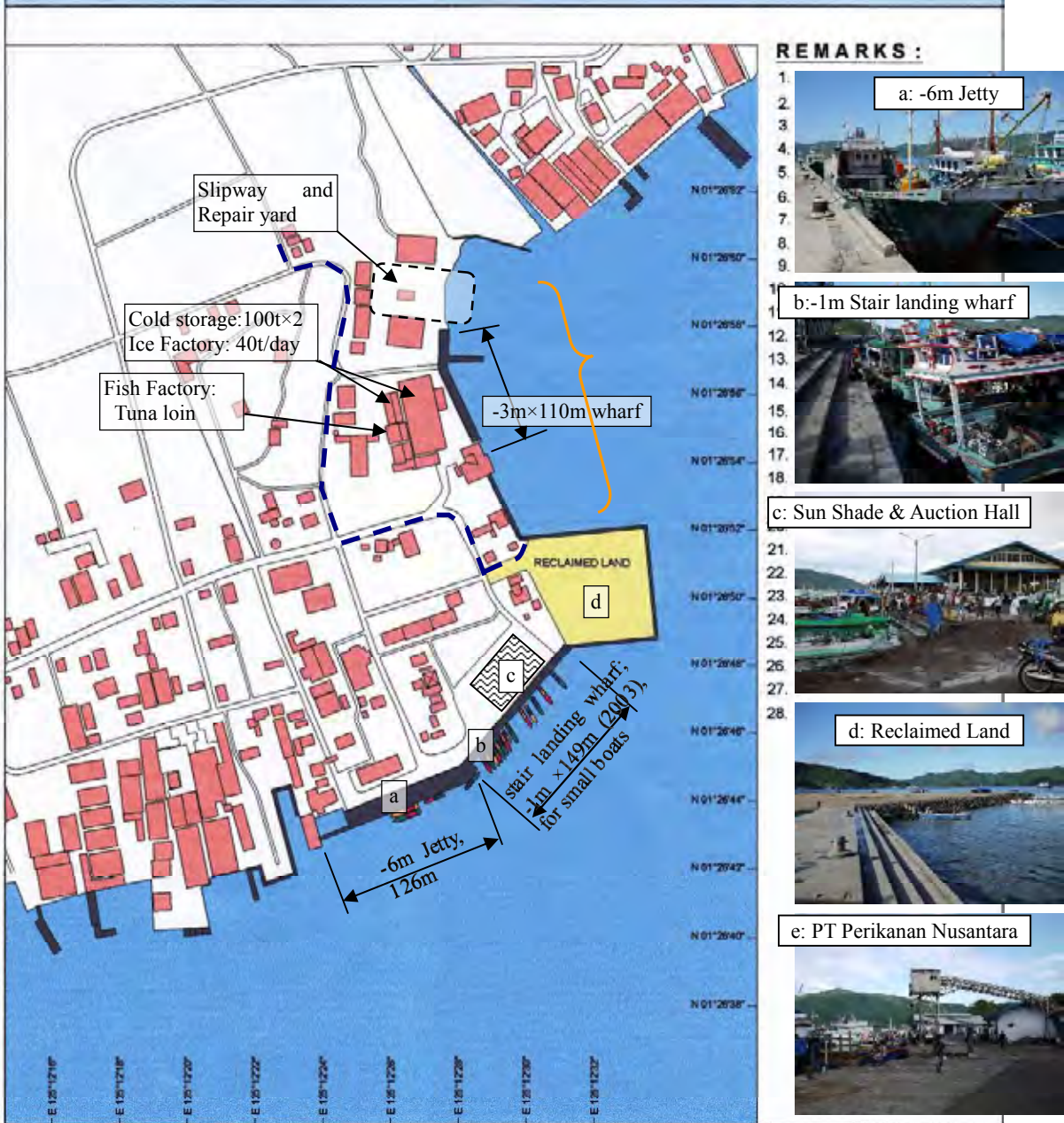
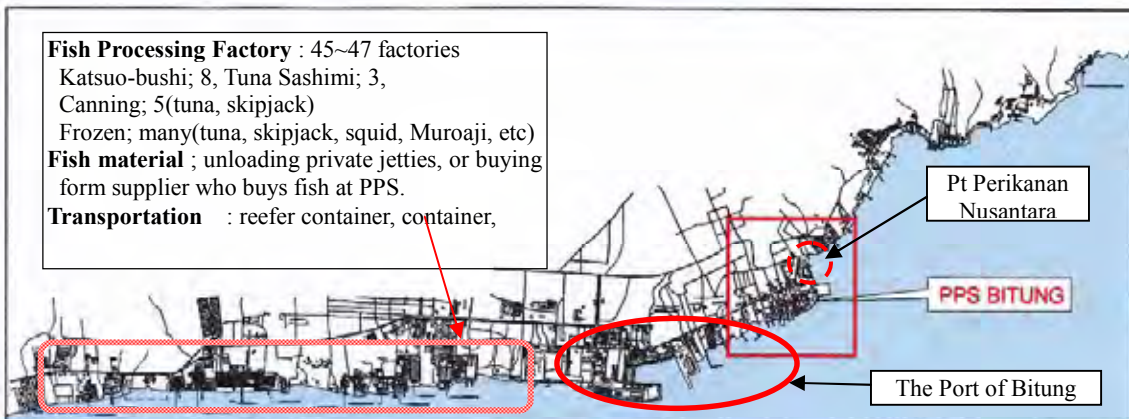
PPS Bitung is a frontier model for transferring commercial capture fisheries. This is due to the dissemination of skipjack pole and line fishing, which was originally introduced by Japanese fishers. Bitung Fishing Port is trying to develop the functions of PPS by maintaining its role of PPI and attracting attention throughout the whole of Indonesia. By 2009, there were 79 personnel including permanent staff, part time and contract employees in total. The main facilities of Bitung fishing port are as follows:

Table 4.2-29 Main facilities of PPS Bitung

	Name of Facility	Dimensions	Remarks
	Fishing port area		
1	Jetty-1 (steel pile supported)	L=126m, 6m deep	For carrier boats
2	Stair landing quay	L=140m, 1m deep	
3	Quay Under construction	75+102+120m, currently rubble mound revetment	Planned as stair landing quay
4	Auction hall		
5	Sun shade roof		
6	Fuel supply	PT. GETRA MITRA USAHA	
7	Administration office (PPN)		
8	Administration office (Kota)		
9	Water supply		
10	Public toilet		
11	Newly reclaimed land		Development plan
12	Quay	110m × -3~-4m	PT. PERIKANAN NUSANTARA
13	Cold storage	100t × 2	
14	Ice factory	40t/day, ice crusher	
15	Processing room		
16	Dock yard		
17	Administration office		

(Source: PPS Bitung)

The following figure on the next page shows the current facilities of PPS Bitung.



Layout PPS Bitung

Fig. 4.2-22 Facilities of PPS Bitung (Source: Survey team)

Table 4.2-30 Revenues in PPS Bitung, 2008-2009

NO.	Type of Income	Income (IDR)		Proportion
		2008	2009	%
1	Cost of fitting into the port	12,387,700	33,963,900	174.2
2	Land Rental	54,252,176	49,996,242	(7.8)
3	Public Toilet Services		3,275,000	100
4	Kiosk Rental	11,383,000	14,266,940	25.3
5	Mooring Boats	33,448,150	64,119,031	91.7
6	Water Services		29,342,800	100
7	Use of Electricity		2,654,160	100
8	Use of the Hall		300,000	100
9	Giro Services		185,013	100
10	Use of Ice Crusher		8,952,330	100
11	Use of Cool Box		3,126,000	100
12	Block Ice Services		6,292,600	100
13	Officer House Rental		2,343,858	100
14	Store services		3,128,096	100
Total		111,471,026	221,945,970	99.11

(Source: PPS Bitung Annual Report 2009)

Fishing port utilization

PPS Bitung is used by a wide range of fishing boats from small-scale boats like sampans for coastal fisheries to commercial fishing boats and large carriers. Fish landing activities are started in early morning by small-scale fishers, then pole and line fishing boats; carry/collecting boats land at any time. Mainly, fishing boats less than 10GT use the -1m stair landing quay. This area is usually heavily crowded with many fishing boats, so many other boats are forced to wait their turn offshore from the quay. Thus, small-scale boats (sampans) use newly reclaimed areas, which are not convenient for unloading work.

The number and type of fishing boats, which were found by the survey team in the fishing port, are shown in the following table. The component ratio of fishing boats less than 10GT and larger than 10GT was almost the same as that of registered fishing boats in the fishing port.

Table 4.2-31 Number of fishing boats using Bitung fishing port (5/19-5/20 ; by Survey team)

5/19,06:00-06:30	sampan	~3GT	3~5GT	5~10GT	10~30GT	30GT~
Quay 1m	2	5	15	8		
Revetment	35					
Jetty 6m					4	5
5/20,09:00-09:30	sampan	~3GT	3~5GT	5~10GT	10~30GT	30GT~
Quay 1m		3	13	8	16	
Revetment	30					
Jetty 6m					4	5
Daily Average	59.5 (78%) boats				1 (22%) boat	
Registered boat	1,846 (89%) boats				230 (11%) boats	

(Source: Survey team)

A large collecting boat of 500GT comes monthly and unloads about 600 tons at one time, occupying the 6m jetty for 4-5 days. This causes problems with other boats, which are forced to wait their turn. In Bitung, 45 fish processors are operating. Many of the boats that provide fish to these processors unload at the private facilities of each processor. The amount of fish might reach about 400 tons per day.



Sun Shade

1m stair landing quay

Revetment (under construction)

Fig. 4.2-24 PPS Bitung in the morning (Survey team)

Table 4.2-32 Frequency of vessel visits in PPS Bitung, 2008-2009

NO.	MONTH	Frequency of Visits (Time)		Proportion
		2008	2009	%
Total		22,215	21,432	(3.52)

(Source: PPS Bitung Annual Report 2009)

Assuming the fishing boat component ratio is 78% for boats less than 10GT and 22% for boats larger than 10GT, the required jetty scale is estimated from the number of fishing boats using the jetty in the following table. From the required scale of the jetty, the aforementioned fishing port improvement plan would be capable of realizing small-scale fishing boat demand. In the case of large fishing boats, there would still be some congestion, but current conditions would improve significantly. Here, the required berth length for preparing work is assumed to be half of the unloading berth length.

Table 4.2-33 Required berth length of Bitung fishing port

Boat size	Number of boats per year	Number of boats per day (85% of availability): N_0	Duration for unloading per boat: H_0 (hr)	Time frame for unloading works: h(hr)	Number of boats at one time: $N_0 * H_0 / h$	Boat Length (m) L(m)	Required length of facility: $Lr : 1.15L \times n$	Jetty length for preparation $=Lr/2$
Less than 10GT	17,000	55	2	6	18.3	13	284	142
Larger than 10GT (mainly 30-50GT)	4,800	15	12	24	7.5	24	221	110

(Source: Survey team)

Fishing Port Development Plan

The current facilities of PPS Bitung were developed through the national budget. Details are based on the detail design in 1998, which was conducted by JICA, but further consultation results have been added. The main jetty, with a depth of 6m, is a steel pile supported jetty, constructed in 2002. The current auction hall, sun shade roof, and apron pavement were completed in 2004. These construction projects were implemented through DAK Funds.

At present, land reclamation (1 ha), and construction of the quay (1m depth, 75m, 102m and 120m long), jetty for large boats (5m depth and 130m long) and trestle (180m long) are under way. In 2010, completion of the revetment of the newly reclaimed land and its apron pavement and expected to be completed, costing 4.5 billion IDR, and 185m of the trestle costing 14 IDR. In 2012, completion of the main jetty is planned (150m) at a cost of 27 billion IDR. The funding is planned to be implemented by APBN.

(6) TERNATE

① North Maluku Region

The PPN Ternate Fishing Port is located on the eastern coast of Ternate Island, which is south of Harmahera Island in North Maluku province. The capital city of the province is Sofifi; however, Ternate is the center for social and economic activity in the province. Ternate Island is about 10km from north to south, and 8km from east to west, with a population of about 95 thousand.



Fig. 4.2-26 Location of PPN Ternate (Edited by Survey team)

② Fisheries in North Maluku

Fisheries activity in North Maluku is dominated by capture fisheries, driven by the locals who prefer marine fishes. The dominating species in North Maluku fishery production are skipjack, scad, tuna, baby tuna, and black trevally. However, the so-called “other species” (including small pelagics) are insignificant in volume. Since pole and line fishing are deeply rooted in the region, small-scale commercial fishing is well established here. Fishing vessels/boats are mainly pole and liners and purse-seiners. Some FRP fishing vessels/boats can be observed. Generally, the fish are consumed locally.

There are three places to land captured fish in Ternate city: PPN Ternate, PPI Dufadufa and the market. The scale of activity is not clearly different between these three, but the main place is PPN Ternate. In addition, there are three PPI in Tidore Island.

The fishing grounds are widely spread, such as the Sulawesi Sea, etc. (FMA: WPP716), Cendra Bay and the Pacific Ocean (FMA: WPP717) and so on. For fishery resources management, it is an important issue to control the operations of fishing vessels/boats that come from other areas, since Ternate is located in a center with considerable potential for marine development.

③ Fisheries in Ternate

Similar to North Maluku Province, Ternate fishery production is also dominated by capture fisheries. The main targets are mostly pelagic fishes, such as tuna, skipjack, scad, black trevallies, and baby tuna. The most dominant bottom fishes are groupers and snapper. The most dominant types of fishing gear in Ternate are beach seine, purse seine, drift gill net, and set gill net. Pelagic fishes are usually caught using purse seine and drift gill net, while the other types of gear are used for bottom fishes.

Pelagic fish dominates (almost 83%) the total catch in Ternate. The main fish landing base is PPN Ternate. In PPN Ternate fish are transported from other areas such as Tidore.

Table 4.2-34 Volume of fishery production by species in Ternate 2002 - 2007

Fish Species	Ton / Year					
	2002	2003	2004	2005	2006	2007
Tuna/Skipjack	3,315	5,013.66	5,038.73	5,074.00	5,682.88	6,308.00
Trevallies	1,364	1,022.21	1,027.32	1,034.51	1,158.65	1,286.10
Fusilier Fishes	315	341.20	342.91	345.31	368.75	409.31
Baby Tuna	441	1,302.80	1,309.31	1,318.48	1,476.70	1,639.03
Goldstripe	258	50.58	50.83	51.19	57.33	63.64
Sardinella	462	218.29	219.38	220.92	247.43	274.65
Snapper/Grouper	381	146.35	147.08	148.11	165.88	184.13
Beak Fish	265	295.87	297.35	299.43	326.96	362.93
Mackerel	15	127.30	127.94	128.84	144.31	160.18
Squid	641	1,479.97	1,487.37	1,497.78	1,667.51	1,850.94
Others						
Total	7,457	9,998.23	10,048.22	10,118.57	11,296.4	12,538.89

(Source: Ternate City)

Fish are mainly transported by carry boats (15-20GT), and from 10GT fishing boats using mini purse seine. Some fish are carried by ferry from Baban Island, which take 5 hours. To transport the fish to PPN Ternate, fishers usually use collecting boats. The fishing boats do not come to PPN so often, except for docking, maintenance and repair. Most of the collecting boats are owned by fishers, but some of them belong to middlemen who operate the boats by themselves.

15 tons of fish a day are unloaded at Ternate Fishing Port and 5 tons of fish a day at Dfadfa Beach to satisfy the demand for fish by the 200,000 people of Ternate City. Many of fish are caught near adjacent area of Ternate. However, in the same sea area, there are also many fish that are caught by fishing boats that come from Bitung and are unloaded at Bitung. Tuna and skipjack are the main species caught in the area. Skipjack is caught a lot near the Bacan Island area. Mini purse seine fishing boats (mainly 10GT) go to Bacan Island to catch mackerel, baby tuna and anchovy. Catches are landed by carry boats at PPN. Pole and line fishing boats (mainly 30GT) catch skipjack and transfer their catch to carry boats in the fishing ground. Carry boats land their catch at Bitung because of the stable prices there. Hand line fishing boats come from the Philippines and land one-third of the time at Ternate, and the rest goes to the Philippines (General Santos) illegally.

④ Fish Distribution and Processing

One company in Ternate ships tuna loin to Jakarta by reefer container for export. There is a regular container service between Surabaya and Ternate port (PELINDO IV), and fishery products are transported to Surabaya by reefer containers.

Fish unloaded at the port are consigned to a substitute boat owner called a “Pelaksana” to sell, she decides on the fish price by negotiating with retailers and middlemen named “Dibodibo”. Fish is distributed through negotiated transactions (OTC) mainly done by women. Most of the fish unloaded are for consumers and only a part of the fish are used as materials in fish processing. The people of Ternate areas require freshness in their fishery products. However, hygiene in the fishing ports and fish markets is not good and needs to be improved. Especially the facilities for drainage, which easily becomes bottlenecked.

Fishers don't have special relationships with middlemen. Many fishers are employed by vessel owners and engage in skipjack fishing and purse-seine fishing. There are fishers' organizations but they are not active.

In most cases, purse-seine fishing boats ask collecting boats to unload fish to save time and labor. The catch is mainly unloaded at Ternate and Tidore fishing ports. Because of the limited market scale in Ternate and Tidore, an oversupply of fish can easily occur and fishers face difficulties selling their catch. Thus, fishers are sometimes forced to stop fishing in such cases.

Processing factories for smoked scad and frozen fish are in the area of PPN Ternate. These factories ship their products to Jakarta. There are few processors and middlemen in Ternate. There are individuals and Kelompok who produce and sell fish sauce made from yellow fin tuna and/or scad. The products are distributed only in the city since production volume is limited. In Maitara Island, there is a smoked skipjack producer who sells the products in Ternate City.

The following figure summarizes fishing activities of the PPN Ternate and the region.

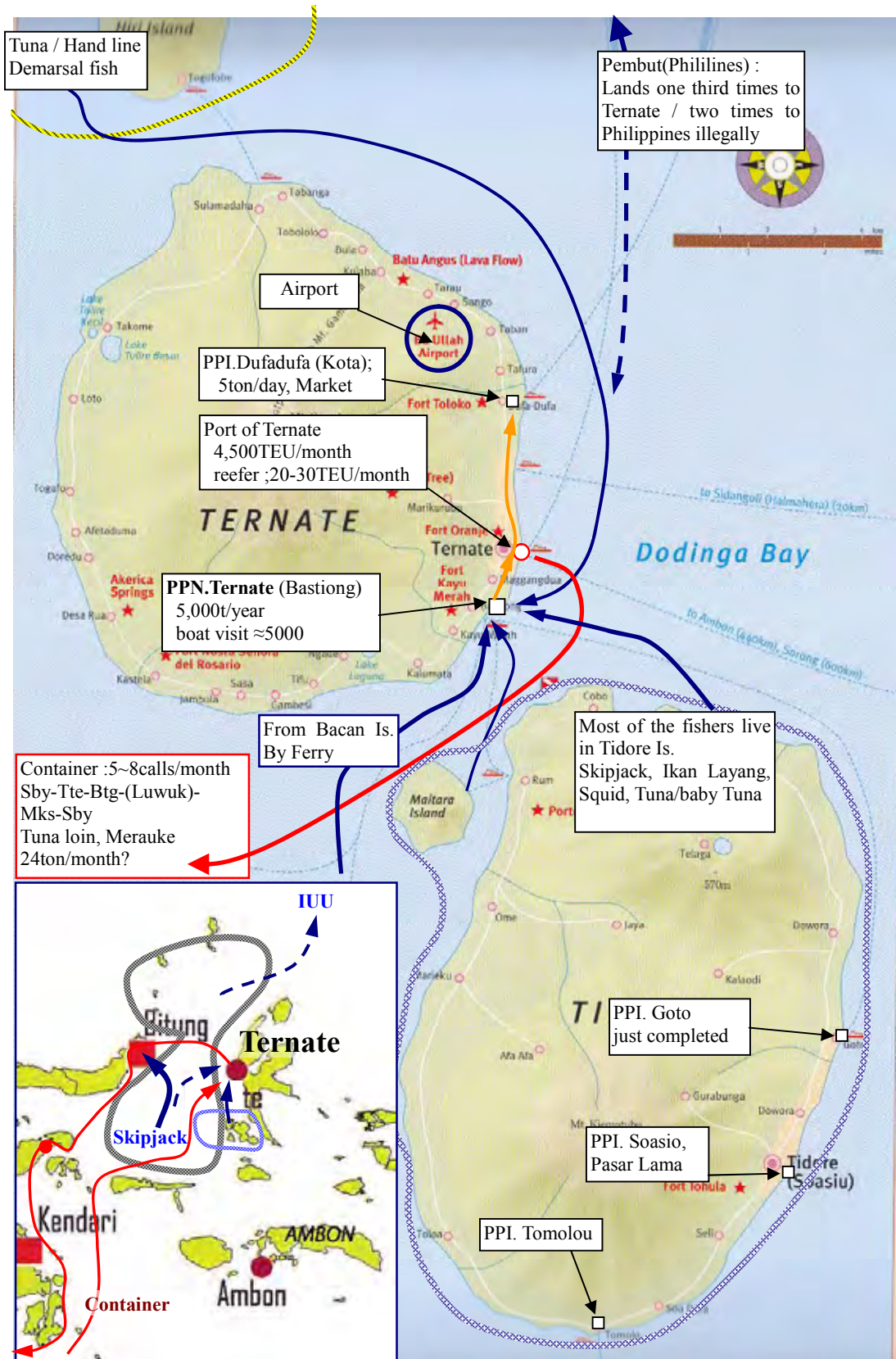


Fig. 4.2-27 Summary of fishing activities of PPN Ternate and the region (Source: Survey team)

⑤ Fishing Port Development

Summary of the fishing port

As the preliminary information describes, the port status is not changed from PPN (Type B); there is an improvement plan to enlarge entrepreneur appeal aimed at undertaking future development in the fish processing sector. The PPN Ternate is managed by the central government.

Ternate used to be a center for physical distribution since the area was an internationally famous production site for spice. The historical background has caused a delay in regional development in North Maluku. However, a development project has just started in the vast Halmahera Island. The establishment of North Maluku Province in 2000 triggered this movement.

In PPN Ternate, there are 32 permanent staff, one hopeful permanent staff, one part time member of staff and 14 day workers.

The development of Ternate fishing port started in 1980, and the main jetty was completed in 1996. In 2003, expansion work for the jetty was carried out and a second jetty was completed in 2005. The following table shows the current fishing port facilities.

Table 4.2-35 List of facilities of PPN Ternate

No	Type of Facility	Size	Condition	Remarks	
A	Main Facilities				
1	Port Area I	40.000	M ²	Good 100%	
2	Jetty I	64 x 6	M ²	Good 80 %	Appropriate
	Trestle I	89,5 x 8	M ²	Good 80 %	Appropriate
3	Jetty II	49 x 6	M ²	Good 80%	Appropriate
	Trestle II	83,38 x 8	M ²	Good 80 %	Appropriate
	Berthing Wharf	50,4 x 4	M ²	Good 80 %	Appropriate
4	Tallud of Sheet Stone	197	M ²	Good 100%	Appropriate
5	Road in the Port	5.140	M ²	Good 100 %	Appropriate
7	Port Pond	-5.5	M	-	-
B	Functional Facilities				
1	Auction Hall/Fish Market	500	M ²		
2	Administrator's Office	415	M ²		
3	Parking Area	544	M ²		Appropriate
4	Fisheries Inspection Office	54	M ²		Appropriate
5	Fuel Tank	50	ton		Functional
6	Block Ice Factory	10	ton		Functional
7	Bulk Ice Factory	20	ton	Bad 20 %	Damaged
8	Cold Storage: 2 units	80	ton		Functional
9	Air Blast Freezer: 3 units	10	ton		Functional
10	Water Tank: 2 units	150	ton		From Artesian Well
11	Artesian Well	4	Lt/s		Functional
12	Sea Water Tower	10	ton	Good 60 %	Functional
13	Toilet	54	M ²		Functional
14	Electric Installation	300	KW		From PLN
15	Genset	150	KW		Functional
16	Mini Plant/Processing Room	210	M ²		Functional
17	Repair Workshop	200	M ²	Good 70 %	Functional
18	Fishers Meeting Room	100	M ²	Good 70 %	Functional
19	Equipment Warehouse	120	M ²	Good 70 %	Functional

No	Type of Facility	Size		Condition	Remarks
20	Drying Net Place	500	M ²	Good 70 %	Functional
C	Supporting Facilities				
1	Officer House	2	Unit	Good 70 %	Functional
2	Operator House	8	Unit	Good 70 %	Functional
3	Mosque/Islamic Prayer House	100	M ²		Functional
4	Wall fence	500	M		Appropriate
5	Guard house: 2 units	18 x 2	M ²		Functional
6	Pawnshop	42	M ²		Rental
7	Laboratorium of Fish Quality	200	M ²		Not Efficient
8	Tennis Court	1	unit		Functional
D	Industrial Company in PPN Ternate				
1	PT. Mitra Nelayan Mandiri				
	1. Block Ice Factory	20	ton		
	2. Reefer Container 20ft	2	unit		
	3. Fishing Vessels 6GT	50	unit		
2	PT. Dwi Poli Perkasa				
	1. Air Blast Freezer	3	ton		
	2. Cold Storage: 2 units	100	ton		
3	PT. Era Mandiri Cemerlang				
	Tuna Loin Processing	150	M ²		
4	CV. Fiberglass Perkasa				
	Shipbuilding yard	1,000	M ²		
5	UD. Hermanto				
6	UD. Agus				
7	UD. Irwan				

(Source: PPN Ternate)

Table 4.2-36 Number of fishing boats using the PPN Ternate facilities 2008-2009

	2008	2009
Visiting vessels	5,770	4,363

(Source: Annual Report of PPN Ternate, 2009)

The number of vessels visiting the PPN Ternate was 4,363 in 2009, which can be seen in the above table. The ice production from ice factories in PPN Ternate was 337 tons, and block ice production from a private factory was 5,630 tons in 2009.

Table 4.2-37 Volume and value of ice sold in PPN Ternate, 2008 - 2009

	Year of 2008		Year of 2009	
	VOL (Ton)	VALUE (IDR)	VOL (Ton)	VALUE (IDR)
Amount	409	92,480,000	337	84,287,500

(Source: Annual Report of PPN Ternate, 2009)

Table 4.2-38 Ice blocks supplied by private ice making factories, 2008 - 2009

	YEAR OF 2008		YEAR OF 2009	
	VOL (Ton)	VALUE (IDR)	VOL (Ton)	VALUE (IDR)
Amount	5,467	1,858,780,000	5,630	1,463,800,000

(Source: Annual Report of PPN Ternate, 2009)

The income of PPN Ternate during the last two years can be seen in the following table.

Table 4.2-39 Revenues in PPN Ternate, 2008-2009

NO.	TYPE OF INCOME	RECEPTION (IDR.) 2008	RECEPTION (IDR.) 2009
I.	<u>GENERAL RECEPTION</u>	<u>29,364,562</u>	<u>8,711,091</u>
1.	Officer House Rental	3,614,941	3,516,480
2.	The return of the remaining contract	25,749,621	5,192,500
II.	<u>FUNCTIONAL RECEPTION</u>	449,012,790	459,527,988
1.	Workshop Services	22,255,000	28,930,000
2.	Sales of Water	61,514,500	65,168,374
3.	Sales of Ice	92,480,000	84,287,500
4.	Cold Storage Rental	54,500,000	58,000,000
5.	Cool Box Rental	2,760,000	2,300,000
6.	Parking Charges	20,905,000	23,583,000
7.	Tank Rental	1,905,000	1,140,000
8.	Land Rental	4,423,300	11,035,354
9.	Toilets Rent	14,642,000	14,925,000
10.	Storage Rental	11,875,000	9,029,000
11.	Stacking Places Rental	2,384,000	2,023,000
12.	Mooring Services > 10 GT	69,582,000	72,453,000
13.	Mooring Services < 10 GT	20,811,000	21,509,000
14.	Electric Services	62,723,990	59,075,760
15.	Fish Sales Place Rental	6,252,000	6,069,000
	Amount of I + II	478,377,352	468,235,075

(Source: Annual Report of PPN Ternate, 2009)

The current condition of the fishing port facilities is shown in the following figures.



Fig. 4.2-28 Current status of PPN Ternate (Edited by Survey team)

Fishing port utilization

The auction hall is used as a fish market for retail selling. The new jetty on the north side is used by ferry boats (Ro-Ro) for resting because of the shortage of facilities in the port of Ternate. Fishing boats also use this jetty for resting.

There were 4,363 boat visits in the fishing port. Assuming the fishing boat component ratio by number of registered fishing boats as 38 for ones less than 10GT and 44 for ones of 10GT to 30GT, the required jetty scale is estimated from the number of fishing boats using the jetty in the following table. Currently, there is 163m (64m+49m+50m) of jetty in total, and this is adequate for the fishing boats in the PPN Ternate.

Table 4.2-40 Required length of berth in Ternate fishing port

Boat size	Estimated number of boats per year	Number of boats per day (85% of availability): N_0	Duration for unloading per boat: H_0 (hr)	Time frame for unloading work: h (hr)	Number of boats at one time: $N_0 * H_0 / h$	Boat Length (m) $L(m)$	Required length of facility: $L_r : 1.15L \times n$	Jetty length for preparation $= L_r / 2$
Less than 10GT	3,393	11	2	6	3.7	13	59.8	29.9
10GT to 30GT	970	3	12	24	1.5	20	46	23

(Source: Survey team)

Fishing port development plan

The following figure shows the development plan of PPN Ternate, which is provided by the office of PPN Ternate. Based on this plan, land acquisition was carried out in 2008. Most of the expansion area have to be provided by land reclamation. The main factors behind the development plan are land expansion and a new jetty and dockyard. The total project cost is estimated at 111.6 billion IDR.



Fig. 4.2-29 Development plan of PPN Ternate (Edited by Survey team)

Table 4.2-41 Cost estimation of PPN Ternate development

Annual task	Cost (IDR)	Remarks
Total Cost	111,622,970,130	
2011	43,232,851,350	
Detail design	500,000,000	245,000m ³
Engineering design of revetment	100,000,000	
Land reclamation	32,914,385,350	
Revetment construction	5,206,398,000	
Drainage	1,344,833,000	
Repair of cold storage, etc.		
2012	8,886,749,021	
Road works	4,083,596,022	9,028m ²
Administration office	3,643,942,998	With 2 floors 760m ²
Gate	475,458,000	
Guard post	248,752,000	42m ²
Park	435,000,000	
2013	6,303,056,009	
Road pavement	978,056,009	4,288m ²
Parking	325,000,000	
Water tank	425,000,000	
Fuel tank	875,000,000	
Electricity	2,500,000,000	
Fuel supply	1,200,000,000	
2014	53,200,313,750	
Jetty	34,400,000,000	800m ²
Access jetty	15,750,000,000	450m ²
Kiosk	585,000,000	150m ²
Auction hall	1,272,420,000	320m ²
Warehouse	1,192,893,000	300m ²

(Source: PPN Ternate)

(7) TUAL

① Maluku Region

The PPN Tual fishing port is located in Tual City, Maluku Province, which covers 632 islands. This province is bordered by North Maluku Province to the north, Timor Leste and Australia State to the south, Southeast Sulawesi and Central Sulawesi Province to the west, and West Papua Province to the east. There are 10 fishing ports in Maluku Province, consisting of 2 type-B ports (PPN) and 8 type-D ports (PPI).

The total population of Maluku is 1,440,014. The population is concentrated in Central Maluku (25.62%), Ambon (19.53%) and the west part of Seram (11.04%). (Statistics of Maluku Province, 2009)



Fig. 4.2-30 Location of PPN Tual fishing port (Edited by Survey team)

② Fishery in Maluku Region

There are two PPN and eight PPI in Maluku Province. Tual is in the Kei Islands located southeast of Ambon, the capital city of Maluku Province.

The fishery production volume in 2008 amounted to 403,081 tons, consisting of capture fisheries which produced 384,543 tons (95.40%), and aquaculture, which produced 18,537 tons (4.60%). The capture fisheries sector is still dominating total fishery production volume. The most dominating types of fishing gear used by the fishers in Maluku Province are boat seine, purse seine, gillnet, lift net, drift long line, set bottom long line, troll line, and hand line.

Table 4.2-42 Volume of fishery production in Maluku Province, 2006-2008

Type of Fisheries	Year		
	2006	2007	2008
Capture Fisheries	488,090.6	491,550.7	384,543.9
- Marine capture	488,090.6	491,550.7	384,543.9
- Inland capture	-	-	-
Aquaculture	3,592.1	17,824.2	18,537.1
- Marine aquaculture	2,992.7	17,569.3	18,270.9

Type of Fisheries	Year		
	2006	2007	2008
- Brackish water aquaculture	482.4	121.3	126.2
- Freshwater Aquaculture	117.0	133.6	140.0

(Source: Statistics of Maluku Province, 2009)

③ Fishery Resources

The provincial borders are all surrounded by sea. The seawater area of Maluku consists of three main seas: the Banda Sea, Ceram Sea, and Arafura Sea. According to the National Commission for Stock Assessment (PRPT FKPPS2008), the three FMAs possess the fishery resources potential amounting to 311,900 tons/year (FMA 714), 324,900 tons/year (FMA 715), and 385,700 tons/year (FMA 718).

Assuming that the total area of seawater in Maluku consists of 100% FMA 714, 20% FMA 715, and 30% FMA 718, and assuming that the fish are distributed equally, it is roughly estimated that the fishery resources potential in Maluku Province amounts to 627,579 tons/year.

④ Fisheries in Tual

The fishery resources are rich in marine areas near the site, and therefore private fishing companies are highly interested in the areas. A large-scale private fishing complex and local small-scale fishers are active in marine capture fisheries.

The most dominant types of fishing gear in Southeast Maluku District, including Tual City, are hand line, purse seine, drift gill net, and portable trap. The targets are bottom fish and squid, and in Bagan it is anchovy. Though seaweed culture has increased in Tual, fishers have been continuing capture fisheries. Fishers live mainly on the western coast of Kai Kecil Island; around 5,000 fishers are there. A total of 14 fisher's Kelompoks and 72 seaweed farmer's Kelompoks exist, and Tual City provides provisional and technical support to these groups. Some fishers make contracts with large-scale middlemen. Their boats are 4-5GT. Generally, small-scale fishers are dominant in Tual.

Generally, there are three types of fishing boats/vessels operated by Maluku fishers, namely non-powered boats, outboard motor boats, and inboard motor boats. The total number of fishing boats in Southeast Maluku, including Tual, in 2008 was 5,101 and the dominating type was non-powered boats, amounting to 4,352 (85.3%).

Table4.2-43 Number of fishing boats in the Southeast Maluku District, including Tual City

Category of Vessel	Year			
	2005	2006	2007	2008
With non-powered boat	2,093	7,535	5,351	4,352
With outboard motor	167	505	906	701
With inboard motor	170	228	153	48
Total	2,330	8,268	6,410	5,101

(Source: Statistics of Southeast Maluku District, 2010)

Bipolarization has been proceeding between local traditional fishing boats and large commercial fishing vessels. The number of fishing vessels utilizing Tual fishing port has decreased drastically since 2007. In 2009, only 30 boats used the fishing port. According to the interviews, there was an inspection by the authorities to the fishing port area to check for IUU fishing, and port users seem to be still sensitive about the incident.

There were 38,666 fishers in Maluku Province in 2008. The number of fishers in Southeast Maluku District, including Tual City, is shown in the following table.

Table 4.2-44 Number of fishers in the Southeast Maluku District, including Tual City

Year	Number of Fishers	Number of Fishers' Groups
2005	15,475	553
2006	15,600	575
2007	15,675	625
2008	8,384	764

(Source: Statistics of Southeast Maluku District, 2009)

⑤ Fish Distribution and Processing

Small-scale fishers can sell their fish to anybody who offers a better price since they are not generally bound by middlemen. There are many fishers who make contracts with middlemen to ship fish to Surabaya.

In Tual, one big company, which owns fishing vessels and fish carrier vessels, exports directly to China by using its own vessels. There are fish suppliers for large-consumption cities and regions such as Jakarta and Bali, small-scale capture fisheries for local markets, seaweed culture, and pearl culture in addition to the abovementioned big company.

The port of Tual (managed by the Ministry), which is located 3 km from the center of Tual city, provides cargo and container services, as well as ferry services. Fishery products are transported by large-scale middlemen to Surabaya using reefer containers without entering Ambon. They buy fish mainly from small-scale fishers.

Foreign vessels from Thailand, Korea, and Taiwan, which used to utilize Tual Fishing Port before 2007, have never returned. At present, large fishing boats and carry boats have changed their landing base to PPS Bitun and/or PPN Ambon. On the other hand, the carry boats which are chartered by processors come to load fish every 3-4 months and carry the fish to Taiwan.

Fishery products, which are consumed locally by 100,000 people in Central Maluku District and 60,000 people in Tual City, are unloaded at the markets of Ohojan and Langur by small-scale fishers. Usually, middlemen lead the fish dealing. Fish fillet and frozen fish are the main processed fish at this site. Using ice is popular to keep the catches fresh. Middlemen know how to maintain the quality of the fish from their individual experience.

Small to middle-scale frozen fish processors mainly buy fish from small-scale fishers directly. There are

no incoming and outgoing fishery products to and from other districts and islands in Maluku Province in Tual. When there is an oversupply of fish in the local markets in Tual, middlemen bring the fish to Timika in Papua Province. Anchovy, mainly caught by Bagan fishing, is frozen and exported to Taiwan and bottom fish is processed as fillet at Surabaya and exported to Australia from Surabaya.

There are two companies that deal with live fish. They collect fishes (mainly grouper), which are stocked and looked after by small-scale fishers, collected by boat and transported to Surabaya and Bali regularly. The collecting boat comes one to three times a month to get a license and inform their catch to fishing port administration office.

180-240 tons of dried seaweed is produced and shipped monthly. In Ubu Island, one company produces dried and salted products such as shark meat and fins. The company ships the products to Makassar, Surabaya, and Jakarta. In Tual City, there are 10 home-industry manufacturers of dried anchovy and some frozen fish producers.

The following figure summarizes fisheries activity around PPN Tual.

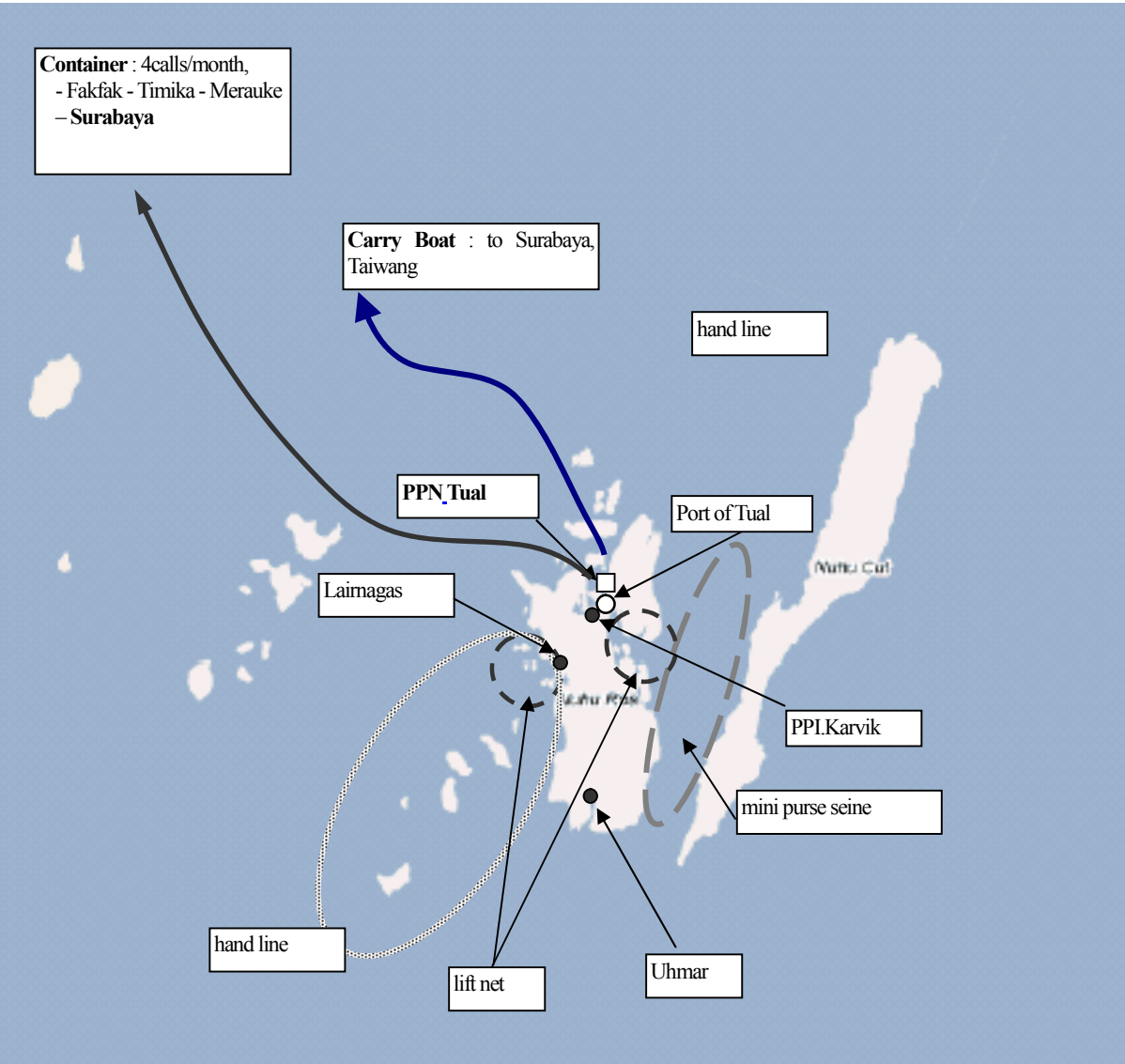


Fig. 4.2.-31 Summary of fishing activities around PPN Tual (Source: Survey team)

⑥ Fishing Port Development

The development plan is to upgrade PPN Fishing Port (Type B) to PPS Fishing Port (Type A) as the preliminary information describes. The central government manages the port. Since the plan for the upgrading exists, the land had already been secured. The property of airport, which used by private air carrier at present, is the Air Force of Indonesia. Thus, a new airport is now being constructed. Also, the commercial port is not managed by a state-owned port company and is directly controlled by the central government. It is one of the characteristics of Tual areas to see the supporting system under the direct control of the central government.

The administrative authority of PPN Tual employs 46 people, consisting of 26 permanent employees, and 20 temporary employees.

The main facilities of Tual fishing port are as follows:

Table 4.2-45 Main facilities of PPN Tual

	Name of Facility	Dimension	Remarks
	Fishing port area	11ha, 5ha is used	
	Field	10ha	
1	RC Jetty	L=136m, A=1,056 m ² , 6-10m deep	
	Trestle	306m ²	
2	POS Jetty		
	Complex road	9,819m ²	
3	Fuel supply		
5	Navigation tower	1 unit	
4, 6	Fuel supply	PT. GETRA MITRA USAHA, 135m ³	
7	Water supply	1 unit	
8, 9	Fuel supply	PT. NINI GERHANA	
10	Water tank	1 unit	
11	Auction hall (TPI)	PT. PUSAKA BAHARI, 450m ²	
12	Net repair/ Workshop	PT. PUSAKA BAHARI, 450m ²	
13	Workshop	34m ²	
14	Public Toilet		
15, 16	Electricity	40KVA, 108m ²	
17	Laboratory	m ²	
18	Meeting house	591m ²	
19	Administration house	550m ²	
20	MESS KALEBUH		
21	Shop		
22	Housing		

(Source: Survey team)



Fig. 4.2-32 Panoramic view of PPN Tual (Source: Survey team)



Fig. 4.2-33 Current facilities of PPN Tual (Source: Survey team)

In 2007, in response to the shortage of jetties and improvement of the ability for fish handling, the development plan was discussed. The main items were a jetty of 300m, repair dock, land expansion and ice factory.



Fig. 4.2-34 Development Plan of PPN Tual (Source: PPN Tual)

4.3 A summary of the survey results

4.3.1 Site specific fishing port development plans and their issues

(1) Development plan of seven (7) sites

As a result of this survey on the seven selected outer ring fishing ports, the development plan of each site are summarized in the following table. Here, in the site survey, SWOT analysis on the development plan was carried out to take into consideration the characteristics, current situation and problems of each site properly, based on discussions with those involved. However, details of the SWOT analysis were left out since they were used as one of the investigative approaches; the results are reflected in the following table.

Table 4.3-1 Survey results on the seven ORFP development sites

Site	Expected Users	Fish Catch	Scale of Facility	Outcome	Construction	Problems & Tasks
PPN Teluk Awang	<p>145 sampan-type boats behind the fishing port and boats from two PPI on the eastern coast. It is not clear whether there will be new entry of 30GT-class boats. In the province, there are 145 boats of 10~20GT class.</p> <p>It is heard that some private companies are considering moving to the fishing port.</p>	<p>Fish catch in Lombok Tengah is only 1,200 tons, since there is no fishing port.</p> <p>Facing the fishing grounds in Indian Ocean, but resources are fully exploited in FMA573.</p> <p>Catch is mainly for local consumption, but juvenile lobsters are transported to other provinces.</p>	<p>The reclaimed land has enough scale at present. Two jetties for small boats and 30GT-class boats are planned. Length of main jetty is maximum scale but in first stage it could be kept to a minimum requirement.</p>	<p>Small-scale fishers expect to enlarge their fishing boats so as to operate off the gulf of Ekas. Get close to the fishing grounds in the Indian Ocean for fishing boats which uses current PPI. Base for patrol boats to operate in the Indian Ocean.</p>	<p>Phase-I (~2012); only 7.3 billion IDR has been used by 2010, where 49.8 billion IDR is needed to complete phase-I. Land reclamation and formation have been completed. Development of jetties is needed, but budget is not enough to start.</p>	<p>Access road is very poor. Development of access road is needed in parallel with fishing port construction.</p> <p>Electricity is limited and lacking.</p> <p>There is the need to investigate expected users of the fishing port, and related measures.</p> <p>Delay caused by budget shortfall.</p>
PPN Untia (Makassar)	<p>In the province, there are 149 boats of 20GT and larger classes. In the Makassar area, all fishing boats are less than 10GT. It is not clear whether there will be new entry of 30GT-class boats.</p> <p>Currently, fishing boats use the two existing PPI, but they are not enough to meet demand. Demarcation for utilization of neighboring PPI is not clear.</p>	<p>There has been about 16 thousand tons of fishing catch in Makassar area continuously since 2006.</p> <p>Since Makassar is the logistics center of eastern Indonesia, processors procure raw materials not only from Makassar but from other provinces.</p>	<p>Fishing port is planned to be located 600m offshore, in order to keep the depth of 3m and to fulfill the requirements of PPN. This requires large-scale breakwater and dredging.</p>	<p>To solve the shortage of mooring and handling facilities in current PPI.</p> <p>To improve hygiene condition and to be capable to meet the requirements of fish processors.</p> <p>To make active use of logistical advantages of the city.</p>	<p>Reclamation of access road and 2/3 of access jetty have been completed in 2010.</p> <p>From 2005, 24IDR was implemented, and 364IDR will be needed to complete the work.</p> <p>Further development requires large-scale budget. It will take many years to complete under the current situation.</p>	<p>There is the need to investigate expected users of the fishing port, and related measures.</p> <p>Delay caused by budget shortfall.</p> <p>Sedimentation in the port pond and around the fishing port.</p>
PPP Kupang	<p>Mainly used by medium to large-class boats larger than 10GT. In 2009, there were 879 visits to PPP, and 100~140 monthly visits have occurred in high season.</p> <p>Fishing port users are well demarcated with other PPI.</p> <p>It is not clear about the demand for land area.</p>	<p>The resources condition of the main fishing ground (FMA573) is considered as over exploited for all the species. The main species are lemuru, frigate tuna, snapper, kembung and skipjack.</p> <p>Catches are mainly transported to large consuming regions. Live fish and expensive fish are transported by air. Others are transported by large carry boat and reefer containers.</p>	<p>In high season, the shortage of jetties becomes serious. To deal with this congestion, the jetty would need to be extended by two to three times. Thus, the development plan for the jetty is considered as adequate.</p> <p>A port pond with enough depth is greatly needed, but not implemented in the development plan.</p>	<p>To solve the congestion of fishing boats in the high season.</p> <p>To shorten the waiting time to unload, and to improve fish quality.</p> <p>To break up transshipment and to intensify catching data collection and resource management.</p> <p>Base for patrol boats.</p>	<p>Not started</p>	<p>Shortage of jetties makes fishers continue transshipment. Development of jetties is greatly needed.</p> <p>Upgrading revetment around port basin and deepening it could improve port basin with enough depth.</p>

Continued from Table 4.3-1 Survey results on the seven ORFP development sites

Site	Expected Users	Fish Catch	Scale of Facility	Outcome	Construction	Problems & Tasks
PPN Nunukan	Outboard engine boats are dominant, as well as inboard engine boats less than 5GT. It is not clear whether there will be a new entry of 30GT-class boats. Most of the fishers live in Sabatik Is. near Nunukan, which is about one or two hours from the project site.	The resources condition of main fishing ground (FMA716) is considered as over exploited in regards to large pelagic fish, and others are unknown. Since the main target species is anchovy here, resource would still be available. Most of catches are for outer regions such as Tarakan and Tawau.	Minimum scale jetty is planned as PPN.	To be an inter-regional and export shipment base. To intensify fishing data collection system and resource management. To be a fishing base for border area and support safe and stable fishing activities. Base for patrol boats.	Construction work started in 2005. But trouble occurred in construction of the trestle. Recovery work is under way at present. Modification of the development plan is being investigated at present (T-shape jetty to be arranged into another shape.)	There is the need to investigate expected users of the fishing port, and related measures. Effectiveness of administrative direction for Sebatik fishers to use new fishing port. Inadequate execution work would cause foundation problems
PPS Bitung	PPS is used by both small-scale boats and large commercial fishing boats (21,000 visits per year). Not only large boats but also small-scale fishers provide fish to processors.	Skipjack and scad are dominant and tuna (long tail, albacore, yellow fin, big eye) comes next. Many other species are caught as well. The resource condition of Celebes Sea (FMA716), it is considered as overexploited for large pelagic fish, and others are unknown. In the Maluku Sea (FMA715), large pelagic fish are over exploited and others are moderate.	The development plan for the jetty is adequate, compared to the required jetty length based on the calculation of the current number of boats and visits for small boats. And it would be also improved for large-scale boats, but some congestion for preparing for development work would occur.	To shorten the waiting time to unload, and to improve fish quality for both large-scale and small-scale fishing boats. To halt additional private jetty enhancement and to consolidate fishing catch at the fishing port. To provide hygienic conditions in the fishing port and to be capable of meeting processors' requirements.	Construction already started. Land reclamation will be completed in 2010. And continuous construction work on the jetty is planned to be completed in 2012 with 27 billion IDR of APBN.	It is difficult to expand further from current development plan, because land space is limited. Demarcation between neighboring Perikanan Nusantara. The sun shade roof is working well. And further development might be considered to improve hygienic conditions.
PPN Temate	Demarcation for utilization of neighboring PPI is not clear. At present, there is no critical shortage of facilities.	Skip jack, tuna and scad are the dominant species. Share the fishing ground in the Molucca Sea with Bitung. Catches are transported by chartered carry boats and reefer containers.	The scale of existing jetty is adequate, compared to the required jetty length (160m) based on the calculation of the current number of boats and visits.	There is a sufficient room for jetties to accept cargo ships but a shortage of commercial port facilities. Thus, the jetties would be capable of handling fishing boats.	Total cost for the development is estimated at 111.6 billion IDR. Land acquisition is completed. But there is no prospect for the commencement of construction.	There is the need to investigate expected users of the fishing port, and development plan. Demarcation between neighboring PPI is to be investigated.
PPN Tual	Number of boat visits in 2009 was only 30 and no fish catch was landed on the fishing port. Currently, it is supposed that large commercial fishing boats are using Ambon and Bitung fishing ports.	Commercial fishery is keen on the resources in the region. There is one large company undertaking fishing and processing with a large fishery complex base in Tual.	Before 2007, many large fishing boats including foreign boats entered PPN Tual. Under these conditions, demand for fishing port facilities was high.		There is land for expansion. But there is no prospect for the commencement of construction.	The most important issue is to normalize the current situation that there is little exploitation by fishing boats. Inter-regional demarcation against Ambon and Bitung about large fishing boats

(2) Review of the ORFP development plan at seven (7) sites

1) Appointment of Outer Ring Fishing Ports for Development

① There were some comments in the interview about the basis of selection for the seven Outer Ring Fishing Ports and the objectives, and that the idea was not shared comprehensively within MMAF for example, “Untia could not be recognized as ORFP because of its location in the archipelago.”, “PPI Morotai should be selected as ORFP instead of Ternate.” However, MMAF confirmed that the current policy of ORFP development will not be changed.

② About Untia/Makassar fishing port, the basis behind its selection for ORFP is to develop a stronghold fishing port in Makassar, which is a logistics and economic gateway in the eastern part of Indonesia, similar to the Jakarta fishing port. Thus, it would be required to assess it from a different point of view from other ORFP.

③ There has been no fish landing activity since 2008 in PPN Tual fishing port because of the incident in late 2007. ORFP development should be discussed resolving this situation.

2) Planning of the Development of Each Fishing Port

① Classification of fishing ports is determined by the maximum allowable resources to utilize. The size and dimensions of each facility are determined not by the current utilization and future demand, current situation and outlook of fisheries sectors, but mainly by the definition of PPN and PPS. Therefore, the scale of planned facilities tends to exceed current and also future demands.

② Especially in the case of new fishing port development (Teluk Awang, Nunukan, Untia), it has not been discussed specifically about the users of the facilities. Therefore, problems might occur regarding usefulness.

③ In Nunukan, which is a newly constructed fishing port, it is said that the government will force the fishers in Sebatik to utilize the new fishing port through administrative directions. The effectiveness and affect of this measure should be carefully considered.

④ Demarcation for utilization of neighboring PPI is not clear in Untia and Ternate. And information sharing is not enough between the parties involved. Thus, it is a concern that the objectives, function and stakeholders might overlap between neighboring fishing ports.

⑤ It is important to clear the way to develop an access road and electricity supply to Awang village.

3) Implementation of the Development Plan

① A shortage of funding has delayed the project in some fishing ports. In Teluk Awang, the administrative office is not able to start construction of the main facilities such as the jetty, instead, only the construction of small facilities has been carried out in recent years. In Untia, it will take a long time to complete the main facilities because of their large-scale under the current funding situation.

② Because of the shortage of funding, construction in Nunukan was carried out without consulting

experts, resulting in serious problems in the construction work.

③ Repeated jurisdiction-related handovers might cause mix ups and a crossing of paths during the implementation of the project.

4.3.2 Necessary considerations in appraising the support for the ORFP development

The study team examined items to be considered for supports based on the following “Table 4.3-2. List of 7 sites conditions”. Those items are ①Fitness of natural conditions, ②Posibbility of fishery business development, ③Remote areas (boarder areas, archipelagic areas etc.) ,④Potential for the regional development, ⑤Possibility of alleviation of threatening on conflict and peace & order, ⑥ Issues.

Results of the examination describes in the order of (1)Teluk Awang, (2)Makassar, (3)Kupang, (4)Nunukan, (5)Bitung, (6)Ternate, and (7)Tual in the following page.

Table 4.3-2 Summary of current situation for the seven ORFP development sites

Site name	Number of fisherman	Degree of autonomy of fisherman	Fish collection person	Middleman	Retailer	Process manufacturer	Exporter	Aquaculturist	Staff	Patrol ship	Merit	Demerit
Teluk Awang	○	×	×	○	○	△	△	-		○	It is near to sightseeing city, Bali. Economic activities of fisheries processing by women are seen. (Only boiled fish)	It stays away from 75km to consuming place, Mataram and Pulaya The condition of access roads to the Teluk Awang fishing port, especially two bridges are bad. The security of access roads reaching to the fishing port are uneasy. There are not water and electric supply.
Makassar	△	×	○	○	○	○	○	-	○		It is accumulation place of fishery products in the eastern part of Indonesia, and a foothold of foreign export. There are many frozen containers. There is an international airport. There are many exporters and process manufacturers. The circulation suppliers led by Middlemen organize it and have strong power.	Development of the Untia fishing port began by the Indonesian government budget, but it is stopped on the way by the lack of budget. It is not the center of fishery production. A foothold of the circulation is PPI Paotere under the present conditions. Interest adjustment of PPI Paotere users may run into difficulties. Small-scale fishermen are exploited in the complicated circulation structure.
Kupang	△	×	○	○	○	○	△		○	○	Kupang city is dealing with environmental safeguard in the coastal water area that are laying eggs and rearing ground as the most important issue. They can use frozen containers. Middlemen have power. Economic activities of fisheries processing by women are seen. (Smoking jerky) There are processing companies, frozen companies and middleman using the PPP Kupang port.	A foothold of the intraregional circulation is in the Oeba fishing port under the present conditions. The expansion plan of the PPP Kupang port has completely stopped the budget since it became the province jurisdiction in 2001. Fishermen receive supports from the particular middleman and cannot sell fishes freely. The number of users of the PPP Kupang port is limited. The troubles happen about waiting order of unloads etc. due to narrow pier space.
Nunukan	×	×	×	△	△	×	×	○	○	○	The employment and income of fishermen increase by seaweed culture. Reinforcement of controlling IUU fishery	Lack of ice Deterioration of wholesale market Decrease of fishermen
Bitung	○	○	×	○	○	○	○	-	○	○	The center of fishery management and monitoring in the eastern part of Indonesia Ship owner There are many frozen containers. Geographical superiority	Facilities scale is small in comparison with the demand. Foreign fishing boats decrease. (Due to the reinforcement of surveillance) The pier which private enterprise builds originally increases.
Ternate	○	○	○	○	○	△	×	△	○	○	There are frozen containers (going for Surabaya) Ship owner Participation to economic activities by women is active (Middlemen, retailer and Process manufacturer). Seaweed	Deficiency of power supply Lack of ice Lack of fish storage facilities There are many fish outflows to Bitung Instability of fish supply and price by seasons There is much illegal fishery.
Tual	○	○	△	○	△	△	△	○	○	○	Sales activity to the fish market by women is active. Seaweed Pearl There is a commercial harbor as an international port. There are frozen containers. The case example of sustainable fishery by the private (live fish export) leadership is seen.	Influence of the affair of foreign fishing boats capture in 2007 is remained, and there are a few fishing boats using the fishing port. The intraregional market is small.

○ : There are many (About the degree of autonomy of fisherman, they do not receive the support from middleman etc.)

△ : There is but not many (not prominent)

× : No exist or there is few (About the degree of autonomy of fisherman, they cannot sell fishes freely by receiving the support from middleman etc.)

(Source: Produced by the study team)

The criteria that should be considered upon examination of priorities for support of the selection of outer-ring fishing ports are described below.

Criteria that should be considered upon examination

①Appropriateness of natural conditions, ②Possibility of fishery business development, ③Remote areas (boarder areas, archipelagic areas, etc.), ④Potential for regional development, ⑤Possibility of alleviation of threat to peace and social order, ⑥Issues.

(1) Teluk Awang

①Appropriateness of natural conditions

1) Natural conditions

Wave conditions: The location is inside Awang Bay. The western side of Ekas Bay connects to the Indian Ocean. Waves from the Indian Ocean have little impact; therefore the fishing port is sufficient in calm conditions.

Topography and water depth: Since the location is in a reef-shaped lagoon, the mooring facility is positioned off-shore in order to secure a water depth of 3m. There is no large river near by. The beach bottom profile is medium sandy and good for foundation. A cape extending to the south of the fishing port might prevent the invasion of sand from the south side and outflow of sand from the nearest points of the fishing port. No negative signs were observed such as a change of erosion or sedimentation of neighboring beaches caused by land reclamation of the fishing port.

Water quality: At present, only household effluence from Awang village could be a negative environmental factor in the neighboring sea area. Since the village is small, the transparency of marine water there is currently very good. Generally, when the fishing port is in use, drainage water is generated from fish stock rooms on vessels, water used to wash the quays, fish handling facilities, and drainage from primary processing and washing of the catch, etc. It doesn't appear that this site has suffered too badly from such problems in comparison to the other existing fishing ports. Seaweed culture exists in Ekas Bay. Therefore, it is important to consider how to treat drainage from the fishing port over the long term in order to prevent deterioration in the water quality. It is important to monitor the sanitary environment near the fishing port if the authorities are going to consider the fishing port as tourism resource in the future.

2) Geographical conditions

Transportation: At present, 2 roads lead to the site. The roads, which connect with Puya, the capital city, and Mataram via Kuta village on the south coast of Lombok Island, are in poor condition between Kuta village and the site due to bad construction. Two poorly built bridges near the site on the route north to Puya need to be repaired. It takes about 3 hours by car to reach Mataram.

Distribution: There is a regular ferry service from Mataram to Bali Island, a major consumption area. Construction of a new airport is planned between Puya and Kuta village. When the new airport is in operation, owing to its proximity to the fishing port, the handling of live fish is expected to increase. However, transportation

using containers from Lombok Island is difficult.

Fisheries and capture fisheries: At present, most of the artisanal fishing boats are sampan-type boats with out-board engines; they are operating only in Ekas Bay. Since the location is closer to the Indian Ocean than to the existing fishing port, it would appear to be advantageous if larger fishing vessels/boats can utilize the port. Although the utilization of resources in the fishing ground by the artisanal fishing boats has almost reached its limit; potential still exists for larger fishing vessels/boats in areas where underutilized fishery resources are available.

② Possibility of fishery business development

Currently, home-industry-scale boiled processed fish produced by women in the fishing village of Teluk Awang is available and a large-scale fish processor and exporter operates in Labuhan Lombok. Distribution to the western coast of Lombok Island, a tourist spot and a high consumption area located near Bali Island, will become easier if the access road to Teluk Awang is improved. Then the fishery business might develop.

③ Remote areas (Boarder areas, archipelagic areas, etc.)

The site is located in the outer-ring area and faces the Indian Ocean.

④ Potential for regional development

The number of households in the fishing village near the fishing port in Teluk Awang is about 300. Upgrading the fishing port to PPN is questionable if these small-scale fishers will remain as the main users. To promote a wider range of users, it is essential to improve the access road and water and electricity supplies as well as settle the security problem as mentioned below.

⑤ Possibility of alleviation of threat to peace and social order

Some people state the access road to Teluk Awang has nighttime security problems. Development is expected to strengthen security.

⑥ Issues

a) Careful confirmation regarding demand is necessary since 30GT fishing vessels, as users of the port, have not yet been seen. About 300 fishers live in the village and less than 150 sampan-type fishing boats are actively using the beach. These small-scale fishers require improved mooring and fish landing facilities. Thus, the order of the development of facilities should be considered for the convenience of small-scale fishers.

b) At present, the supply of electricity to the village is limited to only public facilities. It is important to supply sufficient electricity when the fishing port becomes PPN. Moreover, it is also necessary to expand the facilities to secure a sufficient water supply.

c) Though there are two access roads to the fishing port, both are in a bad condition and there is a security problem. On the north road to the fishing village of Teluk Awang, two bridges crossing a river running to the north of the village are in very bad condition and dangerous to cross. The villagers have been repairing these bridges little by little with their own money. The other road to Puya via Kuta was improved recently between Puya and Kuta, but a 12.5-kilometer stretch from Kuta to Teluk Awang is still in bad condition and has a security problem. Some villagers advised us not to use this road when the study was being implemented.

d) The province owns fishing patrol vessels and the district has 3 fishing patrol vessels. Teluk Awang is ideally located to oversee fishing activity in the Indian Ocean.

(2) Untia (Makassar)

① Appropriateness of natural conditions

1) Natural conditions

Wave conditions: As mentioned later, the fishing port is located about 600m off the coast, and there is no barrier against waves from the Makassar Strait in the Java Sea. Therefore, in order to be able to optimally utilize the mooring facilities, the breakwater should be improved.

Topography and water depth: The site is located in a shallow, flat lagoon behind some reefs. To attain adequate depth, the fishing port is planned to be located about 600m off the coast, but it is still difficult to realize a depth of 3m. Thus, dredging is required. In order to keep the port basin calm enough and to prevent sand creeping into the dredged basin, a breakwater, which will cover the port basin, is planned. For access to the fishing port, a road 460m in length built on reclaimed land and a pile-supported trestle are planned. Since the reclaimed road will prevent the sedimentation along the shore, there is the possibility that accumulation will occur in the upstream side and erosion in the downstream side.

Water quality: At present, the pollutant source is nearby domestic waste water. The fishing port is about 600m offshore; therefore, it would not affect the water condition in the fishing port area. In future operations, pollutant sources could be waste water from the fishing port such as that from the holds of ships, from the apron, from processing and so on. Compared with other common fishing ports, the port basin is unique because of the surrounding breakwater. Therefore, it should be noted that an accumulation of contaminator might occur inside the breakwater. So drainage should be carefully considered.

2) Geographical conditions

Transportation: The fishing port is located about 20 minutes by car from downtown Makassar City. “KIMA” an industrial zone where some fish processing factories operate is located near the site. Most of the catches landed at Makassar are brought from archipelagic areas offshore from Makassar. Therefore, transportation of the catches to the development site will be the same as transportation to the existing PPI from the point of view of convenience of use.

Distribution: The port of Makassar is managed by PELINDO-IV. The port is an important base for distribution, connecting eastern Indonesia to Surabaya, which is the biggest marine transport base for commodity distribution in Indonesia. In recent years, a sophisticated container terminal has been improved, being used for the transportation of fishery products. Most of the regular routes for container vessels bound for eastern Indonesia pass through Makassar. Also, many regular flights going to eastern Indonesia pass through Makassar. Fishery products are often transported by air. Thus, Makassar is in a very important position, acting as a distribution base between eastern Indonesia and Java Island, a high consumption area.

Fisheries and capture fisheries: The existing main fishing grounds are the Makassar Sea Strait and the Java Sea

near archipelagos in the offshore area of Makassar. There are no major fishing ports that can be used as bases for fishing vessels and boats which utilize this marine area. Makassar, as an economic and distribution base, is not fully utilized in the capture fisheries sector.

② Possibility of fishery business development

Makassar City is a base for fish distribution in eastern Indonesia. Since Untia is close to an industrial area, greater export of fishery products is expected, utilizing the international commercial port and international fishing port. However, under the existing conditions, most of the exports are transported by container from the commercial port. The role of the fishing port in relation to exports is still a little doubtful. Fish suppliers in the Makassar area utilize PPI. PPI plays a major role in fish loading for inter-regional distribution in Makassar and to high consumption areas such as Jakarta, as well as exports, which are handled by middlemen who have some power in the fish distribution process. It is difficult to predict how many users there will be of the improved fishing port in Untia since the distance from PPI to Untia is about 10km. It is an urgent task to settle these issues before making a management plan for the operation of the fishing port in Untia.

③ Remote areas (Boarder areas, archipelagic areas, etc.)

This site is not categorized as “outer-ring”, but it is positioned to support the activities of outer-ring fishing ports in eastern Indonesia.

④ Potential for regional development

As mentioned above②, the development potential of Makassar as a base for fish distribution is considerable.

⑤ Possibility of alleviation of threat to peace and social order

There are no specific issues regarding conflict and peace and social order.

⑥ Issues

a) It is reported that 149 fishing boats 20GT or bigger out of 12,015 fishing boats operate in South Sulawesi. However, only fishing boats 10GT or less operate in the adjacent waters of Makassar. It is uncertain how much demand there will be for 30GT fishing boats when the fishing port of PPN is constructed. It is necessary to carefully confirm the demand as no users as yet have clearly been selected as the target.

b) In Paotere fishing port (PPI), the area and facilities of the quay are largely insufficient. Taking this fact into consideration, the potential main users of Untia fishing port deem to be users of the PPI Paotere. It is important to consider the scale of the facility based on the existing utilization of PPI.

c) Some users of Paotere fishing port mentioned that they don't want to completely transfer from the existing PPI near the city center to the new site. It is necessary to alter such users' opinions and coordinate the role sharing between Paotere fishing port and Untia fishing port when the latter will start to be used.

d) The new site is a very shallow beach in a lagoon. There is the possibility of sedimentation and/or erosion of the nearby beach since the sea current along the shore line may change due to the new port. It is important to consider such environmental impact.

e) In the existing construction, the piles are exposed several metres above the surface of the sea. This is dangerous

because of the lack of horizontal strength if there is not enough embeded length of the pile beneath the sea bottom.

f) Only IDR23.96 billion has been invested out of a total budget of IDR364.0 billion as of 2010. It will take a long time to complete the facilities planned with the scale of the current budget.

(3) Kupang

①Appropriateness of natural conditions

1) Natural conditions

Wave conditions: Kupang is located near the narrow Sape Strait, and the waves are usually calm. At present, mostly fishing boats larger than the 10GT class are using PPP Kupang. These fishing boats need a resting basin or quay for resting and repairs because they cannot use beach. Even in Sape Strait it is sometimes difficult to moor at the jetty in PPP Kupang, which is directly facing the strait, owing to the wind and wave conditions. Therefore, a calm port basin, which can allow 10- to 30GT-class fishing boats to rest safely for a specific period, is greatly needed in the fishing port.

Topography and water depth: The main jetty has enough depth, but another one is located in a very shallow place in the lagoon and is only capable of handling small boats. The sea bottom consists of coral reef rocks and sand, and the bottom topography is stable. There is a jetty owned by a fuel company at the south side of the PPP, so any large-scale southward expansion needs to be carefully investigated. The land area of PPP is locating at the bottom of a hill; therefore land use is limited and expansion is difficult. Thus, land reclamation is needed to expand the current fishing port facilities.

Water quality: Pollutant sources could be waste water from the fishing port such as that from the holds of ships, from the apron, from processing and so on. In the site survey, carried out during the low season, the sea water was very clear and there was no waste garbage found on the bottom of the sea. Usually most of the fish is unloaded packed in ice and/or frozen, so processing work is limited in the fishing port, and there is no auction, therefore the most dominant pollutant would be washing water from the holds. On the other hand, large fishing boats could not enter the port basin, so waste water could not be released into the port basin from them, keeping the water clean.

2) Geographical conditions

Transportation: It takes about 20 minutes by car to go to the fishing port from downtown Kupang City. Kupang port, managed by PELINDO-III, is located next to the fishing port. Freezers and fish processors are in the fishing port and the location is convenient for transportation by container. Since there are no facilities for fishing vessels and boats to rest during the off-season, many fishing boats 30GT or bigger move to more remote areas, Bitung for example, and rest there.

Distribution: Regular container vessels bound for Bali, Makassar, and Surabaya use the port of Kupang next to Kupang fishing port. The catches can be transported by reefer containers. Live fish are transported by air.

Fisheries and capture fisheries: The main fishing grounds are the Flores Sea and the Indian Ocean (eastern part of FMA573). The fishing port is a base for fishing boats that operate in the same fishing grounds. 78% of the 2,339 tons of exported fishery products in 2010 were shipped to Japan. It is said that utilization of the fishery

resources in the fishing grounds where artisanal fishing boats operate has reached its limit; however, there is still potential to develop fishing operations carried out by bigger fishing vessels in areas where underutilized fishery resources remain.

② Possibility of fishery business development

At present, PPI plays an important role as a base for fish distribution to the city of Kupang. The number of users of the existing PPP Kupang fishing port is limited, however, there are sufficient number of fish processing companies, frozen fish factories and middlemen who utilize the PPP fishing port. Thus, this figure will probably increase if the handling area and jetties, which have sufficient depth and sufficient space, is improved. Modernization of fishing boats, types of fishing gear and methods, and improvement of security countermeasures are the points that must be solved for more effective functioning of the fishing port.

③ Remote areas (Boarder areas, archipelagic areas, etc.)

Kupang City is located near the border with Timor Leste and Australia. Fishery products are also exported to those countries.

④ Potential for regional development

PPP Kupang fishing port is positioned in the southern outer-ring area of eastern Indonesia and the location could be a new base for growth in the region.

⑤ Possibility of alleviation of threat to peace and social order

There have been problems among fishing boats to secure space for mooring on the narrow jetty. Therefore, it is deemed to be necessary to increase the space for mooring on the jetty.

⑥ Issues

a) The jetty in the off-shore side, which is utilized by fishing vessels of 30GT or bigger, is insufficient in terms of length. It takes 4-5 days for 10 fishing vessels to finish their work, which causes big problems. When a large transportation vessel comes into the PPP fishing port, the quay is occupied for 4-5 days by the same vessel, so other fishing boats are forced to wait off-shore until the quay becomes vacant.

b) Since there is no space for resting and anchoring, fishing boats go back to other fishing ports like Bitung to rest and repair during the off-season. Expenses can be limited by transporting the crews only when necessary if fishing vessels and boats can anchor in PPP Kupang.

(4) Nunukan

① Appropriateness of natural conditions

1) Natural conditions

Wave conditions: The site is facing the Sebatik Strait between Sebatik Island and Nunukan Island, providing cover from waves, so the area is very calm.

Topography and water depth: The site is located in front of a mangrove swamp. The sea is mostly shallow near the coast but becomes deep about 100m off the coast. The ground is silty and very soft. As the waves are calm and there are no large rivers nearby, there would be a negligible effect on the coast caused by construction.

Water quality: At present, water pollutants are not found near the site. In future operations, the pollutant sources could be waste water from the fishing port such as that from holds of ships, from the apron, from processing and so on. Compared to other common fishing ports, there would be no specific difference and problems.

2) Geographical conditions

Transportation: The fishing port is 30–40 minutes by car from downtown Nunukan, where the commercial port is located. Fishers' houses constructed by the local government are near the fishing port. Most of the fishers engage in seaweed aquaculture. The majority of the catch is caught by fishers who live in Sebatik Island. The site is 30–60 minutes from Sebatik Island. Sebatik Island is almost the same distance from Tawau in Malaysia, so the location is advantageous for exports to this city.

Distribution: Nunukan Port, managed by PELINDO-IV, is in the city of Nunukan. Container transportation started from April 2010. Extension of the landing strip at the airport is now under way. Jets airplane will be able to operate from the air strip when the work is completed. A propeller airplane currently operates between Tarakan and Nunukan.

Fisheries and capture fisheries: The main fishing ground is the western Selebes Sea (FMA716). Since there is no major fishing port infrastructure in the western Selebes Sea, which borders with Malaysia in the north, a base for the utilization and management of fishery resources and control of IUU fishing is greatly needed.

② Possibility of fishery business development

Currently, almost no fishers are in Nunukan, while approximately 1,000 fishers are in Sebatik Island located near Nunukan. Fishers in Sebatik Island ship their catch to Tawau in Malaysia and Tarakan with financial and/or physical support from many middlemen in Tarakan and a small number of middlemen in Nunukan. Fishers in Sebatik Island have been turning to seaweed culture from capture fisheries and the number of fishers has been decreasing. Taking these facts into consideration, the potential for business development in the fisheries sector of Nunukan is deemed to be low. Comprehensive development in the border area is currently going on to settle the above issue. Improvement of outer-ring fishing ports focusing on fishery resources is one of the important development policies. It is expected that the improvement of outer-ring fishing ports will have a positive impact on business development.

③ Remote areas (Boarder areas, archipelagic areas, etc.)

The border with Malaysia passes Sebatik Island, located near Nunukan Island. Catches in Indonesian water areas are transported to Tawau, a major base for fishery products in Malaysia. Many problems exist such as IUU fishing by Malaysian fishing boats, Indonesian fishers and middlemen who ship their products illegally to Tawau with the support of Malaysian distributors and so on. Therefore, the control system must be strengthened. The scale of the market of Nunukan is small, since Nunukan Island is located in a low and damp area and is not connected to any other areas in Nunukan District by any transportation. Thus, expectations for the economic development of Nunukan Island are high through the creation of an outer-ring fishing port.

④ Potential for regional development

As mentioned above ② and ③, the development potential in this region, which has no major industries, is

not considered to be high. Therefore, assistance from the central government for regional economic development is a crucial task, and improvement of the fishing port is considered as the core part of this assistance.

⑤ Possibility of alleviation of threat to peace and social order

As mentioned above ③, strengthening the control system to deal with IUU fishing boats from Malaysia, as well as illegal exports, is a high priority. It is also an urgent task to improve the infrastructure to accommodate patrol vessels and boats to combat the above issues.

⑥ Issues

a) In the Nunukan area, most of the catches are from fishers in Sebatik Island and are sent to Tawau, Malaysia. Also, a large quantity of catches landed at Tarakan are processed and exported to Tawau. In Tawau, fish are sold for local consumption and are also exported to Hong Kong, Thailand, and Korea, etc. It is a key issue whether or not fish distribution from Nunukan fishing port can remain competitive in comparison to distribution channels via Malaysia.

b) No fishing ports, including PPI, have the facilities at present that can handle catches. Therefore, the expected users of PPN Nunukan fishing port will be the existing fishers of Sabatik Island. However, in the fishing port plan, there has been no investigation and clarification of the expected users. Currently, it takes only about 30 minutes by sea from Sebatik Island to Tawau. It will take longer due to the longer distance if the transportation goes to Tawau through Nunukan. Regarding this point, the authorities in Nunukan responded that the administration would instruct neighboring fishers to use the newly established fishing port.

c) Some major middlemen in Nunukan said they would purchase 30GT fishing vessels by utilizing the government assistance system targeting small pelagic fish. Nunukan District also supports the government assistance system.

d) It currently takes only about 30 minutes by sea from Sebatik to Tawau. The distance will become longer to Tawau if transportation goes through Nunukan fishing port.

e) Since the supply of ice in Nunukan and Sebatik is limited in regards quantity, fishers buy ice in Tawau. The improvement of the system for supplying ice is a crucial issue.

f) It is difficult to sufficiently monitor Malaysian IUU fishing vessels and boats since there is no facility that patrol vessels and boats can utilize. The role of the fishing port is deemed to be important in this aspect.

g) It is necessary to consider carefully the construction of the piling since the ground at the site of Nunukan fishing port is not firm.

h) In Nunukan, there is a district-appointed coral reef conservation area. But it is not near the planned fishing port construction area. However, it should be determined more precisely whether or not there will be any negative impact from the construction and/or use of the fishing port after construction.

(5) Bitung

① Appropriateness of natural conditions

1) Natural conditions

Wave conditions: Bitung is located in Lembah Strait, which lies between Sulawesi Island and Lembah Island, and the waves are very calm here. On the other hand, on the west coast, from the mouth of the Lembah Strait, waves come in from the Molucca Sea and the area is not so calm.

Topography and water depth: The main jetty has sufficient depth. On the other hand, the expansion area is shallow and the new jetty is planned to be located 180m off the coast. The sea bottom profile is good for foundations and there is little sedimentation.

Water quality: Pollutant sources would be waste water from the fishing port such as from the holds of ships, from the apron, from processing and so on. In comparison to other common fishing ports, there would be no specific difference and problems. However, it was observed that at the quay in the neighboring PERIKANAN NUSANTARA, fishers dissect tuna on board and discard the guts into the sea. Thus, the water quality might be of concern near to this area.

2) Geographical conditions

Transportation: The fishing port is located on the east side of Bitung City. The coast to the west of the fishing port is occupied by the commercial port operated by PELINDO IV and many fish processing factories. It takes about one hour to Manado airport and one and a half hours to the Manado City. Thus, shipborne and airborne transportation can be used easily.

Distribution: From neighboring Bitung port, there are many regular container services to Makassar and Surabaya, including reefer containers for fishery products. Tuna loins are transported by air.

Fisheries and capture fisheries: The main fishing grounds are Molucca Sea and Ceram Sea (FMA715), and Celebes Sea (east part of FMA 716). Bitung fishing port is one of the base ports (the others are Ternate, Ambon and Kendari) in these fishing grounds. In addition, Bitung is an important fishery base for north eastern Indonesia, facing the border with the Philippines across the Celebes Sea.

② Possibility of fishery business development

Bitung, located in the northern part of Sulawesi Island, has good fishing grounds in neighboring areas and advantageous markets including Manado City. In addition, there is a healthy level of distribution to big consumption markets such as Jakarta, Surabaya, etc., utilizing reefer containers and containers. Currently, many fish processing factories and frozen fish companies operate inside and outside of Bitung fishing port, and the demand for utilization of the fishing port is high. However, the space for mooring is not enough to meet demand and private companies have been increasingly building their own jetties for landing fish. Many fishers participate in business capture fisheries organized by vessel owners of purse-seine fishing. Therefore, the dependency of fishers on middlemen is low. Because of this, fishers can enjoy positive fishing activities. The business potential is high both on the supply side and demand side for the distribution of the fish.

③ Remote areas (Boarder areas, archipelagic areas, etc.)

The site is close to certain southern areas of the Philippines such as Jolo, Basilan, and the Tawi Tawi Islands. Illegal fishing by Filipino fishing boats is a serious problem. Therefore, the port needs to be upgraded to strengthen the monitoring and surveillance system of fishing.

④ Potential for regional development

As mentioned above ②, the potential for regional development is high.

⑤ Possibility of alleviation of threat to peace and social order

It is especially important to strengthen the system for monitoring and controlling fishing boats and flag of convenience ships from the Philippines.

⑥ Issues

a) It is necessary to shorten the waiting time for the fishing boats off-shore by extending the 1m-deep quay. It is also necessary to consider improved zoning for landing, handling, and preparation space through the expansion of the fishing port facilities.

b) It takes long time for large fishing vessels in a 6m-deep quay as well. Currently, three wooden 80GT fishing vessels can moor the quay at any one time; on the contrary 5 to 7 of this type of fishing vessels were utilizing the quay when the study team visited from May 18-19, 2010. Improvement of the utilization cycle is also required by separating the landing and preparation zones for large fishing vessels.

c) Due to the lack of a quay, many private fish processing companies construct their own jetties and land fish directly. This may be an obstruction for vessels navigation in the narrow strait between Bitung and Lenbe Island. This has become a serious security problem for maritime navigation; any further increase in private jetties must be prevented.

d) A Sun Shade Roof has been constructed in the handling space between the auction hall and the 1m- deep quay. It controls the rise in temperature of the fish and is effective for maintaining fish quality. But in the drainage system of the auction hall there might be stagnant water and frequent cleaning is necessary.

e) The 6m quay was built with a steel pile-supported jetty and was completed in 2002. However, no corrosion protection measures were taken. PPS Bitung has carried out the investigation for corrosion protection measures and PPS Bitung is applying for the necessary budget at present. The implementation of these measures is urgent.

f) In construction of the access jetty nearby reclaimed land, it is important to consider the order of work. For example, in the pile driving of the access jetty there, the revetment of reclaimed land must be removed once and restored after pile driving works.

(6) Ternate

① Appropriateness of natural conditions

1) Natural conditions

Wave conditions: The site is located at the southwestern end of Ternate Island and the waves are very calm because the site is mostly surrounded by Halmahera and Tidore Island

Topography and water depth: The two jetties have enough depth as does the quay in front of the auction hall. The sea bottom, which is covered with sand and stones, is good for foundations and there is little sedimentation.

Water quality: Pollutant sources could be waste water from the fishing port, such as that from the holds of ships, from the apron, from processing and so on. Sometimes damaged fish are discarded at sea, but most of them are

ingested by benthoses such as sea urchins. Transparency is very high and the water quality is believed to be good.

2) Geographical conditions

Transportation: The fishing port is located in the center of Ternate City. However, the access road from the main road is narrow, so trailers with containers are unable to enter. There is a commercial port operated by PELINDO VI in the town with a regular container service. However, the bridge on the main road between the commercial port and the fishing port is not capable of taking trailers with containers. There are many air services between Ternate and major cities

Distribution: There are regular container services from neighboring commercial ports to Bitung, Makassar and Surabaya, including reefer containers.

Fisheries and capture fisheries: The main fishing grounds are in the Molucca Sea, which is shared with Bitung and Bacan Islands. Ternate fishing port is a fishery base for this area. The demand for fish is very high in the region.

② Possibility of fishery business development

At present, 97% of the catch by fishers living around Ternate is for intraregional consumption, and 3% are supplied as raw materials for small-scale processed products. Since the population in the region is small, consumption is limited and oversupply occurs. Thus, sometimes fishers are forced to postpone to go fishing. Although fishers and their families positively participate in the selling and processing of the catch, the possibility for development as businesses, especially the possibility regarding expansion to areas outside the region, is not high under the present conditions. One of the reasons is that the fishers in the archipelagic areas near to Bitung unload a lot of their catch at Bitung port, and the fishers in Bitung catch fish in the fishing ground around Ternate, which is then transported to Bitung. The prospect of increasing the amount of catch sold outside the region may rise in the future if there is an improvement in quality of the processed fishery products by private enterprises.

③ Remote areas (Boarder areas, archipelagic areas, etc.)

It is an archipelagic area consisting of many islands of various sizes such as Ternate, Tidore, Maitara, Morotai, Halmahera, and transport between the islands is not convenient.

④ Potential for regional development

There is no market to deal with fishery products when a surplus in intraregional consumption occurs. Expansion in the business of private companies that utilize containers is expected in the future.

⑤ Possibility of alleviation of threat to peace and social order

The deterioration in the security situation since 1999 to 2000 is apparent and support for infrastructure development in the local economy after the independence of north Maluku is essential.

⑥ Issues

a) Judging from the availability of fishing ports, there is not a lack of fishing port facilities at present, and there are no serious problems with the present scale of facilities and fishery activity. Also, the possibility of increased demand is unknown.

(7) Tual

① Appropriateness of natural conditions

1) Natural conditions

Wave conditions: The site, which is located on the west coast of Kai Island, is connected to Banda Sea via a complicated water route consisting of many small islands and atolls. Thus the site is shielded from waves and the water is very calm.

Topography and water depth: The seabed is fairly deep near the shore area, and the jetty has adequate depth. Thick vegetation spreads towards the water's edge and the beach is narrow around the fishing port. There is little sedimentation and the effect on the beach of fishing port construction is negligible.

Water quality: Pollutant sources could be waste water from the fishing port such as from the hold of a ship, washing water from the apron, waste water from processing and so on. Currently, water transparency is very high and the water quality is believed to be good.

2) Geographical conditions

Transportation: The site is about 10 minutes from Tual City. In Tual City, there is a commercial port which is managed by the central government, and operates a regular container service. The airport (Langgur Dumatubun) in Tual is basically for military use but commercial airlines can operate regular service to major cities. The construction of a new commercial airport is under way in Tual City.

Distribution: There is a regular container service to Surabaya, which includes a reefer container for fishery products. A chartered carry boat transports frozen fish to Surabaya and Taiwan from Tual fishing port.

Fisheries and capture fisheries: The main fishing grounds are the eastern part of the Banda Sea shared with Ambon, the Arafura Sea and the Timor Sea shared with Merauke. Tual fishing port is one of the base ports for these fishing grounds.

② Possibility of fishery business development

As for the fishery products industry in Tual, there is small-scale fisheries for markets within the region, a supplier for high consumption places such as Jakarta, one large company involved in exporting, large-scale middlemen selling fishery products to areas outside the region, and seaweed culture. Among these, the possibility for expansion into high consumption places appears promising. It is believed that the possibility for expansion within the region is low because islands in Maluku province are widely dispersed and transport between the islands is not convenient. However, in the Tual fishing port, the number of fishing boats has decreased greatly due to the incident involving the seizure of foreign fishing boats in 2007. In this regard, the public sector is expected to engage into this problem with improved manner. There is the issue of cooperation between the public and private sectors at present and the possibility of developing the fishery business is not known. An immediate solution to this issue is necessary.

③ Remote areas (Boarder areas, archipelagic areas, etc.)

Maluku province is in the archipelagic area where a lot of islands are scattered across a wide area.

④ Potential for regional development

Although Tual fishing port was originally a fishing port for exports, the present-use situation is limited as mentioned above ②. If the relationship and level of cooperation between public and private sectors are examined, and the number of fishing boat using the fishing port increases, the development potential of this region, which has abundant fishery resources, would be increased.

⑤ Possibility of alleviation of threat to peace and social order

As mentioned above ④

⑥ Issues

a) It is a matter of highest importance that the situation that has been ongoing since the incident in 2007 is resolved and large-sized fishing boats utilize the fishing port as before. Also, dealing with the fishing boat from the Republic of Korea that is still moored at the port after its seizure is necessary. It is believed that there are enough facilities for fishing boats using the fishing ports at present.

b) The investors who once agreed to participate in the construction and administration of industrial facilities decided to closedown their enterprise because of the stop of economic activities at PPN Tual fishing port in 2008.

c) The site where the expansion is planned has numerous undulations, and there are streams and gorges between the current fishing port sites. Therefore, large-scale land leveling is necessary in order to utilize the site

4.3.3 Conclusions of the site surveys

The prospects for support of fishing port development in the seven (7) fishing port sites are outlined as follows.

(1) Review of all seven sites

In general, fishing port development planning should be based upon a proper spatial plan designed by public sector planners and infrastructures should be planned appropriate to the size and number of fishing boats. Within the seven surveyed sites, Teluk Awang, Untia (Makassar) and Nunukan are to be newly constructing fishing ports and construction work has already been started with the budget provided by the Indonesian government. MMAF is expending considerable effort to secure a budget for the development of all the fishing ports. However, it takes time to secure the budget and a short fall in the budget, meaning there isn't enough to cover the construction work, forces a delay in the development program. In addition, because of the difficulty in supervising the construction work and technical difficulties, progress is not meeting the government's expectations. Thus, the government of Indonesia is hoping for assistance from Japan, because Japan has considerable experience in fishing port/port development meeting high international standards with precise technical management.

In the fishing port development program, unlimited coastal exploitation, which might impact coastal fisheries, such as reclaiming mangrove swamps, should be prevented to insure sustainable fishery development. Within the seven survey sites, PPN Nunukan is located near a mangrove swamp, there is a lobster spawning ground off Awang bay in Teluk Awang, and Kupan City is making a strong effort to protect the coastal environment. These points should be taken into consideration.

(2) Review of each fishing port development site

At every site, the assistance from Japan should be depend upon the investigation about the expected benefits of the fishing port development, recipient of the benefits, and required scale and detail of the facilities based on the above considerations.. In particular, it should be payed attention to newly constructed fishing ports, since the recipient of the benefits have not been investigated, and the demarcation between neighboring PPI and new fishing ports including fishing port users have also not been considered. It would be advisable in every ORFP site to investigate the expected benefits and to re-examine the detailed plans. The review of each of the seven fishing port sites is as follows:

① Teluk Awang

In Teluk Awang, the construction work has already started. However, in terms of shape and quality of facilities, there might be a difference between the parts completed with the Indonesian budget and newly constructed parts built with outside funding. In addition, a proper structural/physical division of the facilities is also needed. In Teluk Awang, starting construction of the main jetty is impossible at this moment. This facility could be a potential assistance target for Japan. Furthermore, in Nunulan and Makassar, the same thing could be considered since construction work has already started.

② Kupang

In Kupang fishing port, the shortage of landing and loading facilities is causing a serious problem. And the demand for anchorage areas and dock yard/slip way is also high. However, there is no indication to start construction work at the moment. In this manner, it is possible to carry out a re-examination of the current development plan based on the high demand for the fishing port facilities. There is an idea for the current development plan to deepen the port basin and improve the revetment into the quay wall with a deepened port basin. The users of neighboring PPI are mainly small-scale fishers with fishing boats of less than 10GT. Thus, demarcation between PPP Kupang, which is used by fishing boats larger than 10GT, and other PPI is clear.

③ Untia (Makassar)

The development of Untia (Makassar) fishing port requires quite a large budget for the construction of the breakwater, dredging and so on. Development will take a long time because the annual budget is limited. Thus, at the first stage of assistance, a review of the current development plan and detailed plan, such points as an investigation into the recipients of funds, coordination with stakeholders, demarcation between neighboring PPI, facility plans considering the above results, a step-by-step construction plan, and an environmental assessment of the surrounding coastal area, could be carried out. It is also important to make good use of the logistic center functions of Makassar City in regards to the fisheries sector.

④ Nunukan

In Nunukan, understanding its competitiveness with the fishery business in Tawao and Tarakan, and an examination of its superior assets, are necessary. The fishing port users mainly consist of Sebatik fishers; however, geographical conditions might greatly alter the current fishing boat activities, so that an examination of the numbers and types of fishing boats that use the fishing port, demand and trend of fishing boats is required. Also, attention should be paid to the effectiveness of administrative guidance on the use of fishing ports. In addition to a review of these plans, there is concern about the structural safety of existing facilities because of the substandard construction work. At present, a review of the facility plan is being carried out, and it is thought that there is a specific time margin between starting the development and the review of the plans.

⑤ Bitung

In Bitung, it seems that a prospect of the budget in APBN is clear. According to the PPN Bitung office, the construction of an access jetty is planned to start this year. If this construction progresses smoothly, the support from Japan for the jetty construction will not be needed. The current Bitung fishing port might be the most advanced fishing port in terms of hygiene management in Indonesia. Through an examination of the comprehensive hygiene management of the fishing port, including expansion of the current facilities, the Bitung fishing port is expected to become a model for fishing port hygiene management in Indonesia.

⑥ Ternate

Since the Ternate fishing port shares its main fishing ground with the Bitung fishing port, it would be necessary to sort out the demarcation regarding fishing port functions between both fishing ports. Also, careful analysis is required about beneficiaries and benefits owing to the development. The Celebes Sea to the north side

shares a border with the Philippines, and its function as a foothold for fisheries in this sea area is important. Thus, it has to be carefully investigated whether the existing facilities are capable in this regard.

⑦ Tual

A lot of large-sized fishing boats used the Tual fishing port before the investigation by the police in 2007; before the investigation, the port performed an important function. At present, the degree of interest from the private sector is still high regarding fishery resources, as a private enterprise manages the private quay and fishery base including a processing factory, in this area. However, to restore the port's position, there needs to be a shift of large-sized fishing boats, which currently use PPN Ambon and PPS Bitung, back to Tual; therefore, prudent consideration will be needed regarding further development.

Chapter 5 Synthesis of the study results

It is always fundamental for any donors to evaluate the adequacy and the level of preparedness of a proposed plan of assistance. This part of the document provides a comprehensive review of the ORFP development plan. In the course of this study, a number of remaining issues are identified, which may require the MMAF's additional actions before this plan is put forward for further discussion..

5.1 Preliminary appraisal of ORFP development plan

5.1.1 Relevance

(1) Consistency with the national objectives of the fishery sector

The National Medium Term Development Plan (NMTDP 2010-2014; RPJMN) is the Indonesia's overarching national strategy, which defines the directions of national development. In this plan, the importance of the qualitative improvement of human resources and strengthening of economic competitiveness with the improved science and technology was highlighted as a priority area. In order to achieve this objective, a total of 11 actions areas are identified, which include administrative reform, poverty reduction, food security, infrastructure development, investment and business, management of environment and disasters, assistance for underdeveloped areas/remote areas/post-conflict areas, and culture/creativity and innovation of technology.

One of the ways to strengthen economic growth in Indonesia is the reinvigoration of primary industry such as agriculture, forestry and fisheries. The ORFP-DP is considered to contribute such policy objectives as infrastructure development, food security, management of environment and disasters, and assistance for underdeveloped areas/remote areas/post-conflict areas.

In terms of national fishery policy, the priority areas defined in the Medium-term Development Plan of the Ministry of Marine Affairs and Fisheries (RENSTRA MMAF2010-2014) consists of 5 areas: administrative reform, poverty reduction, food security, management of environment and disasters, and assistance for underdeveloped areas/remote areas/post-conflict areas, which are totally in line with the NMTDP.

In order to ensure the safety of fishing operations in the near border areas and to promote the better utilization of fishery resources, MMAF has developed the master plan for outer ring fishing port development in 2004, and selected 26 fishing ports in 21 provinces from 968 fishing ports in the whole areas of Indonesia. Selection criteria for the outer ring fishing ports are;

- ◆ Suitability of natural conditions
- ◆ Prospect for fishery business development
- ◆ Remoteness (proximity to borders and island regions, etc.)
- ◆ Development potential in the region

- ◆ Potential to contribute to the threat reduction in disputes and peace (safety).

In the master plan, 9 fishing ports located in the least-developed areas near the eastern border and islands region are selected as priority fishing ports to be developed in the first phase. In addition, the Indonesian government has developed a fishery industry driven rural development plan, so called Minapolitan vision, in which 86 target sites are identified throughout the country including some of outer ring fishing port development sites. As a whole, it can be considered that ORFP-DP fulfills the purpose in the context of the development strategy of the marine fisheries sector.

(2) Consistency with the other relevant policy frameworks

In the natural resources and environment sector, 5 priority policy objectives were outlined as follows.

- ① Sustainable development
- ② Global climate change
- ③ Development of archipelagic water areas
- ④ Utilization of natural resources
- ⑤ Improvement of environmental sustainability and quality

In the fishery sector, there are two policy objectives that are closely related to the above policies.

- ① Improvement of food security (fishery products)
- ② Management of marine resources

The fishery sector forms a part of the natural resources and environment sector; it plays an important role in sustaining people's livelihoods and the supply of raw materials that is crucial to the national economic growth. Therefore, the ORFP development plan is considered to be in line with the plans and policies of the natural resources and environment sector, since the fishing ports of the ORFP development plan, especially those located near borders and island regions, support the better utilization of fishery resources in Indonesian waters and the supply of quality fishery products.

(3) Relevance to the socio-economic needs

The ORFP plan has an important mission to fulfill the increasing domestic demand for fish and there is an issue that the contribution of the fishery sector to the national economy increases as international demand for fishery products increases. Although the Indonesian government is expected to meet these needs, Indonesian fishery production is almost reaching the upper limit from the point of view of the availability of marine fishery resources (MSY: 6.4 million tons and TAC: 5.12 million tons). As such any increment in total fishery production from now on cannot be expected in the marine capture fisheries sector. However, the activities of the fishing fleet are not evenly conducted in the domestic water areas and it can be said that utilization of resources is still low in some areas, so there

should be remaining rooms for further development. These areas are rather remote areas along the outer ring of Indonesian territory, and most of them are underdeveloped. Therefore, it is thought that the needs of fishing port development, which promote balanced utilization of fishery resources, are very high. The ORFP-DP is a plan to contribute to the promotion of effective utilization of resources in the underdeveloped areas within the EEZ, ensuring the safety of fishery industry operation in the marginal areas of Indonesia and proper utilization of fishery resources, in addition to the eradication of the IUU fishing through the provision of operation bases for national patrol vessels for monitoring, control and surveillance of the EEZ areas. For that reason, the development needs of ORFP-DP to provide new fishing ports meeting international standards in outer ring areas are very high.

5.1.2 Efficiency

Regarding the efficiency of this project, it is considered from the viewpoint of (1) output (2) time frame and (3) project costs as shown below. Although they have anticipated financial assistance from external sources (donors) with the implementation of the ORFP development plan of MMAF from the beginning, they have developed the master plan of ORFP in 2004, and initiated their own efforts by making the best use of whatever available budget (central, regional and extraordinary budget, etc.). The project started by taking phased approach (one to three) regarding the 26 outer ring fishing ports with a total project cost of 6,500 billion IDR (approx. 65 billion yen) in the implementation period of 8.5 years. This is because they viewed that overseas assistance would take considerable time. Such effort is an indication of the Indonesian government's firm commitment on the ORFP-DP. However, it was observed during the construction work in phase one that a steel pipe pile of the pier in Nunukan collapsed because of heavy weather, and construction work slowed in Teluk Awang and Makassar because of the delayed disbursement of the project's budget. Similar problems may occur, which may further delay the time of completion. Therefore, at present, completion is nowhere in sight, and it has to be judged that effectiveness level of this plan is low.

These problems can be considered technical matters; but may also be attributed to the fact that they cannot receive the support of overseas donors in a timely manner. The reasons for this are 1) the relatively low priority is given to the fishery sector as compared to the other infrastructure development projects in Indonesia and 2) the fishery industry formed a part of the agricultural sector for many years, and hence it was undervalued in the agriculture-centered administration system. However, since the Ministry of Marine Affairs and Fisheries separated and became independent from the Agriculture Ministry in 1999, the importance of the fishery sector has increased reflecting a rise in international demand for marine fishery resources, needs for mitigation of rural disparity and promotion of district economy by regional industrial upbringing. Therefore, approaches for donors by the Indonesian side on this project may change greatly in order to accomplish the plan in the future.

(1) Output

The plan for this project consists of the following five items. At the point of the site survey, it was at stage ④, and preparation for fishing port construction was being carried out at each site in phase one. Construction was behind at every site, and no sites had been completed. Input to get output is short, and the efficiency is low.

- ① The master plan is drawn up, and the concept/purpose/expectations are made clear.
- ② Based on the results of the master plan, candidate sites for phase 1 are chosen.
- ③ A feasibility study and detailed design of each phase 1 site are carried out.
- ④ Based on the detailed design, outer ring fishing port development construction work is implemented and facilities are completed.
- ⑤ In each phase 1 site, the management administration of finished outer ring fishing port facilities is started.

(2) Time frame

The master plan, dependent on the ORFP development plan, was devised in 2004. The original plan is that phase 1 covers 5 years and phases 2 and phase 3 cover 5.5 years each. The time frame for every phase is 1.5 years, and the total construction schedule is planned to cover 8.5 years. At the point of this survey, Phase 1 had already exceeded its time limit by more than one year and nothing had been completed. The efficiency is low because inputs in terms of human resources, materials and money as outlined in the implementation plan have not been adequately carried out.

The cause of this delay is different for each site, but in the case of a new fishing port like Teluk Awang, Merauke, Nunukan, and Makassar this is because of delayed disbursement of the budget. Regarding Nunukan, a steel tube pile of a pier installation part collapsed because of stormy weather, and reconstruction work is now being carried out; this fact suggests that delays can also be caused by technical problems.

Table 5.1-1 Time schedule of ORFP development plan

Phase	Number of fishing ports	Project cost IDR. billion	Construction period					Remarks
			2004	2006	2008 2013	2010	2012	
Phase 1	9	108	←————→ 5 years					
Phase 2	9	235	←————→ 5.5 years					
Phase 3	8	305	←————→ 5.5 years					
Monitoring evaluation	—	1~2	←————→ 5 years					

Total	26	650	← 8.5 years →
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Source: Produced by the research team with reference to the ROAD MAP, Outer ring fishing port development, Jan. 2010, DGCF, MMAF

(3) Project cost

As for project costs, the total project cost of the ORFP development plan is 6,500 billion IDR (about US\$ 76.61 million), and the project costs of each phase are estimated at 1,080 billion IDR (about 10.8 billion yen), 2,350 billion IDR (about 23.5 billion yen), and 3,050 billion IDR (about 30.5 billion yen) respectively. In addition, monitoring/evaluation research costs are estimated at 10-20 billion IDR (about 100-200 million yen) for five years after phase 1 completion.

From the beginning, funding from a donor was planned for and several procedures were undertaken by the government; however, owing the importance of the project, development has started by making use of the government's own budget (central, regional and extraordinary budget, etc.). This is because securing assistance from foreign countries takes time; however, construction has been slowed because of a delay in budget provision for the new fishing ports, and problems such as pushing back the completion time have become obvious. There is little prospect of completion at present. This is partly caused by technical problems, but also through the timing of support by overseas donors. There is a shortage of funds that will significantly affect the efficiency of the project.

5.1.3 Prospects for effective implementation

(1) Prospects for effectiveness

The purpose of the ORFP development plan is to ensure that 26 outer ring fishing ports are ready within the planned period, and that administration of the ports continues; in addition, the plan also promotes the security of fishery operations in border waters and the appropriate use of fishery resources through the development of outer ring fishing ports.

The purpose is similar to the phase 1 that targeted 9 high-priority places in the eastern area. Construction of basic areas such as shore protection work and a mooring zone (a pier, a quay) have been implemented in four places (Teluk Awang and Nunukan, etc.) among the 9 fishing ports in the eastern parts of phase 1. In addition, the budget to extend the capacity of the outer ring fishing ports has been secured, and one part of the site acquisition program and landfill construction has already started in the existing five fishing ports such as Bitung and Kupang.

As presented above, there is a problem, common at every site, that the construction funds are lacking and there is little prospect for the completion of the whole of phase 1. Even though the project implementation period was initially five years, it has already exceeded two years. Therefore, the expected effects of outer ring fishing port development as shown below have not yet materialized.

Indicators of effectiveness:

- Safe operation in the border areas at sea is ensured.
- Support services for domestic and foreign-operated fishing boats are improved.
- Utilization of outer ring fishing ports increase in terms of unloading of catches by foreign fishing boats that operate in international waters near Indonesia.
- Monitoring of IUU fishing is strengthened, and the loss caused by IUU fishing decreases.
- Economic profit (indirect) through elimination of IUU fishing is ensured.
- Employment opportunities created by domestic and foreign companies using outer ring fishing ports increases.
- Economic activities of outer ring fishing port areas become more active, and a new foothold for local economic growth is formed.

In order to produce a positive effect from fishing port development, good management of facilities working in tandem with other relevant plans such as those for resources, production, processing, circulation, retail and consumption (disposal) are vital.

As for effectiveness, judging from the construction progress situation, it is almost impossible to hope for completion of construction of all the sites in phase 1 (nine places) with the original budget., Although the phase 2 (9 sites), and phase 3 (8 sites) started some construction work in 2007 and 2005 respectively, it is most likely that lack of provision of external funding would influence the whole of the ORFP development plan.

However, the development needs of the outer ring fishing ports are considerable, and this is the project to address urgent issues such as the eradication of IUU fishing, so ensuring promotion of the project is a priority.

(2) Scale of facilities

The requirements regarding scale/specifications of ORFP-DP in Indonesia are as below. These fall into A) current fishing port class (6 ports at present) or B) (13 ports at present), and it is not to demand bigger scale and/or new specifications particularly.

However, the idea that project fishing ports will offer new business opportunities to foreign investors may be beyond the reach of the project. It has been supposed that it is difficult to develop more than 20 ports in one go even if there are only 6 class A fishing ports in the whole of Indonesia at present. As pointed out before, the reason is that a careful examination of the scale of such development is lacking, and it is necessary to review the details for every site.

Moreover, regarding the number of fishing ports, it is important to focus on 9 outer ring fishing ports in the east for the phase 1, and concentrate MMAF's technical resources and funds in these ports,

while shortening the implementation period, and to promote the project's positive effects at an early stage.

Table 5.1-2 Requirements of outer ring fishing port facilities in Indonesia

Item	Contents	Remarks
Concept	<ul style="list-style-type: none"> - Development of competitive and appropriate fishing port facilities to attract foreign investors - Facilities satisfying international standards on quality of fishery products <p>For realization of the above, to achieve optimal management system construction of fishing port facilities and aim at "a one-stop shopping fishing port" responding to various needs of users.</p>	
Facility requirements	<ul style="list-style-type: none"> - Harbor area: Ensure available water area for 6,000GT-grade motherships and container boats - Scale of the pier: Ensure room for 6,000GT cargo boats - Offices such as a management office, agency, etc. - A crane and forklift facility - A shopping center (specialized in fisheries equipment and materials) - An industrial area (basic infrastructure provision: electricity, clean water, telephone lines, waste combustion facility, other) - Facility for discharge and charge of fishery products (sending in-out/ transportation facility) - An access road to the fishing port, others - An export business function: quarantine station, quality test center/to publish quality certificates (equipped with a support function necessary for export of fishery products) 	

Source: Produced by the research team with reference to ROAD MAP, Outer ring fishing port development, Jan. 2010, DGCF, MMAF

(3) Management administration of fishing port

Regarding fishing port facilities in Indonesia, Pertemuan Unit Pelaksana Teknis (UPT), under the direct control of the Ministry of Marine Affairs and Fisheries (MMAF), is in charge of administration maintenance management of public facilities. In addition, Perusahaan Umum (PERUM) of the Ministry of National Enterprise carries out management of commercial facilities inside the fishing ports. The role allotment of these two organizations is established in UPT on fishing port management and through agriculture ministerial order (1999) No. 1082/Kpts/OT.210/10/99 on

operational relations with other organizations. UPT is a government organization, and the budget comes from the national budget. According to MMAF, the annual maintenance and management budget for fishing port facilities managed by UPT was about 10.7 billion IDR in 2007. UPT has an income from port entrance fees, and after having entered the national treasury, it can be withdrawn quarterly in order to make up for any lack in maintenance and management costs. Income in 2007 was about 1.2 billion IDR. Meanwhile, PERUM has a self-support accounting system, and the harbor income except the port entrance fee (including the rent of for tenants, the fee for use of the quay, cold storage, a workplace, and slipways, etc., other sales such as ice, fuel oil and water) becomes the income of PERUM entirely. This harbor income covers the maintenance and management costs that PERUM has to bear. In summary, concerning administration, maintenance and management of facilities after the outer ring fishing port facilities have been completed, it is supposed that there will be no technical problems since UPT and PERUM have already shown their capabilities to do so.

5.2 Feasibility of ORFP development plan

From the viewpoint of sustainability, the feasibility of ORFP-DP was examined regarding technical ability, administration/maintenance/management ability, and funding ability. The results are as follows:

(1) Technical ability

The Indonesian government has about 960 fishing ports throughout the country and makes considerable effort in the development of fishing port infrastructure facilities especially in the rural areas for the continuous utilization of fishery resources. The results show that about 370 fishing ports have undergone development in the last ten years. The outer ring fishing ports will fall into the existing PPS or PPN (classes A or B) according to the plan, and there are 6 places in class A and 13 places in class B at present. Considering these points, it is judged that the technical ability regarding fishing port development is sufficient. It is planned that the scale and specifications of ORFP-DP match international standards, and it is necessary to implement the plan steadily taking into account the experience gained in Jakarta fishing port (as a hub port of ORFP in the western area) where the bank of a quay is presently being raised. In this sense, technical guidance for the staff is needed including engineers from the Directorate General of Capture Fisheries (DGCF) fishing port bureau in MMAF, which is the implementation agency of ORFP-DP.

In addition, administration management after the completion of the facilities is important; also it is significant to establish a comprehensive implementation system for the entire outer ring fishing port development program by involving relevant authorities including UPT and PERUM, and to continuously share the project information in accordance with the progress situation of phase 1, phase 2 and phase 3 at the project sites.

Table 5.2-1 Number of fishing port developments in the past ten years

Class		Standard	The number of fishing ports	
			2000	2010
A	PPS	Accommodate fishing boats of the 200GT class for ocean fisheries	2 places	6 places
B	PPN	Accommodate fishing boats of the 50 - 200GT class for inshore fisheries	12	13
C	PPP	Accommodate fishing boats of the 20 - 50GT class for coastal fisheries	19	46 ¹
D	PPI	Mainly for fishing boats less than 20GT class (district management)	560	895
TOTAL			593	960

Source: Produced by the research team based on the data of MMAF

(2) Maintenance and management ability

Fishing port facilities in Indonesia are managed by two organizations at present namely UPT and PERUM. However, the Directorate General of Capture Fisheries of MMAF (the fishing port bureau is in charge) has responsibility for the completion of construction, and the central government has overall implementation responsibility, although local governments (province, prefecture and city, etc.) sometimes have responsibility due to the change of the source of project budget by site and by year. The ORFP-DP is divided into three phases, and it is for the large-scale project to develop 26 fishing ports throughout the country, which are required to comply with the international standards. In view of the overall scale of this large project, it cannot be simply said that relevant authorities are capable of managing the project based on the fact that they have successfully managed the past (rather smaller scale) fishing port development projects. For this reason, technical guidance especially focused on administration of the project is important as part of the technical assistance.

(3) Funding ability

As mentioned above, outer ring fishing port development has a goal of sustainable utilization of fishery resources; in addition, this project has been approved as an operation of high urgency among the fishery sector development plans in Indonesia. Although the Indonesian government has anticipated assistance from overseas development partners (donors) for the implementation of this program, it settled on the master plan in 2004 because of the urgency of the situation, and through making the most use of its own budget.

¹ The government directly manages 2 out of 46 ports.

However, during the construction work, problems have been revealed such as the collapse of a steel pipe pile, slowing down of construction work, and postponement of the completion date. In Teluk Awang, Nunukan and Merauke, the budget has been allotted annually since construction started in 2005; but the fact is that there is not enough money to be able to finish within the period as originally scheduled. The situation is not clear whether or not the necessary budget can be sourced. Although the Indonesian government has started construction work with its own budget, in terms of the construction progress and management situation of phase 1, considerable delays have already occurred.

(4) Necessity for close cooperation with related projects

For the outer ring fishing port development, it is important to carry out related plans such as fishing boats building and distribution, and preparation of support facilities such as roads and bridges for fish distribution in a timely manner. Close cooperation with the other ministries and private enterprises is essential to achieve the aims of the ORFP development plan, and there is a need to push related projects of public infrastructure such as roads, and to attract private enterprises, especially fishery processing-related companies.

5.3 Suggestions/recommendations on the ORFP development plan

There are a number of salient issues identified in the course of the study, which may require the MMAF's additional actions. The followings are suggestions/ recommendations drawn from the synthesis of the study results.

(1) Principles of facility development

The main point in the facility development project comes down to a simple question; "are they actually used and how effectively are they utilized?" The facilities become obsolete over time, and there is the possibility the useful life of the facilities is reduced even by half when maintenance is not good. Hence, in ORFP-DP the most important point is to maintain the necessary quality (Q), and to complete construction steadily within the given cost brackets (C) and for a fixed period (D).

(2) Re-evaluation of demand prediction/development strategies at each site

The basic design of outer ring fishing ports in Indonesia is to enhance the contribution of the fishery sector in the national economy through effective utilization of fishery resources. Driven by this objective, it is apparent that the size of fishing ports (port classification) in the master plan has been determined simply based on the estimated available quantity of fishery resources in the area. This implicates that the fishing port developed in such a way may likely be over-sized as compared to the actual demand from the fishing industry in the area. The current situation on facility utilization,

demand predictions at present and in the future, and the present status of the local fishery industry are not reflected precisely in the facilities development plan of the ORFP plan.

(3) Clarification of the responsibilities among relevant government agencies in the implementation of the ORFP development plan

In the fishing ports under construction, there are several fishing ports where improvement work is slow due to the lack of budget and delay in budget execution. For example, there is the case where only the development of small incidental facilities was undertaken, since construction of the main facilities like piers could not be started because of limited annual budget. Also, there is the case that the scale of a plan is large and there are no prospects for completion in light of the current construction progress situation. There is the example case that a project was implemented without assigning a consultant in charge of technical supervision due to the lack of budget, and serious faults occurred in construction. In addition, there is the danger that confusion and parts not being completed occurred in certain projects through repeated changes of the construction implementation agencies. For example, there is the case that a province maintained construction records until last year, the records were then transferred to a prefecture, but the information regarding former construction work was not transferred. Therefore, it is necessary to clarify the responsibility system for project implementation before assistance is considered.

(4) Timely and coordinated implementation of supporting facility development

The role of large-sized fishing ports (i.e.PPN, PPS) in various parts of the country, including outer ring fishing ports, is to promote the utilization of fishery resources with support of fishery production activity in offshore fishing grounds, and to improve storage/processing functions at ports and distribution of fishery products to consumption places. For smooth distribution of fishery products beyond the areas of fishing ports, it is required that a frozen container transportation service is available, and/or that regular air freight or transportation by charter service is possible. It was observed that some of the roads and bridges are remained non-functional in some of the outer ring fishing ports of phase 1, it is important to improve the basic social infrastructure to keep pace with outer ring fishing port development, in order to reinforce the distribution system for fishery products, and to ensure enough competitive power.

(5) Clear demarcation of technical responsibilities when taking over development work

In every site, understanding the project benefits, usage patterns of the facilities is important, so investigation/analysis about assumed advantages must be done as a premise of support, and the examination of the facilities' scale based on the results of analysis is indispensable. The problems remain such as construction of facilities taking priority in new fishing ports with the benefits not being

considered, allotment of functions among nearby PPI, and the division of target users has not taken place. Therefore, it is necessary to pay enough attention when taking over such development work which is under way.

The potential use of the fishing port is influenced by the investment trend by the private enterprises such as fishing boats owners and fishery processing factories, etc. that are assumed will be users. Although the situation is different in each fishing port, as for outer ring fishing port development in the eastern part of phase 1, it is important to develop infrastructure through cooperation between the public and private sectors such as keeping public investment to a minimum and the private sector carrying out as much work as possible in cooperation with public sectors; it is also necessary to devise a plan with enough relevance to the situation. Especially, in the projects where construction has already started, there is a possibility of having a difference in the facilities' quality between those with foreign assistance and those of the Indonesian side, and it is necessary to have appropriate and clear division of responsibilities. This requires enough attention in view of making warranty responsibility clear.

Consequently, in the case where construction work on the facilities is under way, it is necessary to analyze the prospective outcomes/benefits and to review the plan based on analysis of each site raised in the ORFP development plan in order to clarify the demarcation of technical responsibilities and to promote the project having a common understanding among stakeholders.

(6) Importance of the supervision of work

There are a number of problems observed during the site survey, which require close attention of relevant government agencies. These include 1) some completed facilities are not fully utilized due to the delay of execution of the construction budget at latter stage, 2) loss of expected revenue because of the delay in the construction work, 3) rise in construction material costs caused by extended construction schedule, and 4) reduced profit owing to an increase in management and security costs. The presence of such problems clearly indicates the importance of the supervision of work.

(7) Necessity of the operation/management plan of the fishing port

For the outer ring fishing port development in the eastern area, although the situation is different in each site, cooperation between the public and private sectors is important in such a way that public sector investment is kept to a minimum and private sectors carry out the development as much as possible in cooperation with public sectors. In this case, it is necessary to formulate an adequate management and administration plan of the port.

5.4 Other remarks

(1) Environmental impact assessment

1) Overview of the system

The environmental law of Indonesia was revised in October 2009, and there is a plan to shift to a new law in the next 2 years. For the construction of fishing ports, examination and evaluation of environmental influences are carried out, and a system to examine the environmental influence on construction is established.

2) Process

The procedure of the existing system is as follows (according to an interview with the Ministry of Environment).

- Planning stage: An environmental document is made up (environmental management, referring to environmental/social influence evaluation).
- The first stage: A public notice is given to related local communities within a fixed time and social/environmental consultation is carried out. It is reviewed in the prescribed evaluation committee meeting. (There are three types of implementation organizations: the Ministry of the Environment, province and local government). On this basis, environmental influence evaluation research (EIA) is implemented. Stakeholders (Indonesian Fisheries Association, etc.) participate in the evaluation committee meeting. Also, an Ad-hoc Commission formed by relevant ministries and experts is held with the chairperson being from the Ministry of Environment at a central government level. In a case where the environmental influence and the project benefits are compared and evaluated, and results presented by this commission are deemed to be useful, permission for the project is granted to a state or local government.
- The second stage: A tackling procedure has already decided, and a plan concerning environment influence countermeasures is made within 6 months in case some incident occurs after the project starts.

3) The points of concern

- ① As regards relevant regulations about the projects in the fishery sector, the rules that meet the scale and contents of the developments (area size, fresh water/seawater distinction) are established, since the development of aquaculture ponds for shrimp and fish have an influence on the ecosystem of the local area and coast (material and water), the land features, and ecosystem of a mangrove swamp. Regarding outer ring fishing port development, consultation with the department in charge is needed in case facilities like a storage tank are set up.
- ② About the fishing port facilities, the regulations regarding harbors are applied. For the fishing port development, the EIA examines certain construction operations such as landfill, dredging and pile driving. Depending on the classification and scale of facilities, such as a breakwater, a quay, shore protection and landfill, the necessity of EIA and the implementation level of evaluation committees

(the ministry, province and district) are decided. Considerations such as an ocean surge, ocean currents, drifting sand and the atmosphere are referred to. Regarding the operations that fall under the items shown in the next table, it is necessary to carry out analysis on the environmental influence (This rule is a new system). In case of fishing port facilities, implementation responsibility of the EIA lies with the MMAF.

Table 5.4-1 Regulations regarding development of the harbor

Number	Contents of development	The scale and scientific reason
1	Railroad track network	More than 25km
2	Underground railroad track construction	All
3	Terminal facilities	More than 2ha
4	a: Dredging in the water area b: Dredging in the river and the ocean bedrock, and nature of rocks	More than 500,000m ² All (There is a possibility of influence on local society and influence on waterway systems, coastal ecosystem, a change in the topography and natural processes flowing to the ocean from the river.)
5	Per each facility: a: Sheet pile and pile driving quay Extension and dimensions b: Gravity-type quay c: Shore protection and breakwaters d: Onshore facilities (Terminals, storage, container facilities, etc.) e: Mooring buoy	More than 200m, more than 6,000m ² All More than 200m More than 5ha More than 10,000DWT
6	Filling in land	More than 25ha, or more than 500,000m ³
7	Waste abandonment near the site (This item is not clear)	More than 500,000m ³ , or more than 5ha
8,9,10	Construction of an airport	All

Source: The environment law decreed by the Ministry of Environment, October 2009

(2) Private sector's needs and projections of the demand for fish and fish products

1) Private sector's needs

The private sector's demand for hygiene standard varies and physical arrangement for quality control can be easily outdated. Therefore it is not always realistic to construct fishing port facilities that meet such demand from the private sector. In order to make effective use of public funding, it

would be worthwhile to consider facilities that do not include hygiene and quality control related functions. The tenants of the facilities (i.e. private sector) can make necessary arrangement that meet their own needs of hygiene and quality control.

It should be also mentioned here that foreign fishery product importers often very selective in purchasing fish aiming mainly for high quality and high value fishes, and it may go against the principles of effective use of fishery resources. There are various consumer needs for fishery products, the authorities need to pay due considerations on such aspect in managing fisheries resources.

Moreover, the present fishing port facilities have a problem with unloading the fish catch; it takes too long and the quality of fish deteriorates. It is desired that the outer ring fishing port facilities will have the scale and specifications to satisfy international standards of hygiene and efficient handling of fish and fishery products.

2) Estimates for demand for fish and processed fish products in Indonesia

The demand for fish has increased generally in Indonesia. This is because the government has been promoting fish consumption from the viewpoint of health. Directorate General of Fisheries Product Processing and Marketing of MMAF has been conducting extension activities for fish consumption. Also, the demand for processed products to satisfy the diversified consumers' preferences has increased, for example fish jerky produced in certain districts such as Ternate are now sold throughout Java Island. To market these products, acquisition of halal certificate is required, and this is the point to pay attention on the technology guidance for product development.

Thus, the development of processed products, even if they are small scale, is promising activity that enables the use of various fish resources with a little market value. To assist the above activity, it is important to strengthen the information service function about fish catch when the fishing port facilities are developed.

Since this study is conducted mainly through the collection and analysis of existing information and site surveys of 7 ports, it has only examined the outline of ORFP-DP, not the details of each fishing port. Therefore, for the thorough examination of the ORFP development plan, it is necessary to collect more detailed information through further investigation, to make clear the level of responsibility for construction work already completed within the framework of the project, and to discuss continuously the concrete implementation methods to ensure quality of each project.